



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	RTU-9		
Room or Area:		Date Completed:	1/25/2024
Signature:			

Instructions

- Read the *IAQ Background* and the Background Information for this checklist.
- Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
- Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
- Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.



3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)..... **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required..... ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

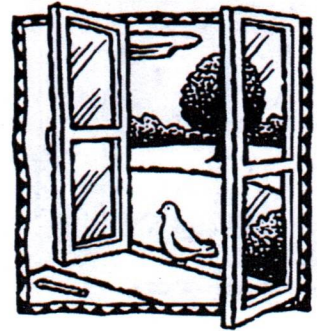
5. EXHAUST SYSTEMS

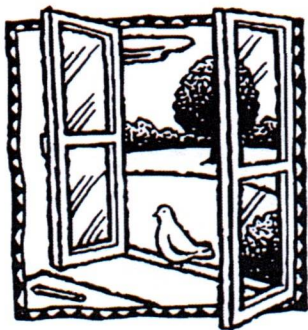
ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces.....

Yes	No	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition.....

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

NOTES



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	RTU-10		
Room or Area:		Date Completed:	1/25/2024
Signature:			

Instructions

- Read the *IAQ Background* and the Background Information for this checklist.
- Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
- Complete the Checklist:
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
- Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

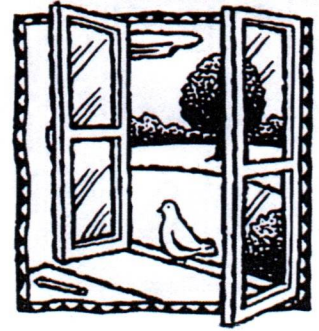
ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied).....

Yes	No	N/A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required.....

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows)

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------
- 4d. Ensured that supply and return vents are open and unblocked

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces

Yes	No	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

NOTES



Ventilation Checklist

Name: Wayne Donaldson

School: Ledyard Middle School

Unit Ventilator/AHU No: AHU-1

Room or Area: _____ Date Completed: 1/25/2024

Signature: [Signature]

Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
3. Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)..... ☒ Yes ☐ No ☐ N/A

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required..... ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

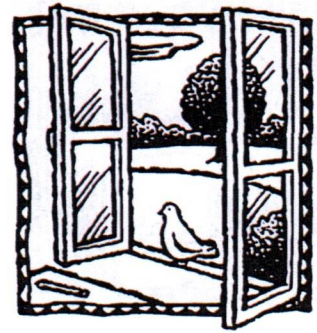
5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces.....

Yes	No	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

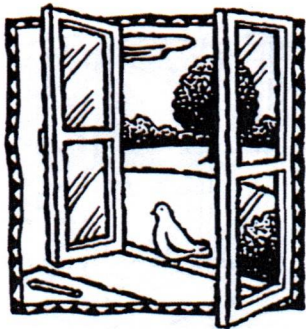
ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

NOTES



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	AHU-2		
Room or Area:		Date Completed:	1/25/2024
Signature:			

Instructions

1. Read the *IAQ Background* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
3. Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied) **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces **Yes** **No** **N/A**
☐ ☒ ☐

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake ☒ ☐ ☐

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition ☐ ☐ ☒

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

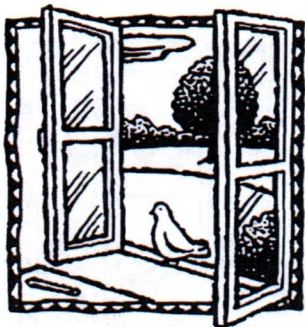
NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit ☐ ☒ ☐
 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration ☐ ☒ ☐
 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c) ☐ ☒ ☐

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1 ☐ ☒ ☐
 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1 ☐ ☒ ☐

NOTES



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	AHU-3		
Room or Area:		Date Completed:	1/25/2024
Signature:			

Instructions

- Read the *IAQ Backgrounder* and the Background Information for this checklist.
- Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
- Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
- Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

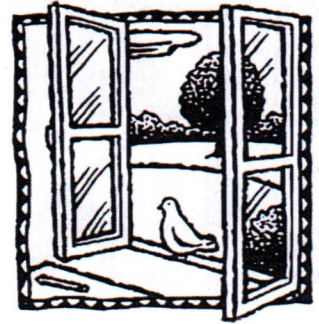
- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.



3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)

Yes	No	N/A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows)

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------
- 4d. Ensured that supply and return vents are open and unblocked

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

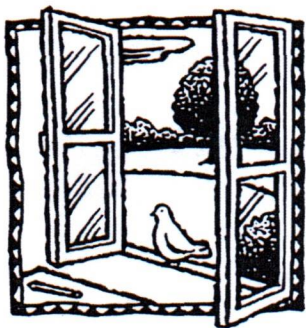
- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces **Yes** ☐ **No** ☒ **N/A** ☐

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake ☒ ☐ ☐

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition ☐ ☐ ☒

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit ☐ ☒ ☐
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration ☐ ☒ ☐
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c) ☐ ☒ ☐

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1 ☐ ☒ ☐
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1 ☐ ☒ ☐

NOTES



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	RTU-4		
Room or Area:		Date Completed:	1/26/2024
Signature:			

Instructions

- Read the *IAQ Background* and the Background Information for this checklist.
- Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
- Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
- Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)..... **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required..... ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces **Yes** **No** **N/A**
☐ ☒ ☐

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake ☒ ☐ ☐

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition ☐ ☐ ☒

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

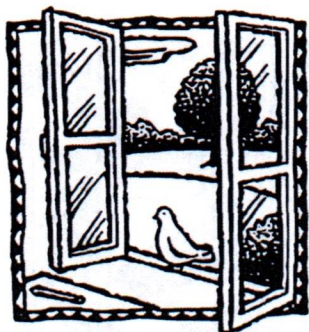
NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit ☐ ☒ ☐
 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration ☐ ☒ ☐
 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c) ☐ ☒ ☐

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1 ☐ ☒ ☐
 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1 ☐ ☒ ☐

NOTES



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	RTU-5		
Room or Area:		Date Completed:	1/25/2024
Signature:			

Instructions

- Read the *IAQ Background* and the Background Information for this checklist.
- Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
- Complete the Checklist:
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
- Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)..... **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required..... ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings)..... ☐ ☒ ☐

5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces

Yes	No	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

NOTES



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	RTU-6		
Room or Area:		Date Completed:	1/25/2024
Signature:			

Instructions

- Read the *IAQ Backgrounder* and the Background Information for this checklist.
- Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
- Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
- Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 11: CONTROL COMPONENTS

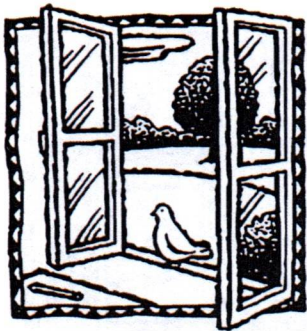
- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)..... **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required..... ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces.....

Yes	No	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition.....

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration.....

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

NOTES



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	RTU-7		
Room or Area:		Date Completed:	1/25/2024
Signature:			

Instructions

- Read the *IAQ Background* and the Background Information for this checklist.
- Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
- Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
- Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

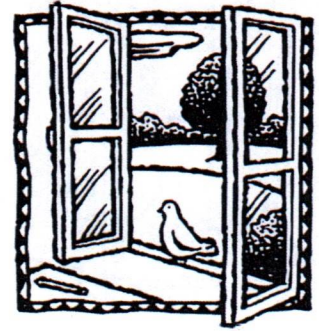
ACTIVITY 11: CONTROL COMPONENTS

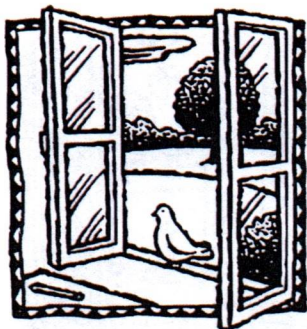
- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)..... **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces.....

Yes	No	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition.....

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

NOTES



Ventilation Checklist

Name: Wayne Donaldson

School: Ledyard Middle School

Unit Ventilator/AHU No: RTU-8

Room or Area: _____ Date Completed: 1/25/2024

Signature: [Signature]

Instructions

1. Read the *IAQ Background* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
3. Complete the Checklist:
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied) **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

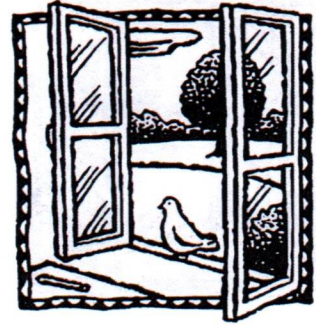
5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces

Yes	No	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

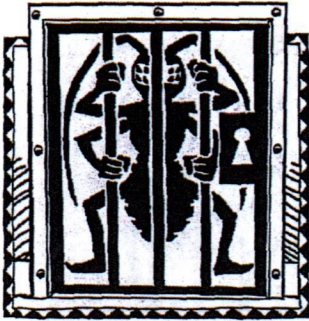
ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

NOTES



Integrated Pest Management Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Room or Area:	Building	Date Completed:	1/23/2024
Signature:			

Instructions

1. Read the *IAQ Background* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of the checklist for future reference.
3. Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. OFFICIAL POLICY STATEMENT

Yes No N/A

- 1a. Developed or located the school's official policy statement for integrated pest management (IPM) ☒ ☐ ☐

2. DESIGNATING PEST MANAGEMENT ROLES

- 2a. Assigned and trained a qualified person to be the pest manager ☒ ☐ ☐
- 2b. Involved decision makers in the IPM program ☒ ☐ ☐
- 2c. Educated students and staff (the occupants of the building) about IPM and asked them to keep their areas clean and free of clutter ☐ ☒ ☐
- 2d. Encouraged parents to learn about IPM practices and implement them at home ☐ ☒ ☐
- 2e. Developed a program to educate and train all IPM participants ☒ ☐ ☐
- 2f. Included language about IPM into contracts with pest management professionals ☒ ☐ ☐

3. SETTING PEST MANAGEMENT OBJECTIVES

- 3a. Set appropriate pest management objectives for school buildings (such as preventing pests from interfering with students' learning environment and preserving the integrity of the building structure) ☒ ☐ ☐
- 3b. Set appropriate pest management objectives for school grounds (such as providing safe playing areas and the best athletic surfaces possible) ☒ ☐ ☐

4. INSPECTING, IDENTIFYING, AND MONITORING

- 4a. Inspected all buildings and grounds for pest evidence, entry points, food, water, and harborage sites ☒ ☐ ☐
- 4b. Identified potential pest habitats in buildings and grounds ☒ ☐ ☐
- 4c. Pinpointed the source of any current pest problems ☒ ☐ ☐
- 4d. Monitored to determine the extent of pest problems and to estimate pest populations ☒ ☐ ☐
- 4e. Developed plans to modify habitat (for example, exclusion, repair, and sanitation efforts) to prevent or resolve any pest problems ☒ ☐ ☐
- 4f. Established a monitoring program that consists of routine inspections to estimate pest population levels and identify evidence of pests and potential habitat ☒ ☐ ☐

5. SETTING ACTION THRESHOLDS

- | | Yes | No | N/A |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 5a. Evaluated all available data obtained through inspecting, identifying, and monitoring | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5b. Determined how many pests the school buildings, grounds, and occupants can tolerate | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 5c. Set action thresholds | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6. PREVENTIVE STRATEGIES

INDOOR SITES

6a. Implemented appropriate strategies to prevent pests from inhabiting the following areas:

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| • Entryways | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Classrooms | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Gymnasiums | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Locker rooms | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Offices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Staff lounges | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Bathrooms | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Food preparation and serving areas | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Rooms with extensive plumbing | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Maintenance areas | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Other | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

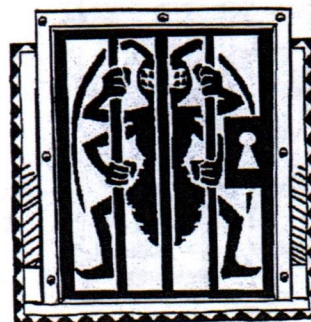
OUTDOOR SITES

6b. Implemented appropriate strategies to prevent pests from inhabiting the following areas:

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| • Playgrounds | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Parking lots | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Lawns and athletic fields | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Teaching gardens or greenhouses | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Loading docks | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Dumpsters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Areas with ornamental shrubs and trees | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Other | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

7. PESTICIDE USE AND STORAGE

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 7a. Explored alternative pest management methods before concluding that pesticides were necessary | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7b. Ensured that pest management professionals integrate IPM into their pest management methods | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7c. Identified the least toxic, target-specific chemical (or pesticide formulation) that is the most effective to address the pest problem, preferably as baits and granules | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7d. Reviewed and followed all label instructions on pesticides and learned how to properly apply and handle these chemicals | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7e. Used spot-treatment (or bait, crack, and crevice applications) to apply pesticides whenever possible and only treated the obviously infested plants in the area | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7f. Used protective clothing or equipment when applying pesticides | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7g. Placed all pesticides in tamper-resistant bait boxes or locations that are inaccessible to children and non-target species | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |





7. PESTICIDE USE AND STORAGE (cont.)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 7h. Locked or fastened lids of all bait boxes and placed bait away from the runway of the box | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7i. Applied pesticides when occupants were not present or in areas where they would not be exposed to the chemicals | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7j. Ensured that school occupants (students and staff) are notified of upcoming pesticide applications through posted notices and/or letters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7k. Ensured that parents are notified of upcoming pesticide applications through letters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7l. Kept copies of current pesticide labels and information on pesticides easily accessible | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7m. Stored pesticides off site or in areas that are locked and accessible only to designated personnel | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7n. Ensured that storage areas are adequately ventilated and are located away from areas prone to flooding or where spills or leaks may contaminate the environment | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7o. Ensured that flammable liquids are stored away from ignition sources | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7p. Ensured that pesticides are stored in their original containers and all lids are securely fastened | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7q. Ensured that air in the storage space cannot mix with the air in the central ventilation system | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

8. EVALUATING RESULTS AND RECORD KEEPING

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 8a. Ensured that accurate, up-to-date records of IPM practices and a pest management log for each property are kept | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8b. Ensured that pesticide records necessary to meet all state, local, and school board requirements are maintained | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8c. Ensured that each log book contains the following items: | | | |
| • Copy of the pest management plan | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Service schedules for maintenance of buildings and grounds | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Current EPA-registered labels | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Current Material Safety Data Sheets (MSDS) for each pesticide project | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Pest surveillance data sheets | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Diagram noting the location of pest activity, traps, and bait stations | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTES



Waste Management Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Room or Area:	Building	Date Completed:	1/25/2024
Signature:			

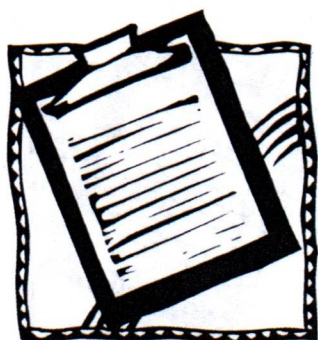
Instructions

1. Read the *IAQ Background* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of the checklist for future reference.
3. Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. WASTE MANAGEMENT

	Yes	No	N/A
1a. Ensured that waste containers are appropriate for use (for example, food waste containers should have lids)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1b. Ensured that waste containers are lined	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1c. Ensured that waste from art, science, vocational classes, etc., are handled separately	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1d. Labeled recycling bins clearly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1e. Ensured number of bins and dumpsters is adequate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1f. Ensured appropriate location of dumpsters (i.e., away from air intakes, doors, and operable windows in relation to prevailing winds)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1g. Ensured waste containers are emptied regularly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1h. Ensured appropriate waste removal schedule	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1i. Ensured waste is stored in a well-ventilated room	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1j. Ensured any exhaust fans in the room are operating properly	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1k. Checked waste storage areas for odors, contaminants, or signs of vermin	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

NOTES



Walkthrough Inspection Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Room or Area:	Building	Date Completed:	1/26/2024
Signature:			

Instructions

- Read the *IAQ Background* and the Background Information for this checklist.
- Keep the Background Information and make a copy of the checklist for future reference.
- Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
- Return the checklist portion of this document to the IAQ Coordinator.

1. GROUND LEVEL

	Yes	No	N/A
1a. Ensured that ventilation units operate properly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1b. Ensured there are no obstructions blocking air intakes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1c. Checked for nests and droppings near outdoor air intakes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1d. Determined that dumpsters are located away from doors, windows, and outdoor air intakes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1e. Checked potential sources of air contaminants near the building (chimneys, stacks, industrial plants, exhaust from nearby buildings)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1f. Ensured that vehicles avoid idling near outdoor air intakes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1g. Minimized pesticide application	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1h. Ensured that there is proper drainage away from the building (including roof downspouts)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1i. Ensured that sprinklers spray away from the building and outdoor air intakes	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1j. Ensured that walk-off mats are used at exterior entrances and that they are cleaned regularly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. ROOF

While on the roof, consider inspecting the HVAC units (use the Ventilation Checklist).

2a. Ensured that the roof is in good condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2b. Checked for evidence of water ponding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2c. Checked that ventilation units operate properly (air flows in)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2d. Ensured that exhaust fans operate properly (air flows out)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2e. Ensured that air intakes remain open, even at minimum setting	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2f. Checked for nests and droppings near outdoor air intakes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2g. Ensured that air from plumbing stacks and exhaust outlets flows away from outdoor air intakes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. ATTIC

3a. Checked for evidence of roof and plumbing leaks	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3b. Checked for birds and animal nests	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

4. GENERAL CONSIDERATIONS

4a. Ensured that temperature and humidity are maintained within acceptable ranges	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4b. Ensured that no obstructions exist in supply and exhaust vents	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4c. Checked for odors	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4d. Checked for signs of mold and mildew growth	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. GENERAL CONSIDERATIONS (continued)

- | | Yes | No | N/A |
|--|-------------------------------------|--------------------------|--------------------------|
| 4e. Checked for signs of water damage | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4f. Checked for evidence of pests and obvious food sources | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4g. Noted and reviewed all concerns from school occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

5. BATHROOMS AND GENERAL PLUMBING

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 5a. Ensured that bathrooms and restrooms have operating exhaust fans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5b. Ensured proper drain trap maintenance: | | | |
| Water is poured down floor drains once per week (approx. 1 quart of water) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Water is poured into sinks at least once per week (about 2 cups of water) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Toilets are flushed at least once per week | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6. MAINTENANCE SUPPLIES

- | | | | |
|--|-------------------------------------|-------------------------------------|--------------------------|
| 6a. Ensured that chemicals are used only with adequate ventilation and when building is unoccupied | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 6b. Ensured that vents in chemical and trash storage areas are operating properly | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6c. Ensured that portable fuel containers are properly closed | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6d. Ensured that power equipment, like snowblowers and lawn mowers, have been serviced and maintained according to manufacturers' guidelines | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

7. COMBUSTION APPLIANCES

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 7a. Checked for combustion gas and fuel odors | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7b. Ensured that combustion appliances have flues or exhaust hoods | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7c. Checked for leaks, disconnections, and deterioration | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7d. Ensured there is no soot on inside or outside of flue components | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

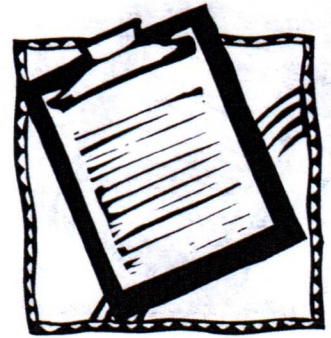
8. OTHER

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 8a. Checked for peeling and flaking paint (if the building was built before 1980, this could be a lead hazard) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8b. Determined date of last radon test | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTES

5b. Drains have trap primers

6a. Cleaning chemicals are used when occupied to sanitize high touch surfaces during Flu season and to clean lunch tables and kitchen equipment. Chemicals are also used to clean bodily fluid spills when needed.





Building and Grounds Maintenance Checklist

Name: Wayne Donaldson

School: Ledyard Middle School

Room or Area: Building Date Completed: 1/24/2024

Signature: [Signature]

Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of the checklist for future reference.
3. Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. BUILDING MAINTENANCE SUPPLIES

	Yes	No	N/A
1a. Developed appropriate procedures and stocked supplies for spill control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1b. Reviewed supply labels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1c. Ensured that air from chemical and trash storage areas vents to the outdoors	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1d. Stored chemical products and supplies in sealed, clearly labeled containers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1e. Researched and selected the safest products available	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1f. Ensured that supplies are being used according to manufacturers' instructions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1g. Ensured that chemicals, chemical-containing wastes, and containers are disposed of according to manufacturers' instructions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1h. Substituted less- or non-hazardous materials (where possible)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1i. Scheduled work involving odorous or hazardous chemicals for periods when the school is unoccupied	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1j. Ventilated affected areas during and after the use of odorous or hazardous chemicals	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. GROUNDS MAINTENANCE SUPPLIES

2a. Stored grounds maintenance supplies in appropriate area(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2b. Ensured that supplies are used and stored according to manufacturers' instructions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2c. Established and followed procedures to minimize exposure to fumes from supplies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2d. Reviewed and followed manufacturers' guidelines for maintenance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2e. Replaced portable gas cans with low-emission cans	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2f. Stored chemical products and supplies in sealed, clearly-labeled containers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2g. Ensured that chemicals, chemical-containing wastes, and containers are disposed of according to manufacturers' instructions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. DUST CONTROL

3a. Installed and maintained barrier mats for entrances	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3b. Used high efficiency vacuum bags	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3c. Used proper dusting techniques	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3d. Wrapped feather dusters with a dust cloth	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3e. Cleaned air return grilles and air supply vents	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. FLOOR CLEANING

- | | Yes | No | N/A |
|--|-------------------------------------|--------------------------|--------------------------|
| 4a. Established and followed schedule for vacuuming and mopping floors | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4b. Cleaned spills on floors promptly (as necessary) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4c. Performed restorative maintenance (as necessary) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

5. DRAIN TRAPS

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 5a. Poured water down floor drains once per week (about 1 quart of water) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5b. Ran water in sinks at least once per week (about 2 cups of water) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5c. Flushed toilets once each week (if not used regularly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6. MOISTURE, LEAKS, AND SPILLS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 6a. Checked for moldy odors | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6b. Inspected ceiling tiles, floors, and walls for leaks or discoloration (may indicate periodic leaks) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6c. Checked areas where moisture is commonly generated (e.g., kitchens, locker rooms, and bathrooms) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6d. Checked that windows, windowsills, and window frames are free of condensate | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6e. Checked that indoor surfaces of exterior walls and cold water pipes are free of condensate | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6f. Ensured the following areas are free from signs of leaks and water damage: | | | |
| Indoor areas near known roof or wall leaks | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Walls around leaky or broken windows | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Floors and ceilings under plumbing | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Duct interiors near humidifiers, cooling coils, and outdoor air intakes | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

7. COMBUSTION APPLIANCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 7a. Checked for odors from combustion appliances | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7b. Checked appliances for backdrafting (using chemical smoke) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7c. Inspected exhaust components for leaks, disconnections, or deterioration | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7d. Inspected flue components for corrosion and soot | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

8. PEST CONTROL

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 8a. Completed the <i>Integrated Pest Management Checklist</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

NOTES

5a. We have trap primers





Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	AHU-4		
Room or Area:		Date Completed:	1/25/2024
Signature:			

Instructions

1. Read the *IAQ Backgrounder* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
3. Complete the Checklist:
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

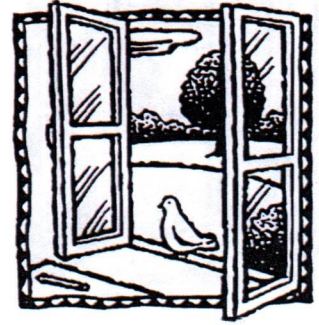
- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.



3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied) **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

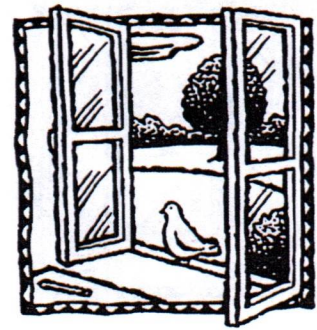
5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces **Yes** **No** **N/A**
☐ ☒ ☐

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake ☒ ☐ ☐

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition ☐ ☐ ☒

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit ☐ ☒ ☐
 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration ☐ ☒ ☐
 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c) ☐ ☒ ☐

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1 ☐ ☒ ☐
 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1 ☐ ☒ ☐

NOTES



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	MAU-1		
Room or Area:		Date Completed:	1/25/2024
Signature:			

Instructions

- Read the *IAQ Backgrounder* and the Background Information for this checklist.
- Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
- Complete the Checklist:
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
- Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied) **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces

Yes	No	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------	--------------------------

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	-------------------------------------

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------

NOTES



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	RTU-1		
Room or Area:		Date Completed:	1/26/2024
Signature:			

Instructions

1. Read the *IAQ Background* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
3. Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.



3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)..... **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required..... ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning..... ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows)..... ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked..... ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply..... ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes..... ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents..... ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities..... ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals..... ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings)..... ☐ ☒ ☐

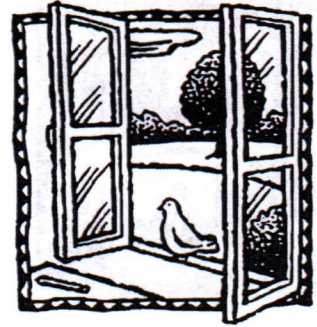
5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s)..... ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces **Yes** **No** **N/A**
☐ ☒ ☐

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake ☒ ☐ ☐

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition ☐ ☐ ☒

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit ☐ ☒ ☐
 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration ☐ ☒ ☐
 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c) ☐ ☒ ☐

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1 ☐ ☒ ☐
 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1 ☐ ☒ ☐

NOTES

3s. Unit has both types of controls



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	RTU-2		
Room or Area:		Date Completed:	1/26/2024
Signature:			

Instructions

1. Read the *IAQ Background* and the Background Information for this checklist.
2. Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
3. Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
4. Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

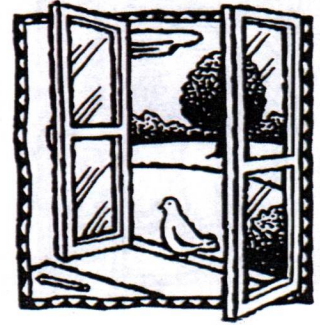
ACTIVITY 11: CONTROL COMPONENTS

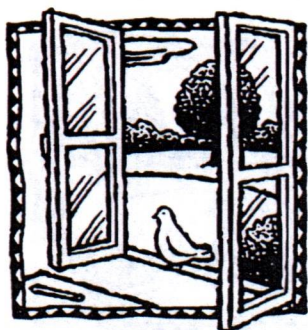
- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied) **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

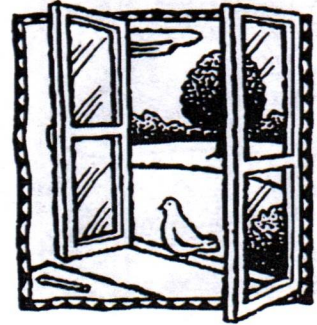
5. EXHAUST SYSTEMS

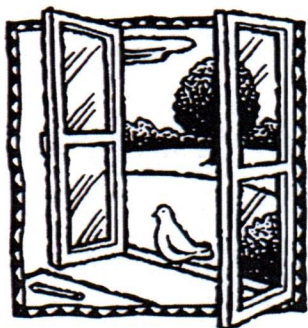
ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces **Yes** **No** **N/A**
☐ ☒ ☐

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake ☒ ☐ ☐

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition ☐ ☐ ☒

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit ☐ ☒ ☐
 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration ☐ ☒ ☐
 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c) ☐ ☒ ☐

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1 ☐ ☒ ☐
 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1 ☐ ☒ ☐

NOTES

3s. Unit has both types of controls



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	RTU-3		
Room or Area:		Date Completed:	1/26/2024
Signature:			

Instructions

- Read the *IAQ Backgrounder* and the Background Information for this checklist.
- Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
- Complete the Checklist.
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
- Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

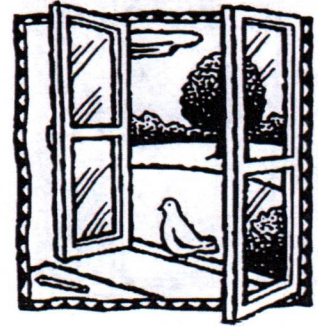
ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied) **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

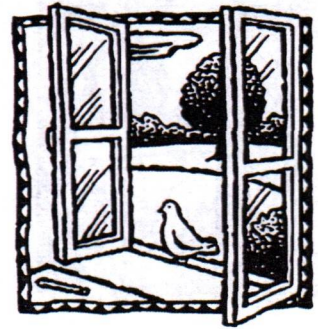
5. EXHAUST SYSTEMS

ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces **Yes** ☐ **No** ☒ **N/A** ☐

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake ☒ ☐ ☐

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition ☐ ☐ ☒

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit ☐ ☒ ☐
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration ☐ ☒ ☐
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c) ☐ ☒ ☐

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1 ☐ ☒ ☐
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1 ☐ ☒ ☐

NOTES

3s. Unit has both types of controls



Ventilation Checklist

Name:	Wayne Donaldson		
School:	Ledyard Middle School		
Unit Ventilator/AHU No:	RTU-4		
Room or Area:		Date Completed:	1/26/2024
Signature:			

Instructions

- Read the *IAQ Background* and the Background Information for this checklist.
- Keep the Background Information and make a copy of this checklist for **each** ventilation unit in your school, as well as a copy for future reference.
- Complete the Checklist:
 - Check the "yes," "no," or "not applicable" box beside each item. (A "no" response requires further attention.)
 - Make comments in the "Notes" section as necessary.
- Return the checklist portion of this document to the IAQ Coordinator.

1. OUTDOOR AIR INTAKES

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1b. Ensured that the ventilation system was on and operating in "occupied" mode | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 1: OBSTRUCTIONS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 2: POLLUTANT SOURCES

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1g. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 3: AIRFLOW

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) .. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1i. Confirmed that outdoor air is entering the intake appropriately | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS

ACTIVITY 4: AIR FILTERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2a. Replaced filters per maintenance schedule | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2c. Vacuumed filter areas before installing new filters | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2e. Confirmed proper installation of filters (correct direction for airflow) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2g. Cleaned drain pans | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2h. Checked drain pans for mold and mildew | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 6: COILS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2i. Ensured that heating and cooling coils are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 2j. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2k. Ensured that ducts are clean | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 8: MECHANICAL ROOMS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 2l. Checked mechanical room for unsanitary conditions, leaks, and spills | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. CONTROLS FOR OUTDOOR AIR SUPPLY

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3a. Ensured that air dampers are at least partially open (minimum position) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3b. Ensured that minimum position provides adequate outdoor air for occupants | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 9: CONTROLS INFORMATION

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3c. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|-------------------------------------|--------------------------|--------------------------|

ACTIVITY 10: CLOCKS, TIMERS, SWITCHES

- | | | | |
|---|-------------------------------------|--------------------------|-------------------------------------|
| 3d. Turned summer-winter switches to the correct position | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3e. Set time clocks appropriately | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

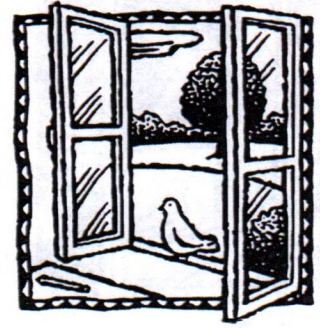
ACTIVITY 11: CONTROL COMPONENTS

- | | | | |
|--|--------------------------|--------------------------|-------------------------------------|
| 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3h. Checked that the line dryer prevents moisture buildup | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTIVITY 12: OUTDOOR AIR DAMPERS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3k. Ensured that the outdoor air damper is visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3l. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: It is necessary to ensure that the damper is operating properly and within the normal range to continue.





3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

- | | Yes | No | N/A |
|---|-------------------------------------|--------------------------|--------------------------|
| 3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3o. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3p. If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3q. If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3r. If the outdoor air damper does not move, confirmed the following items: | | | |
| • The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Moving parts are free of impediments (e.g., rust, corrosion) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • Electrical wire or pneumatic tubing connects to the damper actuator | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| • The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Proceed to Activities 13–16 if the damper seems to be operating properly.

ACTIVITY 13: FREEZE STATS

- | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|
| 3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| OR | | | |
| 3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

ACTIVITY 14: MIXED AIR THERMOSTATS

- | | | | |
|---|-------------------------------------|--------------------------|--------------------------|
| 3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ACTIVITY 15: ECONOMIZERS

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3x. Confirmed proper economizer settings based on design specifications or local practices | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|-------------------------------------|--------------------------|--------------------------|

NOTE: The dry-bulb is typically set at 65°F or lower.

- | | | | |
|--|-------------------------------------|--------------------------|--------------------------|
| 3y. Checked that sensor on the economizer is shielded from direct sunlight | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued)

ACTIVITY 16: FANS

- 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied) **Yes** ☒ **No** ☐ **N/A** ☐

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4. AIR DISTRIBUTION

ACTIVITY 17: AIR DISTRIBUTION

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required ☒ ☐ ☐
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning ☐ ☐ ☒

NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.

- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows) ☒ ☐ ☐
- 4d. Ensured that supply and return vents are open and unblocked ☒ ☐ ☐

NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.

- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply ☐ ☐ ☒
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes ☐ ☐ ☒
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents ☒ ☐ ☐
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities ☒ ☐ ☐
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals ☒ ☐ ☐

ACTIVITY 18: PRESSURIZATION IN BUILDINGS

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings) ☐ ☒ ☐

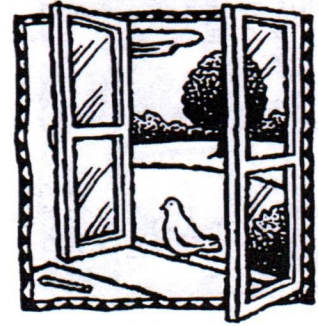
5. EXHAUST SYSTEMS

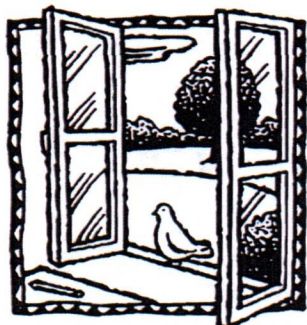
ACTIVITY 19: EXHAUST FAN OPERATION

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) ☐ ☒ ☐

If fans are running but air is not flowing toward the exhaust intake, check for the following:

- Inoperable dampers
- Obstructed, leaky, or disconnected ductwork
- Undersized or improperly installed fan
- Broken fan belt





5. EXHAUST SYSTEMS (continued)

ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces **Yes** ☐ **No** ☒ **N/A** ☐

Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").

- 5c. Ensured that air is flowing toward the exhaust intake ☒ ☐ ☐

ACTIVITY 21: EXHAUST DUCTWORK

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition ☐ ☐ ☒

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit ☐ ☒ ☐
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration ☐ ☒ ☐
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c) ☐ ☒ ☐

ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1 ☐ ☒ ☐
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1 ☐ ☒ ☐

NOTES