

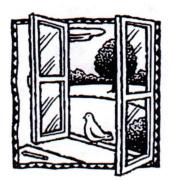
- Read the IAQ
 Backgrounder and
 the Background
 Information for
 this checklist.
- 2. Keep the
 Background
 Information and
 make a copy of
 this checklist for
 each ventilation
 unit in your school,
 as well as a
 copy for future
 reference.
- 3. Complete the Checklist.
 - Check the "yes," "no," or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

Ventilation Checklist

Wavne Donaldson

Name:		
School: Ledyard Middle School		
Unit Ventilator/AHU No: RTU-9		_
Room or Area: Date Completed: 1/25/2024		
Signature:		
1. OUTDOOR AIR INTAKES		
1a. Marked locations of all outdoor air intakes on a small floor plan (for		
example, a fire escape floor plan)		
1b. Ensured that the ventilation system was on and operating in "occupied" mode		
ACTIVITY 1: OBSTRUCTIONS		
1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs,		
or covers		
1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)		
ACTIVITY 2: POLLUTANT SOURCES		
1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)		
1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen,		
toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers)		
1g. Resolved any problems with pollutant sources located near outdoor air		
intakes (e.g., relocated dumpster or extended exhaust pipe)		
ACTIVITY 3: AIRFLOW		
1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic)		
1i. Confirmed that outdoor air is entering the intake appropriately		
2. SYSTEM CLEANLINESS		
ACTIVITY 4: AIR FILTERS		
2a. Replaced filters per maintenance schedule		
2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)		
2c. Vacuumed filter areas before installing new filters	0	
2d. Confirmed proper fit of filters to prevent air from bypassing (flowing		
around) the air filter		
2e. Confirmed proper installation of filters (correct direction for airflow)		

ACTIVITY 5: DRAIN PANS Yes No N/A 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) 2g. Cleaned drain pans 2h. Checked drain pans for mold and mildew ACTIVITY 6: COILS 2i. Ensured that heating and cooling coils are clean **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 2k. Ensured that ducts are clean **ACTIVITY 8: MECHANICAL ROOMS** 21. Checked mechanical room for unsanitary conditions, leaks, and spills 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies 3. CONTROLS FOR OUTDOOR AIR SUPPLY 3a. Ensured that air dampers are at least partially open (minimum position) 3b. Ensured that minimum position provides adequate outdoor air for occupants..... **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) **ACTIVITY 10: CLOCKS, TIMERS, SWITCHES** 3d. Turned summer-winter switches to the correct position 3e. Set time clocks appropriately..... 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) **ACTIVITY 11: CONTROL COMPONENTS** 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting 3h. Checked that the line dryer prevents moisture buildup...... 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)..... 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) **ACTIVITY 12: OUTDOOR AIR DAMPERS** 3k. Ensured that the outdoor air damper is visible for inspection..... 31. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range





3.	CONTROLS FOR OUTDOOR AIR SUPPLY (continued)				
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler		No	N/A	
	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on				l
	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				l
	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				1
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	9			1
	 Moving parts are free of impediments (e.g., rust, corrosion) Electrical wire or pneumatic tubing connects to the damper actuator 				
	The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly))
Pro	oceed to Activities 13–16 if the damper seems to be operating properly.				
3s.	Disconnected power to controls (for automatic reset only) to test continuity across terminals				
OF					
	Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped)		, 0	Ģ	ב
	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats				ב
cle	OTE: HVAC systems with water coils need protection from the cold. The freeze- ose the outdoor air damper and disconnect the supply air when tripped. The ty nge is 35°F to 42°F.	-sta pic	t ma al tri	y p	
A	CTIVITY 14: MIXED AIR THERMOSTATS				
	Ensured that the mixed air stat for heating mode is set no higher than 65°F			ı [
31	w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting	. 🖭			
A	CTIVITY 15: ECONOMIZERS				
3:	x. Confirmed proper economizer settings based on design specifications or local practices	. 🗨)	
N	OTE: The dry-bulb is typically set at 65°F or lower.		_		
3	 y. Checked that sensor on the economizer is shielded from direct sunlight z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications 				
1	NOTE: Economizers use varying amounts of cool outdoor air to assist with the oad of the room or rooms. There are two types of economizers, dry-bulb and end on the conomizers wary the amount of outdoor air based on outdoor tempers.	coontho	oling ulpy.		

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 Yes No N/A hours (even when room thermostat is satisfied)..... 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





ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms and labs by keeping them under negative pressure (as compared to surrounding	spac	ces).	
5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces	/es □	No	N/A
Stand outside the room with the door slightly open while checking airflow high a the door opening (see "How to Measure Airflow").	ınd l	low ii	1
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 CALCULATIO	NS		
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		9	
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 QUANTITY	ES		
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......

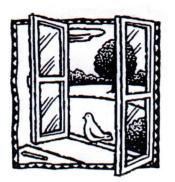


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 this checklist.
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 unit in your school,
 as well as a
 copy for future
 reference.
- Complete the Checklist.
 - Check the "yes,"
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 box beside each
 item. (A "no"
 response
 requires further
 attention.)
 - Make comments in the "Notes" section as necessary.
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Ventilation Checklist

Name: Wayne Donaldson			
School: Ledyard Middle School			
Unit Ventilator/AHU No: RTU-10			
Room or Area: Date Completed: 1/25/2024			
Signature:			
A CUITO COD AID INITAKEO			
1. OUTDOOR AIR INTAKES	1	NIa	NI/A
1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan)			IV/A
1b. Ensured that the ventilation system was on and operating in "occupied" mode			
ACTIVITY 1: OBSTRUCTIONS			
1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers			
1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)			٦
A CTIVITY A POLITICIS			
ACTIVITY 2: POLLUTANT SOURCES 1e. Checked ground-level intakes for pollutant sources (dumpsters, loading			
docks, and bus-idling areas)			
 Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from 			
air-conditioning cooling towers)			
lg. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe)		٥	
ACTIVITY 3: AIRFLOW			
1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic)	9		
li. Confirmed that outdoor air is entering the intake appropriately			
2. SYSTEM CLEANLINESS			
ACTIVITY 4: AIR FILTERS			
2a. Replaced filters per maintenance schedule			
2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)			
2c. Vacuumed filter areas before installing new filters			
2d. Confirmed proper fit of filters to prevent air from bypassing (flowing			
around) the air filter		0	

ACTIVITY 5: DRAIN PANS 2f. Ensured that drain pans slant toward the drain (to prevent water from Yes No N/A accumulating) 2g. Cleaned drain pans 2h. Checked drain pans for mold and mildew ACTIVITY 6: COILS 2i. Ensured that heating and cooling coils are clean **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 2k. Ensured that ducts are clean **ACTIVITY 8: MECHANICAL ROOMS** 21. Checked mechanical room for unsanitary conditions, leaks, and spills 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies 3. CONTROLS FOR OUTDOOR AIR SUPPLY 3a. Ensured that air dampers are at least partially open (minimum position) 3b. Ensured that minimum position provides adequate outdoor air for occupants **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).... **ACTIVITY 10: CLOCKS, TIMERS, SWITCHES** 3d. Turned summer-winter switches to the correct position 3e. Set time clocks appropriately..... 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) **ACTIVITY 11: CONTROL COMPONENTS** 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting 3h. Checked that the line dryer prevents moisture buildup..... 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)..... 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) ACTIVITY 12: OUTDOOR AIR DAMPERS 3k. Ensured that the outdoor air damper is visible for inspection..... 31. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range





3.	CONTROLS FOR OUTDOOR AIR SUPPLY (continued)			
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler		No	N/A
30.	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on			
	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			
	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			
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 Moving parts are free of impediments (e.g., rust, corrosion) Electrical wire or pneumatic tubing connects to the damper actuator		000	000
	The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly)			
Pre	oceed to Activities 13–16 if the damper seems to be operating properly.			
A(3s.	Disconnected power to controls (for automatic reset only) to test continuity across terminals	. 🗖		
OI 3t.	the manual recet button (usually	. •		
3u	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats			٦
cl	OTE: HVAC systems with water coils need protection from the cold. The freeze ose the outdoor air damper and disconnect the supply air when tripped. The ty nge is 35°F to 42°F.	?-sta ypica	t maj al tri	y p
A	CTIVITY 14: MIXED AIR THERMOSTATS			
	Ensured that the mixed air stat for heating mode is set no higher than 65°F	🗟		
31	w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting	🖭		
A 3:	CTIVITY 15: ECONOMIZERS x. Confirmed proper economizer settings based on design specifications or	-		
	local practices	🗷		
	OTE: The dry-bulb is typically set at 65°F or lower.	•	_	
3	 y. Checked that sensor on the economizer is shielded from direct sunlight z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications 			_
1	NOTE: Economizers use varying amounts of cool outdoor air to assist with the oad of the room or rooms. There are two types of economizers, dry-bulb and e Dry-bulb economizers vary the amount of outdoor air based on outdoor tempe	e coo	oling alpy.	

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 Yes No N/A hours (even when room thermostat is satisfied)..... 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) \square 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





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 Yes No N/A adjacent spaces 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 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......



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 Backgrounder and the Background Information for this checklist.
- 2. Keep the
 Background
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 make a copy of
 this checklist for
 each ventilation
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 - Make comments in the "Notes" section as necessary.
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Ventilation Checklist

Name: Wayne Donaldson	1.1		
School: Ledyard Middle School			
Unit Ventilator/AHU No: AHU-1			
Room or Area: Date Completed: 1/25/2024			
Signature:			
Signature.			
1. OUTDOOR AIR INTAKES			
1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan)	Yes	No	N/A
1b. Ensured that the ventilation system was on and operating in "occupied" mode	🖸		
ACTIVITY 1: OBSTRUCTIONS			
1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers	📵		
1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)	🖭		٦
ACTIVITY 2: POLLUTANT SOURCES			
1e. Checked ground-level intakes for pollutant sources (dumpsters, loading			
docks, and bus-idling areas)	🗑		
1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from			
air-conditioning cooling towers)	🗨		
lg. Resolved any problems with pollutant sources located near outdoor air intakes (e.g., relocated dumpster or extended exhaust pipe)	🗨		
ACTIVITY 3: AIRFLOW			
1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic	:)		
1i. Confirmed that outdoor air is entering the intake appropriately			
2. SYSTEM CLEANLINESS			
ACTIVITY 4: AIR FILTERS	-		
2a. Replaced filters per maintenance schedule2b. Shut off ventilation system fans while replacing filters (prevents dirt from the content of the co		۵	
blowing downstream)			
2c. Vacuumed filter areas before installing new filters			
2d. Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter			
2e. Confirmed proper installation of filters (correct direction for airflow)	🗖	0	

ACTIVITY 5: DRAIN PANS 2f. Ensured that drain pans slant toward the drain (to prevent water from Yes No N/A accumulating) 2g. Cleaned drain pans 2h. Checked drain pans for mold and mildew **ACTIVITY 6: COILS** 2i. Ensured that heating and cooling coils are clean 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 2k. Ensured that ducts are clean **ACTIVITY 8: MECHANICAL ROOMS** 21. Checked mechanical room for unsanitary conditions, leaks, and spills 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies 3. CONTROLS FOR OUTDOOR AIR SUPPLY 3a. Ensured that air dampers are at least partially open (minimum position) 3b. Ensured that minimum position provides adequate outdoor air for occupants..... **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)..... ACTIVITY 10: CLOCKS, TIMERS, SWITCHES 3d. Turned summer-winter switches to the correct position 3e. Set time clocks appropriately..... 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) **ACTIVITY 11: CONTROL COMPONENTS** 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting 3h. Checked that the line dryer prevents moisture buildup...... 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)..... 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) **ACTIVITY 12: OUTDOOR AIR DAMPERS** 3k. Ensured that the outdoor air damper is visible for inspection..... 31. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range.....





3.	CONTROLS FOR OUTDOOR AIR SUPPLY (continued)			
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler		No	N/A □
	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on			
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			
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		_	_
3r.	to 60°F and mixed air thermostat is set to 45°F	. 🖭		
	The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight		0	
	 Moving parts are free of impediments (e.g., rust, corrosion) Electrical wire or pneumatic tubing connects to the damper actuator 			
	The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly)			
Pro	oceed to Activities 13–16 if the damper seems to be operating properly.			
3s.	Disconnected power to controls (for automatic reset only) to test continuity across terminals	. 🗅		
OR 3t.	Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped)			٥
	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats	🖢		٦
clc	OTE: HVAC systems with water coils need protection from the cold. The freezose the outdoor air damper and disconnect the supply air when tripped. The tange is 35°F to 42°F.	e-sta ypica	t may al trij	v D
	CTIVITY 14: MIXED AIR THERMOSTATS			
3v	Ensured that the mixed air stat for heating mode is set no higher than 65°F			
3v	v. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting	D		
A	CTIVITY 15: ECONOMIZERS			
3x	c. Confirmed proper economizer settings based on design specifications or local practices	🗨		
N	OTE: The dry-bulb is typically set at 65°F or lower.			
3y 3z	 Checked that sensor on the economizer is shielded from direct sunlight Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications 			
lo D ar	OTE: Economizers use varying amounts of cool outdoor air to assist with the ad of the room or rooms. There are two types of economizers, dry-bulb and entry-bulb economizers vary the amount of outdoor air based on outdoor temperate and enthalpy economizers vary the amount of outdoor air based on outdoor temperate and humidity level.	e coc entha eratu	oling lpy. re,	е

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 Yes No N/A hours (even when room thermostat is satisfied)..... 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) \square 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





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 Yes No N/A adjacent spaces...... 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......



- 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.
- Return the checklist portion of this document to the IAQ Coordinator.

Ventilation Checklist

Wayne Donaldson

Name:

Sc	hool: Ledyard Middle School		
Uı	nit Ventilator/AHU No: AHU-2		
	pom or Area: Date Completed: 1/25/2024		
Si	gnature:		
		-	
1.	OUTDOOR AIR INTAKES		
1a.	Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan)	No	N/A
1b.	Ensured that the ventilation system was on and operating in "occupied" mode		
AC	TIVITY 1: OBSTRUCTIONS		
lc.	Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers		
1d.	Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)	0	٦
AC	TIVITY 2: POLLUTANT SOURCES		
le.	Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)		
1f.	Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from		
1 ~	air-conditioning cooling towers)		
ıg.	intakes (e.g., relocated dumpster or extended exhaust pipe)		
AC	TIVITY 3: AIRFLOW		
	Obtained chemical smoke (or a small piece of tissue paper or light plastic) © Confirmed that outdoor air is entering the intake appropriately		
2.	SYSTEM CLEANLINESS		
AC	TIVITY 4: AIR FILTERS		
	Replaced filters per maintenance schedule		
	Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)	0	
	Confirmed proper fit of filters to prevent air from bypassing (flowing		
	around) the air filter		

ACTIVITY 5: DRAIN PANS Yes No N/A 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) 2g. Cleaned drain pans 2h. Checked drain pans for mold and mildew **ACTIVITY 6: COILS** 2i. Ensured that heating and cooling coils are clean **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 2k. Ensured that ducts are clean **ACTIVITY 8: MECHANICAL ROOMS** 21. Checked mechanical room for unsanitary conditions, leaks, and spills 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies 3. CONTROLS FOR OUTDOOR AIR SUPPLY 3a. Ensured that air dampers are at least partially open (minimum position) 3b. Ensured that minimum position provides adequate outdoor air for occupants...... **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)..... **ACTIVITY 10: CLOCKS, TIMERS, SWITCHES** 3d. Turned summer-winter switches to the correct position 3e. Set time clocks appropriately..... 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) **ACTIVITY 11: CONTROL COMPONENTS** 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting 3h. Checked that the line dryer prevents moisture buildup...... 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)..... 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) **ACTIVITY 12: OUTDOOR AIR DAMPERS** 3k. Ensured that the outdoor air damper is visible for inspection..... 31. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range





3.	CONTROLS FOR OUTDOOR AIR SUPPLY (continued)			
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler		No	N/A
30.	Checked that the outdoor air damper opens (at least partially with no delay)			
3p.	when the air handler is turned on		_	
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			
3r.	to 60°F and mixed air thermostat is set to 45°F	. 🖭		
	 The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight		000	000
	The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly)			
Pro	ceed to Activities 13–16 if the damper seems to be operating properly.			
AC	TIVITY 13: FREEZE STATS			
	Disconnected power to controls (for automatic reset only) to test continuity across terminals			
OR				
31.	Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was			
	tripped)			
3u.	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats	. 鱼		
clos	TE: HVAC systems with water coils need protection from the cold. The freeze se the outdoor air damper and disconnect the supply air when tripped. The tyge is 35° F to 42° F.			
AC	TIVITY 14: MIXED AIR THERMOSTATS			
3v.	Ensured that the mixed air stat for heating mode is set no higher than 65°F			
3w.	Ensured that the mixed air stat for cooling mode is set no lower			
	than the room thermostat setting	. 2		
AC	TIVITY 15: ECONOMIZERS			
3x.	Confirmed proper economizer settings based on design specifications or local practices			
NO	TE: The dry-bulb is typically set at 65°F or lower.			
3у.	Checked that sensor on the economizer is shielded from direct sunlight	. 🖭		
3z.	Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications			
loa Dry and	TE: Economizers use varying amounts of cool outdoor air to assist with the dolor of the room or rooms. There are two types of economizers, dry-bulb and envy-bulb economizers vary the amount of outdoor air based on outdoor tempered enthalpy economizers vary the amount of outdoor air based on outdoor tembered humidity level.	thalp ature	oy. 2,	

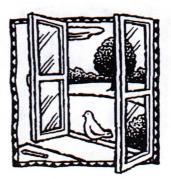
3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued) **ACTIVITY 16: FANS** 3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied Yes No N/A hours (even when room thermostat is satisfied)..... NOTE: If fan shuts off when 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........ 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 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, 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





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	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	9			
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.....



- 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.

Ventilation Checklist

	Name: Wayne Donaldson		
	School: Ledyard Middle School		
	Unit Ventilator/AHU No: AHU-3		
	Room or Area: Date Completed: 1/25/2024		_
3	Signature:		
1	. OUTDOOR AIR INTAKES		
18	a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan)	No	N/A
11	b. Ensured that the ventilation system was on and operating in "occupied" mode		
Δ	CTIVITY 1: OBSTRUCTIONS		_
le	Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers		_
10	I. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)		
A	CTIVITY 2: POLLUTANT SOURCES		
1e	Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)		
1f.	toilet, or laboratory exhaust fans; puddles; and mist from		
lg	air-conditioning cooling towers)		
	intakes (e.g., relocated dumpster or extended exhaust pipe)		
	CTIVITY 3: AIRFLOW		
1h. 1i.	Obtained chemical smoke (or a small piece of tissue paper or light plastic) Confirmed that outdoor air is entering the intake appropriately		0
2.	SYSTEM CLEANLINESS		
AC	CTIVITY 4: AIR FILTERS		
2a.	Replaced filters per maintenance schedule		
2b.	Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)		
2c.	vacuumed filter areas before installing new filters		
2d.	Confirmed proper fit of filters to prevent air from hypassing (flaving	_	_
2e.	around) the air filter		

ACTIVITY 5: DRAIN PANS 2f. Ensured that drain pans slant toward the drain (to prevent water from Yes No N/A accumulating) 2g. Cleaned drain pans 2h. Checked drain pans for mold and mildew **ACTIVITY 6: COILS** 2i. Ensured that heating and cooling coils are clean **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 2k. Ensured that ducts are clean **ACTIVITY 8: MECHANICAL ROOMS** 21. Checked mechanical room for unsanitary conditions, leaks, and spills 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies 3. CONTROLS FOR OUTDOOR AIR SUPPLY 3a. Ensured that air dampers are at least partially open (minimum position) 3b. Ensured that minimum position provides adequate outdoor air for occupants..... **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) **ACTIVITY 10: CLOCKS, TIMERS, SWITCHES** 3e. Set time clocks appropriately.....□ 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) **ACTIVITY 11: CONTROL COMPONENTS** 3g. Ensured appropriate system pressure by testing line pressure at both the 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)...... 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) ACTIVITY 12: OUTDOOR AIR DAMPERS 3k. Ensured that the outdoor air damper is visible for inspection..... 31. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range





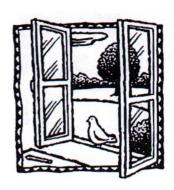
2	CONTROL S FOR OUTDOOR AIR SURRIY (southerned)			
	CONTROLS FOR OUTDOOR AIR SUPPLY (continued) Checked that the outdoor air damper fully closes within a few minutes	Ves	No	N/A
	of shutting off appropriate air handler	•		
30	. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on			
	. 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			
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	n		
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		_	
	 Moving parts are free of impediments (e.g., rust, corrosion) Electrical wire or pneumatic tubing connects to the damper actuator 		0 0	
	location, calibrated correctly)			
Pro	oceed to Activities 13–16 if the damper seems to be operating properly.			
	CTIVITY 13: FREEZE STATS			
	Disconnected power to controls (for automatic reset only) to test continuity across terminals			
OR 3t.				
3u.	Assessed the feasibility of replacing all manual reset freeze-stats with			
MO	automatic reset freeze-stats			
clos	TE: HVAC systems with water coils need protection from the cold. The freeze-, se the outdoor air damper and disconnect the supply air when tripped. The typ ge is 35°F to 42°F.	stat i vical	nay trip	
	TIVITY 14: MIXED AIR THERMOSTATS			
	Ensured that the mixed air stat for heating mode is set no higher than 65°F			
3w.	Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting			
AC	TIVITY 15: ECONOMIZERS			
	Confirmed proper economizer settings based on design specifications or local practices			
NO	TE: The dry-bulb is typically set at 65°F or lower.			
3y. 3z.	Checked that sensor on the economizer is shielded from direct sunlight Ensured that dampers operate properly (for outside air, return air,	ם		
	exhaust/relief air, and recirculated air), per the design specifications			

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) Yes No N/A that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)..... 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, 5. EXHAUST SYSTEMS **ACTIVITY 19: EXHAUST FAN OPERATION** 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) \square 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





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



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 as well as a
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- 3. Complete the Checklist.
 - Check the "yes,"
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 "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.

Ventilation Checklist

Wayne Donaldson

Name:			
School: Ledyard Middle School			
Unit Ventilator/AHU No: RTU-4			
Room or Area:	Date Completed: 1/26/2024		
Signature:	1		
1. OUTDOOR AIR INTAKES			
Marked locations of all outdoor air intake example, a fire escape floor plan)	tes on a small floor plan (for Yes	No	N/A
1b. Ensured that the ventilation system was mode	on and operating in "occupied"		
ACTIVITY 1: OBSTRUCTIONS			
1c. Ensured that outdoor air intakes are clear or covers			
1d. Installed corrective devices as necessary frequently block an intake)	(e.g., if snowdrifts or leaves		
ACTIVITY 2: POLLUTANT SOURCES			
le. Checked ground-level intakes for pollut docks, and bus-idling areas)	ant sources (dumpsters, loading		
1f. Checked rooftop intakes for pollutant so toilet, or laboratory exhaust fans; puddl	ources (plumbing vents; kitchen, es; and mist from	-	
air-conditioning cooling towers)			
lg. Resolved any problems with pollutant s intakes (e.g., relocated dumpster or extension)	ended exhaust pipe)		
ACTIVITY 3: AIRFLOW			
1h. Obtained chemical smoke (or a small p	ece of tissue paper or light plastic)		
li. Confirmed that outdoor air is entering t	he intake appropriately		
2. SYSTEM CLEANLINESS			
ACTIVITY 4: AIR FILTERS			
2a. Replaced filters per maintenance sched2b. Shut off ventilation system fans while remained	replacing filters (prevents dirt from	_	_
blowing downstream)			
2c. Vacuumed filter areas before installing2d. Confirmed proper fit of filters to preve	new filters		
around) the air filter			
2e. Confirmed proper installation of filters	(correct direction for airflow)		

ACTIVITY 5: DRAIN PANS 2f. Ensured that drain pans slant toward the drain (to prevent water from Yes No N/A accumulating) 2g. Cleaned drain pans 2h. Checked drain pans for mold and mildew ACTIVITY 6: COILS 2i. Ensured that heating and cooling coils are clean **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 2k. Ensured that ducts are clean **ACTIVITY 8: MECHANICAL ROOMS** 21. Checked mechanical room for unsanitary conditions, leaks, and spills 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies 3. CONTROLS FOR OUTDOOR AIR SUPPLY 3a. Ensured that air dampers are at least partially open (minimum position) 3b. Ensured that minimum position provides adequate outdoor air for occupants.... **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) ACTIVITY 10: CLOCKS, TIMERS, SWITCHES 3d. Turned summer-winter switches to the correct position 3e. Set time clocks appropriately..... 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) **ACTIVITY 11: CONTROL COMPONENTS** 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting 3h. Checked that the line dryer prevents moisture buildup...... 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)..... 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) ACTIVITY 12: OUTDOOR AIR DAMPERS 3k. Ensured that the outdoor air damper is visible for inspection..... 31. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range.....





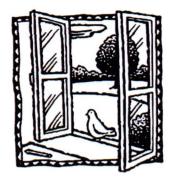
3.	CONTROLS FOR OUTDOOR AIR SUPPLY (continued)		
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler	No	N/A
30.	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on		_
3p.	If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F.		
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	7	
3r.	to 60°F and mixed air thermostat is set to 45°F		
	• The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight		
	 Moving parts are free of impediments (e.g., rust, corrosion) Electrical wire or pneumatic tubing connects to the damper actuator The outside air thermostat(s) is functioning properly (e.g., in the right 		٥
	location, calibrated correctly)		
	ceed to Activities 13–16 if the damper seems to be operating properly.		
	TIVITY 13: FREEZE STATS Disconnected power to controls (for automatic reset only) to test continuity across terminals		
OR	Confirmed (if applicable) that depressing the manual reset button (usually		
31.	red) trips the freeze stat (clicking sound indicates freeze stat was tripped)		٥
3u.	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats		٦
clo	OTE: HVAC systems with water coils need protection from the cold. The freeze-state se the outdoor air damper and disconnect the supply air when tripped. The typic age is 35°F to 42°F.	t may al trip	,)
	CTIVITY 14: MIXED AIR THERMOSTATS		
	Ensured that the mixed air stat for heating mode is set no higher than 65°F		
3w	Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting		
A (CTIVITY 15: ECONOMIZERS		
	Confirmed proper economizer settings based on design specifications or local practices	0	
No	OTE: The dry-bulb is typically set at 65°F or lower.		
3 y	. Checked that sensor on the economizer is shielded from direct sunlight		
3z	Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications		

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 Yes No N/A hours (even when room thermostat is satisfied). 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





ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, had labs by keeping them under negative pressure (as compared to surrounding sp	ac	es).	
5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces	S	No	N/A
Stand outside the room with the door slightly open while checking airflow high and the door opening (see "How to Measure Airflow").	d le	ow ii	n
5c. Ensured that air is flowing toward the exhaust intake	1		
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 CALCULATION	S		
NOTE: Refer to "How to Measure Airflow" for techniques.			
6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit	ב		
6b. Calculated the number of occupants served (22b) by the ventilation unit		9	
6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c)	ב		
ACTIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIE 6d. Compared the existing outdoor air per person (22c) to the recommended	S		
levels in Table 1		9	
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.....



- 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.
- 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.

Ventilation Checklist

Nam	Wayne Donaldson			
Scho	Ledvard Middle School			
	DTILE			
Unit	t Ventilator/AHU No: 1/25/2024			
Roo	m or Area: Date Completed: 1/25/2024			-
	nature:			
1. (OUTDOOR AIR INTAKES			
(example, a fire escape floor plan)		No	N/A
1b. I	Ensured that the ventilation system was on and operating in "occupied"	n		
1	mode	2		
ACT	TIVITY 1: OBSTRUCTIONS			
lc. l	Ensured that outdoor air intakes are clear of obstructions, debris, clogs,			7
	or covers	21		_
Id.	frequently block an intake)			
	TIVITY 2: POLLUTANT SOURCES			
le.	Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)			
1f.	Checked rooftop intakes for pollutant sources (plumbing vents; kitchen,			
	toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers)			
10	Resolved any problems with pollutant sources located near outdoor air			
	intakes (e.g., relocated dumpster or extended exhaust pipe)			
ACT	TIVITY 3: AIRFLOW			
1h.	Obtained chemical smoke (or a small piece of tissue paper or light plastic)	9		
1i.	Confirmed that outdoor air is entering the intake appropriately	3		
•	SYSTEM CLEANLINESS			
	FIVITY 4: AIR FILTERS Replaced filters per maintenance schedule			
2a. 2b.	Shut off ventilation system fans while replacing filters (prevents dirt from			
	blowing downstream)			
2c.	Vacuumed filter areas before installing new filters	**	J	_
	around) the air filter			
2e.	Confirmed proper installation of filters (correct direction for airflow)			

A	CTIVITY 5: DRAIN PANS			
21	Ensured that drain pans slant toward the drain (to prevent water from accumulating)		No	N/A
28	. Cleaned drain pans			
	. Checked drain pans for mold and mildew		ū	
	CTIVITY 6: COILS			
2i	Ensured that heating and cooling coils are clean	🖷		
A	CTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS			
2 j	Ensured that the interior of air-handling unit(s) or unit ventilator	_	_	_
2 k	(air-mixing chamber and fan blades) is clean Ensured that ducts are clean			
20	Lisured that ducts are clean	. 🖭		J
	CTIVITY 8: MECHANICAL ROOMS			
21.	Checked mechanical room for unsanitary conditions, leaks, and spills			
Zn	Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies	. 🗨		٥
3.	CONTROLS FOR OUTDOOR AIR SUPPLY			
3a	Ensured that air dampers are at least partially open (minimum position)			
3b	Ensured that minimum position provides adequate outdoor air			
	for occupants			
	CTIVITY 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)			
AC	TIVITY 10: CLOCKS, TIMERS, SWITCHES			
3d.	Turned summer-winter switches to the correct position			
3e. 3f	Set time clocks appropriately			
51.	Ensured that settings fit the actual schedule of building use (including night/weekend use)	_		_
	TIVITY 11: CONTROL COMPONENTS			
5g.	Ensured appropriate system pressure by testing line pressure at both the			
3h.	occupied (day) setting and the unoccupied (night) setting Checked that the line dryer prevents moisture buildup			
3i.	Replaced control system filters at the compressor inlet based on the	J		9
	compressor manufacturer's recommendation (for example, when you			
	blow down the tank)			9
3j.	Set the line pressure at each thermostat and damper actuator at the proper			
	level (no leakage or obstructions)			
	TIVITY 12: OUTDOOR AIR DAMPERS			
K.	Ensured that the outdoor air damper is visible for inspection			
1.	Ensured that the recirculating relief and/or exhaust dampers are visible for inspection		_	_
m.	Ensured that air temperature in the indoor area(s) served by each			
	outdoor air damper is within the normal operating range		_	
10	TE. It is wearened to the state of the state			





3.	CONTROLS FOR OUTDOOR AIR SUPPLY (continued)			
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler		No	N/A □
	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on			
	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			
	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			
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	. 9		0000
Pro	oceed to Activities 13–16 if the damper seems to be operating properly.			
AC 3s.	Disconnected power to controls (for automatic reset only) to test continuity across terminals	. 🗆	0	
3t.	Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped)	🗨		٥
3u.	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats			٦
clo	OTE: HVAC systems with water coils need protection from the cold. The freeze use the outdoor air damper and disconnect the supply air when tripped. The t unge is 35°F to 42°F.	z-sta ypica	t ma al tri	v p
A	CTIVITY 14: MIXED AIR THERMOSTATS			
3v.	Ensured that the mixed air stat for heating mode is set no higher			· •
3v	v. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting			
Α.	CTIVITY 15: ECONOMIZERS			
3x	Confirmed proper economizer settings based on design specifications or local practices	🗨		
	OTE: The dry-bulb is typically set at 65°F or lower.			
35	7. Checked that sensor on the economizer is shielded from direct sunlight	•		
	Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications			
N	OTE: Economizers use varying amounts of cool outdoor air to assist with the	coc entha	oling lpv.	

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 Yes No N/A hours (even when room thermostat is satisfied)..... 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





ACTIVITY 20: EXHAUST AIRFLOW

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens,

6. QUANTITY OF OUTDOOR AIR

ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS

under positive pressure) is sealed and in good condition.......

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

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......



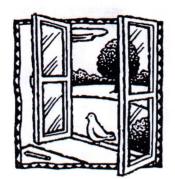
- Read the IAQ
 Backgrounder and
 the Background
 Information for
 this checklist.
- 2. Keep the
 Background
 Information and
 make a copy of
 this checklist for
 each ventilation
 unit in your school,
 as well as a
 copy for future
 reference.
- 3. Complete the Checklist.
 - Check the "yes," "no," or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

Ventilation Checklist

Wayne Donaldson

Nai	ne:		
Sch	Ledyard Middle School		
Uni	it Ventilator/AHU No: RTU-6		_
Roo	om or Area: Date Completed:		
Roc	on of Area.		
Sig	nature:		_
1.	OUTDOOR AIR INTAKES		
la.	Marked locations of all outdoor air intakes on a small floor plan (for	s No	N/A
	example, a fire escape floor plan)		
1b.	Ensured that the ventilation system was on and operating in "occupied" mode		
10	TIVITY 1: OBSTRUCTIONS		
	Ensured that outdoor air intakes are clear of obstructions, debris, clogs,		
	or covers		
1d.	Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)		٦
AC'	TIVITY 2: POLLUTANT SOURCES		
	Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)		
1f.	Checked rooftop intakes for pollutant sources (plumbing vents; kitchen,		
	toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers)		
lg.	Resolved any problems with pollutant sources located near outdoor air		
	intakes (e.g., relocated dumpster or extended exhaust pipe)		
	TIVITY 3: AIRFLOW		
1h.	Obtained chemical smoke (or a small piece of tissue paper or light plastic)		
li.	Confirmed that outdoor air is entering the intake appropriately		
2.	SYSTEM CLEANLINESS		
	TIVITY 4: AIR FILTERS		_
2a.	Replaced filters per maintenance schedule		J
2b.	Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)		
20	Vacuumed filter areas before installing new filters		
2d.	Confirmed proper fit of filters to prevent air from bypassing (flowing		_
	around) the air filter		
2e.	Confirmed proper installation of filters (correct direction for airflow)		_

A	CTIVITY 5: DRAIN PANS			
2f			No	N/A
2	accumulating)			
	Checked drain pans for mold and mildou			
211	. Checked drain pans for mold and mildew	🕶		
A	CTIVITY 6: COILS			
2i.	Ensured that heating and cooling coils are clean	🗨		
A	CTIVITY 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			
2k	. Ensured that ducts are clean			
11	CTIVITY 8: MECHANICAL ROOMS			
	Checked mechanical room for unsanitary conditions, leaks, and spills	-		
2m	Ensured that mechanical rooms and air-mixing chambers are free of trash,	. 🗷		
	chemical products, and supplies			
•				
3.	CONTROLS FOR OUTDOOR AIR SUPPLY			
3a.	Ensured that air dampers are at least partially open (minimum position)			
36.	Ensured that minimum position provides adequate outdoor air	_	_	ř.
	for occupants			
	CTIVITY 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)			
AC	CTIVITY 10: CLOCKS, TIMERS, SWITCHES			
3d.	Turned summer-winter switches to the correct position			
se.	Set time clocks appropriately			
<i>3</i> 1.	Ensured that settings fit the actual schedule of building use (including			
	night/weekend use)			
AC	TIVITY 11: CONTROL COMPONENTS			
3g.	Ensured appropriate system pressure by testing line pressure at both the			
24	occupied (day) setting and the unoccupied (night) setting			
31i.	Checked that the line dryer prevents moisture buildup			
<i>J</i> 1.	Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you			
	blow down the tank)			
3j.	Set the line pressure at each thermostat and damper actuator at the proper			
	level (no leakage or obstructions)			9
AC	TIVITY 12: OUTDOOR AIR DAMPERS			
3k.	Ensured that the outdoor air damper is visible for inspection			
31.	Ensured that the recirculating relief and/or exhaust dampers are visible			_
	for inspection			
Z111.	Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range	a .	_	
	operating range		_	



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)		
3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler	No	N/A □
30. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on		
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.	<u> </u>	٥
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	0	
 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. Moving parts are free of impediments (e.g., rust, corrosion) 	0 0	0
• Electrical wire or pneumatic tubing connects to the damper actuator		
• The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly)		
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		
OR		
3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped)		
3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats.		٥
NOTE: HVAC systems with water coils need protection from the cold. The freeze-staclose the outdoor air damper and disconnect the supply air when tripped. The typicarange is 35°F to 42°F.	t may al trip	v D
ACTIVITY 14: MIXED AIR THERMOSTATS		
3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F		
3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting		٦
ACTIVITY 15: ECONOMIZERS 3x. Confirmed proper economizer settings based on design specifications or local practices		٥
NOTE: The dry-bulb is typically set at 65°F or lower.		
3y. Checked that sensor on the economizer is shielded from direct sunlight		
3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications		
NOTE: Economizers use varying amounts of cool outdoor air to assist with the cool load of the room or rooms. There are two types of economizers, dry-bulb and enthal	oling alpy.	

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 Yes No N/A hours (even when room thermostat is satisfied)..... 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) \square 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). Yes No N/A 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces...... 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 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......



- Read the IAQ
 Backgrounder and
 the Background
 Information for
 this checklist.
- 2. Keep the
 Background
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 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.
- Return the checklist portion of this document to the IAQ Coordinator.

Ventilation Checklist

Wayne Donaldson

Name:			
School: Ledyard Middle School			
Unit Ventilator/AHU No: RTU-7			
Room or Area: Date Completed: 1/25/2024			
Signature:			
1. OUTDOOR AIR INTAKES			
la. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan)	Yes	No	N/A
1b. Ensured that the ventilation system was on and operating in "occupied"			
mode	. 🖭		
ACTIVITY 1: OBSTRUCTIONS			
1c. Ensured that outdoor air intakes are clear of obstructions, debris, clogs,	-		_
or covers			
1d. Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)	. 🖭		
ACTIVITY 2: POLLUTANT SOURCES			
1e. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)	. 🖀		
1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen,			
toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers)	. 🕥		
lg. Resolved any problems with pollutant sources located near outdoor air			
intakes (e.g., relocated dumpster or extended exhaust pipe)	. 🗷		
ACTIVITY 3: AIRFLOW			
1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic).	🖲		
1i. Confirmed that outdoor air is entering the intake appropriately	😅		
2. SYSTEM CLEANLINESS			
ACTIVITY 4: AIR FILTERS			_
2a. Replaced filters per maintenance schedule	🖸		
2b. Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)	🗃		
2c. Vacuumed filter areas before installing new filters	🗨		
2d. Confirmed proper fit of filters to prevent air from bypassing (flowing			
around) the air filter	🕝	0	0

A	CTIVITY 5: DRAIN PANS			
2f.	Ensured that drain pans slant toward the drain (to prevent water from accumulating)			N/A
20	Cleaned drain pans			
	. Checked drain pans for mold and mildew		ם	
	CTIVITY 6: COILS			
2i.	Ensured that heating and cooling coils are clean	🖷		
	CTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS			
4).	Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean			
2k	Ensured that ducts are clean		0	2
	CTIVITY 8: MECHANICAL ROOMS			
21.	Checked mechanical room for unsanitary conditions, leaks, and spills	. 🚇		
2m	Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies	. •		٥
3.	CONTROLS FOR OUTDOOR AIR SUPPLY			
3a.	Ensured that air dampers are at least partially open (minimum position)		٦	
30.	Ensured that minimum position provides adequate outdoor air for occupants	. 🗑	٥	٦
AC	CTIVITY 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)	(S)	_	_
	and controls operations manuals (often uniquely designed)	. 🖀		
AC	TIVITY 10: CLOCKS, TIMERS, SWITCHES			
3d.	Turned summer-winter switches to the correct position			
3e. 3f	Set time clocks appropriately Ensured that settings fit the actual schedule of building use (including			
J1.	night/weekend use)			٥
AC	TIVITY 11: CONTROL COMPONENTS			
	Ensured appropriate system pressure by testing line pressure at both the			
	occupied (day) setting and the unoccupied (night) setting			
3h.	Checked that the line dryer prevents moisture buildup			
31.	Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)			_
3j.	Set the line pressure at each thermostat and damper actuator at the proper	u		•
	level (no leakage or obstructions)	٦		•
	TIVITY 12: OUTDOOR AIR DAMPERS			
3k.	Ensured that the outdoor air damper is visible for inspection	•		
31.	Ensured that the recirculating relief and/or exhaust dampers are visible for inspection			0
Bm.	Ensured that air temperature in the indoor area(s) served by each			_
	outdoor air damper is within the normal operating range			



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)			
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler		No	N/A □
	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on	1		
	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. If in cooling mode, checked that the outdoor air damper goes to its minimum	ı		۵
	position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F	1		
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. Moving parts are free of impediments (e.g., rust, corrosion) Electrical wire or pneumatic tubing connects to the damper actuator. The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) 		0000	000
Pro	oceed to Activities 13–16 if the damper seems to be operating properly.			
	Disconnected power to controls (for automatic reset only) to test continuity across terminals)		
3t.	Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped) Assessed the feasibility of replacing all manual reset freeze-stats with	Đ		
Su.	automatic reset freeze-stats			
clo	OTE: HVAC systems with water coils need protection from the cold. The freeze-s use the outdoor air damper and disconnect the supply air when tripped. The typinge is 35°F to 42°F.	tat ica	may l trip	9
A	CTIVITY 14: MIXED AIR THERMOSTATS			
3v	Ensured that the mixed air stat for heating mode is set no higher than 65°F			
3v	Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting			
Account of the same of the sam	CTIVITY 15: ECONOMIZERS Confirmed proper economizer settings based on design specifications or local practices			
	OTE: The dry-bulb is typically set at 65°F or lower.			
3y 3z	Checked that sensor on the economizer is shielded from direct sunlight			_
lo D ar	OTE: Economizers use varying amounts of cool outdoor air to assist with the content of the room or rooms. There are two types of economizers, dry-bulb and ention of the conomizers vary the amount of outdoor air based on outdoor temperated enthalpy economizers vary the amount of outdoor air based on outdoor temperated humidity level.	nai tur	ру. е,	2

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 Yes No N/A hours (even when room thermostat is satisfied)..... 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) \square 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, kitchen, and labs by keeping them under negative pressure (as compared to surrounding spaces).	S,
5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces	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").	n
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	
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	



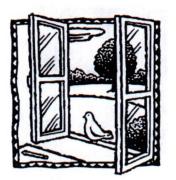
- 1. Read the IAQ Backgrounder and the Background Information for this checklist.
- 2. Keep the Background Information and make a copy of this checklist for each ventilation unit in your school, as well as a copy for future reference.
- 3. Complete the Checklist.
 - · Check the "yes," "no," or "not applicable" 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.

Ventilation Checklist

Wayne Donaldson

Name: Wayne Donaldson		
School: Ledyard Middle School		
Unit Ventilator/AHU No: RTU-8		
Room or Area: Date Completed:		
Signature:		
1. OUTDOOR AIR INTAKES		
1a. Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan)	No	N/A
1b. Ensured that the ventilation system was on and operating in "occupied"	_	_
mode		
ACTIVITY 1: OBSTRUCTIONS		
lc. Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers		
ld. Installed corrective devices as necessary (e.g., if snowdrifts or leaves		_
frequently block an intake)		
ACTIVITY 2: POLLUTANT SOURCES		
le. Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)		
1f. Checked rooftop intakes for pollutant sources (plumbing vents; kitchen,	_	_
toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers)		
lg. Resolved any problems with pollutant sources located near outdoor air		
intakes (e.g., relocated dumpster or extended exhaust pipe)		
ACTIVITY 3: AIRFLOW	_	
1h. Obtained chemical smoke (or a small piece of tissue paper or light plastic) 1i. Confirmed that outdoor air is entering the intake appropriately		
2. SYSTEM CLEANLINESS		
ACTIVITY 4: AIR FILTERS 2a. Replaced filters per maintenance schedule		
2b. Shut off ventilation system fans while replacing filters (prevents dirt from	_	_
blowing downstream)		
2d. Confirmed proper fit of filters to prevent air from bypassing (flowing	_	_
around) the air filter		
Common proper monadation of Theore (correct direction for antitow)	_	_

ACTIVITY 5: DRAIN PANS Yes No N/A 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) 2g. Cleaned drain pans 2h. Checked drain pans for mold and mildew ACTIVITY 6: COILS 2i. Ensured that heating and cooling coils are clean **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 2k. Ensured that ducts are clean ACTIVITY 8: MECHANICAL ROOMS 21. Checked mechanical room for unsanitary conditions, leaks, and spills 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies 3. CONTROLS FOR OUTDOOR AIR SUPPLY 3a. Ensured that air dampers are at least partially open (minimum position) 3b. Ensured that minimum position provides adequate outdoor air for occupants..... **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)..... **ACTIVITY 10: CLOCKS, TIMERS, SWITCHES** 3d. Turned summer-winter switches to the correct position 3e. Set time clocks appropriately..... 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) **ACTIVITY 11: CONTROL COMPONENTS** 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting 3h. Checked that the line dryer prevents moisture buildup...... 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)..... 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) **ACTIVITY 12: OUTDOOR AIR DAMPERS** 3k. Ensured that the outdoor air damper is visible for inspection..... Ensured that the recirculating relief and/or exhaust dampers are visible for inspection 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range



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)			
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler		No	N/A
30.	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on)		
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			
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			
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			
	Moving parts are free of impediments (e.g., rust, corrosion)	. 🗨	0 0	
	 Electrical wire or pneumatic tubing connects to the damper actuator The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly) 			
Proc	ceed to Activities 13–16 if the damper seems to be operating properly.			
AC	TIVITY 13: FREEZE STATS			
	Disconnected power to controls (for automatic reset only) to test continuity across terminals			
OR				
31.	Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped)			
3u.	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats			٦
clos	TE: HVAC systems with water coils need protection from the cold. The freeze e the outdoor air damper and disconnect the supply air when tripped. The tyge is 35°F to 42°F.			
AC	TIVITY 14: MIXED AIR THERMOSTATS			
3v.	Ensured that the mixed air stat for heating mode is set no higher than 65°F	. 🗃		
3w.	Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting	. 2		
ACT	TIVITY 15: ECONOMIZERS			
	Confirmed proper economizer settings based on design specifications or local practices			
NOT	TE: The dry-bulb is typically set at 65°F or lower.			_
3y.	Checked that sensor on the economizer is shielded from direct sunlight	•		
	Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications	9		
load Dry- and	TE: Economizers use varying amounts of cool outdoor air to assist with the color the room or rooms. There are two types of economizers, dry-bulb and entebulb economizers vary the amount of outdoor air based on outdoor temperal enthalpy economizers vary the amount of outdoor air based on outdoor temphumidity level.	thalp; iture,	y.	

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 Yes No N/A hours (even when room thermostat is satisfied)..... 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. 4i. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, 5. EXHAUST SYSTEMS **ACTIVITY 19: EXHAUST FAN OPERATION** 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s) \Box If fans are running but air is not flowing toward the exhaust intake, check for the following:

Inoperable dampers

· Broken fan belt

Obstructed, leaky, or disconnected ductwork
Undersized or improperly installed fan





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). Yes No N/A 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces..... 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 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 6b. Calculated the number of occupants served (22b) by the ventilation unit 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.......



- 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.
- Return the checklist portion of this document to the IAQ Coordinator.

Integrated Pest Management Checklist

N	Name: Wayne Donaldson	1100		
	chool: Ledyard Middle School			
	Ruilding 1/22/202	4	<i>y</i>	
R	Coom or Area: Date Completed: 1723/202			-
S	ignature:			
1.	OFFICIAL POLICY STATEMENT	Yes	No	N/A
la	Developed or located the school's official policy statement for integrated pest management (IPM)	🖸		
2.	DESIGNATING PEST MANAGEMENT ROLES			
	Assigned and trained a qualified person to be the pest manager			
	Involved decision makers in the IPM program Educated students and staff (the occupants of the building) about IPM	🙎		
20	and asked them to keep their areas clean and free of clutter	🖸		
2d	. Encouraged parents to learn about IPM practices and implement them			_
2e.	at home Developed a program to educate and train all IPM participants			
2f.	Included language about IPM into contracts with pest management		٦	
	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)	3 0		
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,			
4b.	food, water, and harborage sites	-		
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, renair, and		_	_
4f.	sanitation efforts) to prevent or resolve any pest problems			
	estimate pest population levels and identify evidence of pests and potential habitat			

5. SETTING ACTION THRESHOLDS				
5a. Evaluated all available data obtained through inspecting, identifying and monitoring	3 7	No I	N/A	A
5b. Determined how many pests the school buildings, grounds, and				
occupants can tolerate		•		
5c. Set action thresholds	🛍			
6. PREVENTIVE STRATEGIES				
INDOOR SITES	41 - Callowin	2 010	00.	
6a. Implemented appropriate strategies to prevent pests from inhabiting	g the follows		as.	
E-t-rayove		0	0	
Classrooms				
C				
T - 1 oms				
055:				
C+- ff love gas				
D-th-come				
First engagation and serving areas				
D with extensive plumbing				
	······ —			
Maintenance areas Other		_		
OUTDOOR SITES				
a stratagies to prevent pests from innability	ng the follow	ing ar	eas:	_
1				
				ב
1 11 4 - fields				ב
				_
				_
Areas with ornamental shrubs and trees Other				_
7. PESTICIDE USE AND STORAGE				
	ng that			_
7a. Explored alternative pest management methods before concluding pesticides were necessary			1	
			1	
torget checitic chemical (of positive				
7c. Identified the least toxic, target-specific orderess the pest proble formulation) that is the most effective to address the pest proble	m,		1	
			-	_
			ב	
		St note		
pesticides whenever possible and only treated				
plants in the area	S			
7f. Used protective clothing or equipment when applying positions	that are			
7g. Placed all pesticides in tamper-resistant balt boxes of received inaccessible to children and non-target species				





7.	PESTICIDE USE AND STORAGE (cont.)			
7h.	Locked or fastened lids of all bait boxes and placed bait away from the runway of the box	Yes	No	N/A
7i.	they would not be exposed to the chemicals			
7j.	Ensured that school occupants (students and staff) are notified of upcoming pesticide applications through posted notices and/or letters			
7k.	Ensured that parents are notified of upcoming pesticide applications through letters	•		
71.	Kept copies of current pesticide labels and information on pesticides easily accessible			
	Stored pesticides off site or in areas that are locked and accessible only to designated personnel			
/11.	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			
7o.	Ensured that flammable liquids are stored away from ignition sources Ensured that pesticides are stored in their original containers and all lids			
	are securely fastened			
1	Ensured that air in the storage space cannot mix with the air in the central ventilation system			
	EVALUATING RESULTS AND RECORD KEEPING			
8a.	Ensured that accurate, up-to-date records of IPM practices and a pest			
	Ensured that pesticide records necessary to meet all state.			
8c.	Ensured that each log book contains the following items:			
	Copy of the pest management plan Service schedules for maintain and a service schedules for the service schedules for maintain and a service schedules			
	Service schedules for maintenance of buildings and grounds Current EPA-registered labels			
	Current Material Safety Data Sheets (MSDS) for each posticide and in			
	- Lest surveillance data sheets			
-	 Diagram noting the location of pest activity, traps, and bait stations 			



- 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.
- Return the checklist portion of this document to the IAQ Coordinator.

Waste Management Checklist

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

1.	WASTE MANAGEMENT	No	N/A
1a	Ensured that waste containers are appropriate for use (for example,	NO	IV/A
	food waste containers should have lids)		
1b.	Ensured that waste containers are lined		
	Ensured that waste from art, science, vocational classes, etc., are		
	handled separately		
ld.	Labeled recycling bins clearly		
le.	Ensured number of bins and dumpsters is adequate		
1 f.	Ensured appropriate location of dumpsters (i.e., away from air intakes,		
	doors, and operable windows in relation to prevailing winds)		
1g.	Ensured waste containers are emptied regularly		
1h.	Ensured appropriate waste removal schedule		
li.	Ensured waste is stored in a well-ventilated room		
lj.	Ensured any exhaust fans in the room are operating properly		
1k.	Checked waste storage areas for odors, contaminants, or signs of vermin	0	



- Read the IAQ
 Backgrounder and
 the Background
 Information for
 this checklist.
- 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.
- Return the checklist portion of this document to the IAQ Coordinator.

Walkthrough Inspection Checklist

	w 5 11		
N	Tame: Wayne Donaldson		
S	chool: Ledyard Middle School		
R	oom or Area: Building Date Completed: 1/26/2024		
Si	ignature:		
1.	GROUND LEVEL	. N.	NI/A
1a.	Ensured that ventilation units operate properly	No 🗆	IV/A
	Ensured there are no obstructions blocking air intakes		
	. Checked for nests and droppings near outdoor air intakes		
1d.	Determined that dumpsters are located away from doors, windows, and outdoor air intakes		
le.	Checked potential sources of air contaminants near the building		
	(chimneys, stacks, industrial plants, exhaust from nearby buildings)		
1 f.	Ensured that vehicles avoid idling near outdoor air intakes		
1g.	1		
1h.	Ensured that there is proper drainage away from the building (including roof downspouts)		_
1 i.	Ensured that sprinklers spray away from the building and outdoor air intakes		
1j.			
2.	ROOF		
Wh	tile on the roof, consider inspecting the HVAC units (use the Ventilation Checklis	st).	
	Ensured that the roof is in good condition		
2b.	Checked for evidence of water ponding		
2c.	Checked that ventilation units operate properly (air flows in)	ō	
2d.	Ensured that exhaust fans operate properly (air flows out)		
2e.	Ensured that air intakes remain open, even at minimum setting		
2f.	Checked for nests and droppings near outdoor air intakes		
2g.	Ensured that air from plumbing stacks and exhaust outlets flows away from outdoor air intakes		
3.	ATTIC		
3a.	Checked for evidence of roof and plumbing leaks		a
3b.	Checked for birds and animal nests.	0	
4.	GENERAL CONSIDERATIONS		
4a.	Ensured that temperature and humidity are maintained within		
41	acceptable ranges		
40. 4c	Ensured that no obstructions exist in supply and exhaust vents		

4d. Checked for signs of mold and mildew growth

4.	GENERAL CONSIDERATIONS (continued) Yes	No	N/A
4e.	Checked for signs of water damage		
4f.			
	Noted and reviewed all concerns from school occupants		
5.	BATHROOMS AND GENERAL PLUMBING		
	Ensured that bathrooms and restrooms have operating exhaust fans		
50.	Water is poured down floor drains once per week (approx. 1 quart of water) \Box		
	Water is poured into sinks at least once per week (about 2 cups of water)		
	Toilets are flushed at least once per week		
6.	MAINTENANCE SUPPLIES		
6a	Ensured that chemicals are used only with adequate ventilation and when		
ou.	building is unoccupied		
6b.	Ensured that vents in chemical and trash storage areas are operating		
	properly		
6c.	Ensured that portable fuel containers are properly closed		
6d	Ensured that power equipment, like snowblowers and lawn mowers, have		
	been serviced and maintained according to manufacturers' guidelines		
7.	COMBUSTION APPLIANCES		
72	Checked for combustion gas and fuel odors		
7h	Ensured that combustion appliances have flues or exhaust hoods		
70	Checked for leaks, disconnections, and deterioration	. 0	
70	Ensured there is no soot on inside or outside of flue components		
/ (1	. Ensured there is no soot on histae of outside of flat components		
8.	OTHER		
8a	. Checked for peeling and flaking paint (if the building was built before	-1	-
	1980, this could be a lead hazard)		
86	Determined date of last radon test		
		Ta.	

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.



- Read the IAQ Backgrounder and the Background Information for this checklist.
- 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.
- Return the checklist portion of this document to the IAQ Coordinator.

Building and Grounds Maintenance Checklist

Name: Wayne D	onaldson	- E			
School:	Ledyard Middle	e School			
Room or Area: Bu	ilding	_ Date Completed:	1/24/2024		
Signature:		•			
1. BUILDING M	ΔΙΝΤΕΝΙΔΝΙΟΕ 9	SI IDDI IES			
		staniand supplies for s		Yes No	

1.	BUILDING MAINTENANCE SUPPLIES	Yes	No	N/A
	Developed appropriate procedures and stocked supplies for spill control Reviewed supply labels			
	Ensured that air from chemical and trash storage areas vents to		_	<u> </u>
ld.	the outdoors	. •		
	containers			
16. 1f.	Researched and selected the safest products available	. 🗷		
	instructions	. 🙍		
	Ensured that chemicals, chemical-containing wastes, and containers are disposed of according to manufacturers' instructions			
1h. 1i.	Substituted less- or non-hazardous materials (where possible)			
11.	Scheduled work involving odorous or hazardous chemicals for periods when the school is unoccupied			
lj.	Ventilated affected areas during and after the use of odorous or hazardous chemicals			
		. 3	_	Ų
2.	GROUNDS MAINTENANCE SUPPLIES			
2a.	Stored grounds maintenance supplies in appropriate area(s) Ensured that supplies are used and stored according to manufacturers'			
	instructions	•		
2c.	Established and followed procedures to minimize exposure to fumes from supplies			
2d.	Reviewed and followed manufacturers' guidelines for maintenance	•	0	0
2e. 2f.	Replaced portable gas cans with low-emission cans Stored chemical products and supplies in sealed, clearly-labeled			
	containers			
2g.	Ensured that chemicals, chemical-containing wastes, and containers are disposed of according to manufacturers' instructions			
				u
3.	DUST CONTROL			
	Installed and maintained barrier mats for entrances			ū
3c.	Used high efficiency vacuum bags			
3d.	Wrapped feather dusters with a dust cloth		0	
3e.	Cleaned air return grilles and air supply vents			

4.	FLOOR CLEANING Y	es	No	N/A	
4b.	Established and followed schedule for vacuuming and mopping floors			000	
5.	DRAIN TRAPS				
5b.	Poured water down floor drains once per week (about 1 quart of water) Ran water in sinks at least once per week (about 2 cups of water) Flushed toilets once each week (if not used regularly)		000		6
	MOISTURE, LEAKS, AND SPILLS				
6a.	Checked for moldy odors				
	Inspected ceiling tiles, floors, and walls for leaks or discoloration (may indicate periodic leaks)	9			
	Checked areas where moisture is commonly generated (e.g., kitchens, locker rooms, and bathrooms)	•			
	Checked that windows, windowsills, and window frames are free of condensate				
	Checked that indoor surfaces of exterior walls and cold water pipes are free of condensate	. 🗨			
6f.	Ensured the following areas are free from signs of leaks and water damage: Indoor areas near known roof or wall leaks				
	Walls around leaky or broken windows				
	Floors and ceilings under plumbing				
	Duct interiors near humidifiers, cooling coils, and outdoor air intakes		٦		
7.	COMBUSTION APPLIANCES				
7a	. Checked for odors from combustion appliances	🗑			
7h	Checked appliances for backdrafting (using chemical smoke)				
70	. Inspected exhaust components for leaks, disconnections, or deterioration	🖭			
70	I. Inspected flue components for corrosion and soot	., 🖭			
8	PEST CONTROL				
82	. Completed the Integrated Pest Management Checklist	🗟			

NOTES

5a. We have trap primers



- 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.
- 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.

Ventilation Checklist

1	Name: Wayne Donaldson		
5	School: Ledyard Middle School		
Į	Unit Ventilator/AHU No: AHU-4	8	
- 1	Room or Area: Date Completed: 1/25/2024		
	4/		
1	OUTDOOR AIR INTAKES		
	a. Marked locations of all outdoor air intakes on a small floor plan (for	s No	N/
	example, a fire escape floor plan)		
16	b. Ensured that the ventilation system was on and operating in "occupied" mode		_
	CTIVITY 1: OBSTRUCTIONS		
le	. Ensured that outdoor air intakes are clear of obstructions, debris, clogs,		
1d	or covers		
	frequently block an intake)		
AC	CTIVITY 2: POLLUTANT SOURCES		
	Checked ground-level intakes for pollutant sources (dumpsters, loading		
	docks, and bus-idling areas)		
1f.	Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from		
	air-conditioning cooling towers)		
1g.	Resolved any problems with pollutant sources located near outdoor air	_	_
	intakes (e.g., relocated dumpster or extended exhaust pipe)		
	CTIVITY 3: AIRFLOW		
lh.	Obtained chemical smoke (or a small piece of tissue paper or light plastic)		
11.	Confirmed that outdoor air is entering the intake appropriately		
2.	SYSTEM CLEANLINESS		
	TIVITY 4: AIR FILTERS		
2a.	Replaced filters per maintenance schedule		
2b.	Shut off ventilation system fans while replacing filters (prevents dirt from	_	_
2c.	Vacuumed filter areas before installing new filters		
2d.	Confirmed proper fit of filters to prevent air from hypassing (flowing		
	around) the air filter		
20.	Confirmed proper installation of filters (correct direction for airflow)		

ACTIVITY 5: DRAIN PANS Yes No N/A 2f. Ensured that drain pans slant toward the drain (to prevent water from accumulating) 2g. Cleaned drain pans 2h. Checked drain pans for mold and mildew **ACTIVITY 6: COILS** 2i. Ensured that heating and cooling coils are clean ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS 2]. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean 2k. Ensured that ducts are clean **ACTIVITY 8: MECHANICAL ROOMS** 21. Checked mechanical room for unsanitary conditions, leaks, and spills 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies 3. CONTROLS FOR OUTDOOR AIR SUPPLY 3a. Ensured that air dampers are at least partially open (minimum position) 3b. Ensured that minimum position provides adequate outdoor air for occupants..... **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) **ACTIVITY 10: CLOCKS, TIMERS, SWITCHES** 3e. Set time clocks appropriately.....□ 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) **ACTIVITY 11: CONTROL COMPONENTS** 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting 3h. Checked that the line dryer prevents moisture buildup...... 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)..... 3j. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) **ACTIVITY 12: OUTDOOR AIR DAMPERS** 3k. Ensured that the outdoor air damper is visible for inspection..... 31. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range



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)			
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler		No	N/A
30.	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on)		
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		_	_
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	m		
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			
	Moving parts are free of impediments (e.g., rust, corrosion) Electrical wire or pneumatic tubing connects to the damper actuator	. 🗨		
	The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly)	. 🕥		
Pro	ceed to Activities 13–16 if the damper seems to be operating properly.			
	TIVITY 13: FREEZE STATS			
3s.	Disconnected power to controls (for automatic reset only) to test continuity across terminals			
3t.	Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was	-		_
3u.	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats			
clos	TE: HVAC systems with water coils need protection from the cold. The freeze the outdoor air damper and disconnect the supply air when tripped. The tyge is 35°F to 42°F.			
AC	TIVITY 14: MIXED AIR THERMOSTATS			
3v.	Ensured that the mixed air stat for heating mode is set no higher than 65°F	. 🗃		
3w.	Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting			
	TIVITY 15: ECONOMIZERS			
JX.	Confirmed proper economizer settings based on design specifications or local practices			
NO.	TE: The dry-bulb is typically set at 65°F or lower.			
	Checked that sensor on the economizer is shielded from direct sunlight Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications			
load Dry and	TE: Economizers use varying amounts of cool outdoor air to assist with the of the room or rooms. There are two types of economizers, dry-bulb and ent-bulb economizers vary the amount of outdoor air based on outdoor temperal enthalpy economizers vary the amount of outdoor air based on outdoor temperal humidity level.	thalp uture,	y.	

3. CONTROLS FOR OUTDOOR AIR SUPPLY (continued) **ACTIVITY 16: FANS** 3aa. Ensured that all fans (supply fans and associated return or relief fans) Yes No N/A that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)..... 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 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. 4i. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, 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

· Broken fan belt

Obstructed, leaky, or disconnected ductwork
Undersized or improperly installed fan





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).

and labs by keeping them under negative pressure (as compared to surroun	iding spac	ces).	
5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces		No	N/A
Stand outside the room with the door slightly open while checking airflow the door opening (see "How to Measure Airflow").	high and i	low i	n
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 (wh under positive pressure) is sealed and in good condition			
6. QUANTITY OF OUTDOOR AIR			
ACTIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULA	TIONS		
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 un 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 QUANT	TITIES		
6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1	ed		
6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) med the recommended levels in Table 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.
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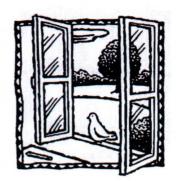
Ventilation Checklist

Wayne Donaldson

	School: Ledyard Middle School	
	Unit Ventilator/AHU No: MAU-1	
	Room or Area: Date Completed: 1/25/2024	
	Signature:	
1	. OUTDOOR AIR INTAKES	
1:	a. Marked locations of all outdoor air intakes on a small floor plan (for	
11	example, a fire escape floor plan)	
	mode	
A	CTIVITY 1: OBSTRUCTIONS	
10	e. Ensured that outdoor air intakes are clear of obstructions, debris, clogs,	
10	or covers	
	frequently block an intake)	
A	CTIVITY 2: POLLUTANT SOURCES	
	c. Checked ground-level intakes for pollutant sources (dumpsters, loading	
1 f	docks, and bus-idling areas)	
• • •	toilet, or laboratory exhaust fans; puddles; and mist from	
10	air-conditioning cooling towers)	
1.5	intakes (e.g., relocated dumpster or extended exhaust pipe)	
Δ	CTIVITY 3: AIRFLOW	
1 h	. Obtained chemical smoke (or a small piece of tissue paper or light plastic)	
li	Confirmed that outdoor air is entering the intake appropriately	
2.	SYSTEM CLEANLINESS	
A	CTIVITY 4: AIR FILTERS	
2a	Replaced filters per maintenance schedule	
20	Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)	
2c	. Vacuumed filter areas before installing new filters	
20	Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter	
2e	. Confirmed proper installation of filters (correct direction for airflow)	

ACTIVITY 5: DRAIN PANS

2f. Ensured that drain pans slant toward the drain (to prevent water from Yes No N/A accumulating) 2g. Cleaned drain pans 2h. Checked drain pans for mold and mildew **ACTIVITY 6: COILS** 2i. Ensured that heating and cooling coils are clean **ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS** 2i. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean 2k. Ensured that ducts are clean **ACTIVITY 8: MECHANICAL ROOMS** 21. Checked mechanical room for unsanitary conditions, leaks, and spills 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies 3. CONTROLS FOR OUTDOOR AIR SUPPLY 3a. Ensured that air dampers are at least partially open (minimum position) 3b. Ensured that minimum position provides adequate outdoor air for occupants..... **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) **ACTIVITY 10: CLOCKS, TIMERS, SWITCHES** 3e. Set time clocks appropriately□ 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) ACTIVITY 11: CONTROL COMPONENTS 3g. Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)...... 3i. Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions) ACTIVITY 12: OUTDOOR AIR DAMPERS 3k. Ensured that the outdoor air damper is visible for inspection..... 31. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range



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)			
	3n. Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler		No	N/A
	30. Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on			
	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			
	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	1		3
	to 60°F and mixed air thermostat is set to 45°F			
	screws or bolts are tight			
	Electrical wire or pneumatic tubing connects to the damper actuator			
	The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly)			
	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	_		
	3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was			
	tripped)			
	3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats			
	NOTE: HVAC systems with water coils need protection from the cold. The freeze-sclose the outdoor air damper and disconnect the supply air when tripped. The typ 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			
	3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting			
		2 .		
	ACTIVITY 15: ECONOMIZERS			
•	3x. Confirmed proper economizer settings based on design specifications or local practices			
,	NOTE: The dry-bulb is typically set at 65°F or lower.			
	 3y. Checked that sensor on the economizer is shielded from direct sunlight 3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications 			
				_
	NOTE: Economizers use varying amounts of cool outdoor air to assist with the coload of the room or rooms. There are two types of economizers, dry-bulb and enth Dry-bulb economizers vary the amount of outdoor air based on outdoor temperat and enthalpy economizers vary the amount of outdoor air based on outdoor temperat humidity level.	alp) ure,	y.	

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 Yes No N/A hours (even when room thermostat is satisfied)..... 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 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 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. 4i. 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).

ana	l labs by keeping them under negative pressure (as compared to surrounding s	spac	es).	
5b.	Checked (using chemical smoke) that air is drawn into the room from adjacent spaces	es	No •	N/A
	nd outside the room with the door slightly open while checking airflow high a door opening (see "How to Measure Airflow").	nd l	ow ii	1
5c.	Ensured that air is flowing toward the exhaust intake			
AC	TIVITY 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			
AC	TIVITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATION	NS		
NO	TE: Refer to "How to Measure Airflow" for techniques.			
	Measured the quantity of outdoor air supplied (22a) to each ventilation unit	<u> </u>		
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)	_		
AC	TIVITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIE	CS		
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			



- 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.
- Return the checklist portion of this document to the IAQ Coordinator.

Ventilation Checklist

1	Name: Wayne Donaldson		
	School: Ledyard Middle School		
	Jnit Ventilator/AHU No: RTU-1		
F	Room or Area: Date Completed:		
3	Signature:		_
1.	OUTDOOR AIR INTAKES		
la	. Marked locations of all outdoor air intakes on a small floor plan (for		N/A
16	example, a fire escape floor plan) Ensured that the ventilation system was on and operating in "occupied" mode		
A	CTIVITY 1: OBSTRUCTIONS		
	Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers		
ld	Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)	٥	ت ت
40	CTIVITY 2: POLLUTANT SOURCES		
	Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)		
1f.	Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers)		J
lg.	Resolved any problems with pollutant sources located near outdoor air		
	intakes (e.g., relocated dumpster or extended exhaust pipe)		
	CTIVITY 3: AIRFLOW		
lh. li.	Obtained chemical smoke (or a small piece of tissue paper or light plastic) Confirmed that outdoor air is entering the intake appropriately	0	0
2.	SYSTEM CLEANLINESS		
AC	TIVITY 4: AIR FILTERS		
2a.	Replaced filters per maintenance schedule		
20.	Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)		
2c.	vacuumed filter areas before installing new filters		
2d.	Confirmed proper fit of filters to prevent air from hypassing (flowing		_
e.	around) the air filter		

	TIVITY 5: DRAIN PANS			
	accumulating)	. 9	No □	A/N
2g.	Cleaned drain pans			
	Checked drain pans for mold and mildew			
	TIVITY 6: COILS			
2i.	Ensured that heating and cooling coils are clean			٦
	TIVITY 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			
2k.	Ensured that ducts are clean			D
AC	TIVITY 8: MECHANICAL ROOMS			
	Checked mechanical room for unsanitary conditions, leaks, and spills			
2m	Ensured that mechanical rooms and air-mixing chambers are free of trash,			
	chemical products, and supplies	. 9		
3.	CONTROLS FOR OUTDOOR AIR SUPPLY			
3a.	Ensured that air dampers are at least partially open (minimum position)		٥	
3b.	Ensured that minimum position provides adequate outdoor air for occupants			٦
	101 Occupants			
AC	CTIVITY 9: CONTROLS INFORMATION			
3c.	Obtained and reviewed all design inside/outside temperature and humidity			
	requirements, controls specifications, as-built mechanical drawings,		_	$\overline{}$
	and controls operations manuals (often uniquely designed)	🖷	٦	J
AC	CTIVITY 10: CLOCKS, TIMERS, SWITCHES		_	_
3d.	Turned summer-winter switches to the correct position	u	C	
3e.	Set time clocks appropriately	u		
3f.	Ensured that settings fit the actual schedule of building use (including night/weekend use)	🗃		Ö
A	CTIVITY 11: CONTROL COMPONENTS			
3g	Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting			
	occupied (day) setting and the unoccupied (flight) setting			
3h	. Checked that the line dryer prevents moisture buildup			
31.	Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you	П		
	blow down the tank)		_	
3j	Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions)	a		
4	CTIVITY 12: OUTDOOR AIR DAMPERS			
31	c. Ensured that the outdoor air damper is visible for inspection	3		
31	Ensured that the recirculating relief and/or exhaust dampers are visible			
	for inspection	🖢		
31	m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range			
	to TE 1: and that the damper is operating properly and wit	hin t	he no	rmal





3.	CONTROLS FOR OUTDOOR AIR SUPPLY (continued)		
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler	No	N/A
30.	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on		
	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		
	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	0	
	 The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight	0 0 0	
	• The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly)		
Pro	ceed to Activities 13–16 if the damper seems to be operating properly.		
AC	TIVITY 13: FREEZE STATS		
3s.	Disconnected power to controls (for automatic reset only) to test continuity across terminals	•	٦
3t.	Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was		_
3u.	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats.		٥
clos	TE: HVAC systems with water coils need protection from the cold. The freeze-stose the outdoor air damper and disconnect the supply air when tripped. The typic ge is $35^{\circ}F$ to $42^{\circ}F$.		
AC	TIVITY 14: MIXED AIR THERMOSTATS		
3v.	Ensured that the mixed air stat for heating mode is set no higher than 65°F		
3w.	Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting		
10	TIVITY 15: ECONOMIZERS		
	Confirmed proper economizer settings based on design specifications or local practices		
NO	TE: The dry-bulb is typically set at 65°F or lower.		
	Checked that sensor on the economizer is shielded from direct sunlight	0	
	exhaust/relief air, and recirculated air), per the design specifications		
load Dry and	TE: Economizers use varying amounts of cool outdoor air to assist with the cood of the room or rooms. There are two types of economizers, dry-bulb and enthater-bulb economizers vary the amount of outdoor air based on outdoor temperatural enthalpy economizers vary the amount of outdoor air based on outdoor temperatural humidity level.	ру. е,	

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 Yes No N/A hours (even when room thermostat is satisfied)..... 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, 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





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

NOTES

3s. Unit has both types of controls



Instructions

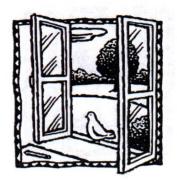
- Read the IAQ
 Backgrounder and the Background Information for this checklist.
- 2. Keep the
 Background
 Information and
 make a copy of
 this checklist for
 each ventilation
 unit in your school,
 as well as a
 copy for future
 reference.
- 3. Complete the Checklist.
 - Check the "yes," "no," or "not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

Ventilation Checklist

Name:	Wayne Donaldson		app.	
School:	Ledyard Middle School			
Unit Ven	atilator/AHU No: RTU-2			
	Area: Date Completed:			
Signature	e: <i>M</i>			
	TDOOR AIR INTAKES			
la. Marke exam	ed locations of all outdoor air intakes on a small floor plan (for ple, a fire escape floor plan)	Yes	No	N/A
Ensur	red that the ventilation system was on and operating in "occupied"		_	_
mode		. 🗨		
	TY 1: OBSTRUCTIONS			
or cov	red that outdoor air intakes are clear of obstructions, debris, clogs, wers			
d. Install	led corrective devices as necessary (e.g., if snowdrifts or leaves		_	_
rreque	ently block an intake)			
ACTIVIT	Y 2: POLLUTANT SOURCES			
docks	ted ground-level intakes for pollutant sources (dumpsters, loading , and bus-idling areas)			
f. Check	ted rooftop intakes for pollutant sources (plumbing yents: kitchen		_	_
air-coi	or laboratory exhaust fans; puddles; and mist from nditioning cooling towers)			
g. Resolv	ved any problems with pollutant sources located near outdoor air		_	_
	s (e.g., relocated dumpster or extended exhaust pipe)			
	Y 3: AIRFLOW			
i. Confir	ned chemical smoke (or a small piece of tissue paper or light plastic) med that outdoor air is entering the intake appropriately			
		•	_	_
	TEM CLEANLINESS			
	Y 4: AIR FILTERS red filters per maintenance schedule			
o. Shut of	If ventilation system fans while replacing filters (prevents dirt from			
DIOWIII	ned filter areas before installing new filters			0
i. Confiri	med proper fit of filters to prevent air from hypassing (flowing			
around	the air filter			0

2. SYSTEM CLEANLINESS (continued)

AC	TIVITY 5: DRAIN PANS			
2f.	Ensured that drain pans slant toward the drain (to prevent water from accumulating)		No □	N/A
2g.	Cleaned drain pans	🗑		
2h.	Checked drain pans for mold and mildew	🖢		
AC	TIVITY 6: COILS			
2i.	Ensured that heating and cooling coils are clean	•		
	TIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS			
	Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean			
2k.	Ensured that ducts are clean	🖢		J
	TIVITY 8: MECHANICAL ROOMS Checked mechanical room for unsanitary conditions, leaks, and spills			
	Ensured that mechanical rooms and air-mixing chambers are free of trash,		_	_
2m.	chemical products, and supplies	🖫		
3.	CONTROLS FOR OUTDOOR AIR SUPPLY			
3a.	Ensured that air dampers are at least partially open (minimum position)	1		
3b.	Ensured that minimum position provides adequate outdoor air for occupants			٦
AC	TIVITY 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)	🗑		٦
AC	CTIVITY 10: CLOCKS, TIMERS, SWITCHES	_	_	_
3d.	Turned summer-winter switches to the correct position	🖵	U	
3e.	Set time clocks appropriately	u		
3f.	Ensured that settings fit the actual schedule of building use (including night/weekend use)	🗃		
• (CTIVITY 11: CONTROL COMPONENTS			
	Ensured appropriate system pressure by testing line pressure at both the	_	_	-
21	occupied (day) setting and the unoccupied (night) setting			
3h	Replaced control system filters at the compressor inlet based on the		_	
31.	compressor manufacturer's recommendation (for example, when you blow down the tank)	🗅		9
3j.	Set the line pressure at each thermostat and damper actuator at the proper			_
	level (no leakage or obstructions)	u	u	
A	CTIVITY 12: OUTDOOR AIR DAMPERS	2		
3k	Ensured that the outdoor air damper is visible for inspection			U
	Ensured that the recirculating relief and/or exhaust dampers are visible for inspection	🗨		
3r	n. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range			
	Outdoor an damper is within the normal operating range	elein ei	h a m a	um al



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)			
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler		No	N/A
30.	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on			
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		_	_
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	m		
3r.	to 60°F and mixed air thermostat is set to 45°F	. 💌		
	screws or bolts are tight			
	 Moving parts are free of impediments (e.g., rust, corrosion) Electrical wire or pneumatic tubing connects to the damper actuator 			
	The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly)			
Pro	ceed to Activities 13–16 if the damper seems to be operating properly.			
AC	TIVITY 13: FREEZE STATS			
	Disconnected power to controls (for automatic reset only) to test continuity across terminals			
OR 3t.				
51.	red) trips the freeze stat (clicking sound indicates freeze stat was tripped)			
3u.	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats		_	
VO			_	
clos	TE: HVAC systems with water coils need protection from the cold. The freeze- te the outdoor air damper and disconnect the supply air when tripped. The ty ge is 35°F to 42°F.	-stat pical	may l trip	
	TIVITY 14: MIXED AIR THERMOSTATS			
3v.	Ensured that the mixed air stat for heating mode is set no higher than 65°F	5		
3w.	Ensured that the mixed air stat for cooling mode is set no lower			
	than the room thermostat setting			
	TIVITY 15: ECONOMIZERS			
3x.	Confirmed proper economizer settings based on design specifications or local practices			
NOT	TE: The dry-bulb is typically set at 65°F or lower.			
3y. 3z.	Checked that sensor on the economizer is shielded from direct sunlight Ensured that dampers operate properly (for outside air, return air,	9		
	exhaust/relief air, and recirculated air), per the design specifications			
NOT	TE: Economizers use varying amounts of cool outdoor air to assist with the c	oolii	10	

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) Yes No N/A that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)..... 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 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) \Box 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





ACTIVITY 20: EXHAUST AIRFLOW

	Prevent migration of indoor contaminants from areas such as bathrooms, ki by keeping them under negative pressure (as compared to surrounding spa		S,
5b. Che adja	cked (using chemical smoke) that air is drawn into the room from cent spaces	No	N/A
	atside the room with the door slightly open while checking airflow high and opening (see "How to Measure Airflow").	low i	n
5c. Ensu	ared that air is flowing toward the exhaust intake		
5d. Che	TTY 21: EXHAUST DUCTWORK cked that the exhaust ductwork downstream of the exhaust fan (which is er positive pressure) is sealed and in good condition	٥	
6. QU	IANTITY OF OUTDOOR AIR		
ACTIV	ITY 22: OUTDOOR AIR MEASUREMENTS AND CALCULATIONS		
NOTE: I	Refer to "How to Measure Airflow" for techniques.		
unit	asured the quantity of outdoor air supplied (22a) to each ventilation		
und	culated the number of occupants served (22b) by the ventilation unit		
6c. Divi	ided outdoor air supply (22a) by the number of occupants (22b) to ermine the existing quantity of outdoor air supply per person (22c)		
ACTIV	ITY 23: ACCEPTABLE LEVELS OF OUTDOOR AIR QUANTITIES		
leve	mpared the existing outdoor air per person (22c) to the recommended els in Table 1	•	
qua	rected problems with ventilation units that supplied inadequate intities of outdoor air to ensure that outdoor air quantities (22c) meet recommended levels in Table 1	•	

NOTES

3s. Unit has both types of controls



Instructions

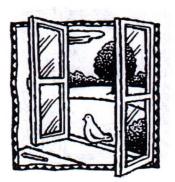
- Read the IAQ
 Backgrounder and the Background Information for this checklist.
- 2. Keep the
 Background
 Information and
 make a copy of
 this checklist for
 each ventilation
 unit in your school,
 as well as a
 copy for future
 reference.
- 3. Complete the Checklist.
 - Check the "yes," "no," or "not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

Ventilation Checklist

N	ame: Wayne Donaldson		
	chool: Ledyard Middle School		
	nit Ventilator/AHU No: RTU-3		
R	oom or Area: Date Completed:		
	ignature:		
1.	OUTDOOR AIR INTAKES		
la.	Marked locations of all outdoor air intakes on a small floor plan (for example, a fire escape floor plan)	No	N/
1b.	Ensured that the ventilation system was on and operating in "occupied" mode		
AC	CTIVITY 1: OBSTRUCTIONS		
1c.	Ensured that outdoor air intakes are clear of obstructions, debris, clogs, or covers		
1d.	Installed corrective devices as necessary (e.g., if snowdrifts or leaves frequently block an intake)		٦
AC	CTIVITY 2: POLLUTANT SOURCES		
le.	Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)		
1f.	Checked rooftop intakes for pollutant sources (plumbing vents; kitchen, toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers)		
lg.	Resolved any problems with pollutant sources located near outdoor air		_
	intakes (e.g., relocated dumpster or extended exhaust pipe)		
	CTIVITY 3: AIRFLOW		
1h.	Obtained chemical smoke (or a small piece of tissue paper or light plastic)		
11.	Confirmed that outdoor air is entering the intake appropriately		
2.	SYSTEM CLEANLINESS		
AC	CTIVITY 4: AIR FILTERS		
2a.	Replaced filters per maintenance schedule		
2b.	Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)		
	Vacuumed filter areas before installing new filters	0	
	Confirmed proper fit of filters to prevent air from bypassing (flowing around) the air filter		
2e	Confirmed proper installation of filters (correct direction for airflow)		

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) 2g. Cleaned drain pans 2h. Checked drain pans for mold and mildew **ACTIVITY 6: COILS** 2i. Ensured that heating and cooling coils are clean **ACTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS** 2i. Ensured that the interior of air-handling unit(s) or unit ventilator (air-mixing chamber and fan blades) is clean 2k. Ensured that ducts are clean **ACTIVITY 8: MECHANICAL ROOMS** 21. Checked mechanical room for unsanitary conditions, leaks, and spills 2m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies 3. CONTROLS FOR OUTDOOR AIR SUPPLY 3a. Ensured that air dampers are at least partially open (minimum position) 3b. Ensured that minimum position provides adequate outdoor air for occupants..... **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)..... **ACTIVITY 10: CLOCKS, TIMERS, SWITCHES** 3e. Set time clocks appropriately....... 3f. Ensured that settings fit the actual schedule of building use (including night/weekend use) ACTIVITY 11: CONTROL COMPONENTS 3g. Ensured appropriate system pressure by testing line pressure at both the 3i. Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank)..... 3i. Set the line pressure at each thermostat and damper actuator at the proper ACTIVITY 12: OUTDOOR AIR DAMPERS 3k. Ensured that the outdoor air damper is visible for inspection 31. Ensured that the recirculating relief and/or exhaust dampers are visible for inspection 3m. Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range



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)				
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler	Yes	No	N/A	
30.	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on)			
•	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	. 🗨		<u> </u>	
	If in cooling mode, checked that the outdoor air damper goes to its minimu position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F				
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				
	 Moving parts are free of impediments (e.g., rust, corrosion) Electrical wire or pneumatic tubing connects to the damper actuator The outside air thermostat(s) is functioning properly (e.g., in the right 				
	location, calibrated correctly)				
	ceed to Activities 13–16 if the damper seems to be operating properly.				
3s.	TIVITY 13: FREEZE STATS Disconnected power to controls (for automatic reset only) to test continuity across terminals		<u> </u>		
OR 3t.	Confirmed (if applicable) that depressing the manual reset button (usually				
	red) trips the freeze stat (clicking sound indicates freeze stat was tripped)	. 📦		٦	
3u.	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats	. 9			
clo.	TE: HVAC systems with water coils need protection from the cold. The freeze se the outdoor air damper and disconnect the supply air when tripped. The tyge is 35° F to 42° F.				
	TIVITY 14: MIXED AIR THERMOSTATS				
	Ensured that the mixed air stat for heating mode is set no higher than 65°F	🗃			
3w.	Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting	. •			
	TIVITY 15: ECONOMIZERS Confirmed proper economizer settings based on design specifications or local practices	🗨	0		
NO	TE: The dry-bulb is typically set at 65°F or lower.				
	Checked that sensor on the economizer is shielded from direct sunlight Ensured that dampers operate properly (for outside air, return air,	🖭			
	exhaust/relief air, and recirculated air), per the design specifications				
loa Dr	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) Yes No N/A that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied)..... 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 lavout 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





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). Yes No N/A 5b. Checked (using chemical smoke) that air is drawn into the room from 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 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 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



Instructions

- 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.
- 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.

Ventilation Checklist

	Wayne Donaldson		
	I advand Middle Calcard		
S	chool: Ledyard Middle School		
U	nit Ventilator/AHU No: RTU-4		
R	oom or Area: Date Completed:		_
1	ignature:		
1.	OUTDOOR AIR INTAKES		
la.	Marked locations of all outdoor air intakes on a small floor plan (for	No	N/
1b	example, a fire escape floor plan)		
	mode		
AC	CTIVITY 1: OBSTRUCTIONS		
	Ensured that outdoor air intakes are clear of obstructions, debris, clogs,		
	or covers		
ld.	Installed corrective devices as necessary (e.g., if snowdrifts or leaves		
	frequently block an intake)		
	CTIVITY 2: POLLUTANT SOURCES		
	Checked ground-level intakes for pollutant sources (dumpsters, loading docks, and bus-idling areas)		
1f.	Checked rooftop intakes for pollutant sources (plumbing vents: kitchen	_	_
	toilet, or laboratory exhaust fans; puddles; and mist from air-conditioning cooling towers)		_
lg.	Resolved any problems with pollutant sources located near outdoor air		
	intakes (e.g., relocated dumpster or extended exhaust pipe)		
10			
	TIVITY 3: AIRFLOW Obtained chemical smalls (on a small miner of the control of t		
li.	Obtained chemical smoke (or a small piece of tissue paper or light plastic) Confirmed that outdoor air is entering the intake appropriately		
	appropriately	_	_
2.	SYSTEM CLEANLINESS		
	TIVITY 4: AIR FILTERS		
2a.	Replaced filters per maintenance schedule		
20.	Shut off ventilation system fans while replacing filters (prevents dirt from blowing downstream)		
2c.	blowing downstream)		
2d.	Confirmed proper fit of filters to prevent air from bypassing (flowing	_	
	around) the air filter		
e.	Confirmed proper installation of filters (correct direction for airflow)		

2. SYSTEM CLEANLINESS (continued)

ACTIVITY 5: DRAIN PANS					
2	f. Ensured that drain pans slant toward the drain (to prevent water from accumulating)		No □	N/A	
2	g. Cleaned drain pans				
2	h. Checked drain pans for mold and mildew	🖢	٦		
-	ACTIVITY 6: COILS				
2	i. Ensured that heating and cooling coils are clean	🛢	٦	٦	
	CTIVITY 7: AIR-HANDLING UNITS, UNIT VENTILATORS				
2	j. Ensured that the interior of air-handling unit(s) or unit ventilator	_		_	
	(air-mixing chamber and fan blades) is clean				
2	k. Ensured that ducts are clean	🗷		J	
	ACTIVITY 8: MECHANICAL ROOMS				
	1. Checked mechanical room for unsanitary conditions, leaks, and spills	🖲			
2	m. Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies	🗨		٦	
3	B. CONTROLS FOR OUTDOOR AIR SUPPLY				
3	a. Ensured that air dampers are at least partially open (minimum position)				
3	b. Ensured that minimum position provides adequate outdoor air for occupants			٦	
	ACTIVITY 9: CONTROLS INFORMATION				
3	Se. Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed)		٥	٦	
,	ACTIVITY 10: CLOCKS, TIMERS, SWITCHES				
	Bd. Turned summer-winter switches to the correct position				
3	Be. Set time clocks appropriately	□			
3	3f. Ensured that settings fit the actual schedule of building use (including night/weekend use)			٥	
	ACTIVITY 11: CONTROL COMPONENTS 3g. Ensured appropriate system pressure by testing line pressure at both the				
-	occupied (day) setting and the unoccupied (night) setting				
	3h. Checked that the line dryer prevents moisture buildup				
	3i. Replaced control system filters at the compressor inlet based on the				
	compressor manufacturer's recommendation (for example, when you				
	blow down the tank)			•	
	level (no leakage or obstructions)	ם		9	
	ACTIVITY 12: OUTDOOR AIR DAMPERS				
	3k. Ensured that the outdoor air damper is visible for inspection				
	31. Ensured that the recirculating relief and/or exhaust dampers are visible				
	for inspection		_	_	
	outdoor air damper is within the normal operating range	📦			
	to the state of th	Lin ol		- 1 a	



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)			
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler	Yes	No	N/A
30.	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on			
	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			
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		П	
3r.		. 2	_	_
	Moving parts are free of impediments (e.g., rust, corrosion)			
	 Electrical wire or pneumatic tubing connects to the damper actuator The outside air thermostat(s) is functioning properly (e.g., in the right 			
Pro	location, calibrated correctly)			
	TIVITY 13: FREEZE STATS			
3s.	Disconnected power to controls (for automatic reset only) to test continuity across terminals			
OR 3t.	Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was			
3u.	Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats			
clos	TE: HVAC systems with water coils need protection from the cold. The freeze- te the outdoor air damper and disconnect the supply air when tripped. The ty ge is 35°F to 42°F.	-stat	may ! trip	_
AC'	TIVITY 14: MIXED AIR THERMOSTATS			
	Ensured that the mixed air stat for heating mode is set no higher than 65°F			
3w.	Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting			
AC'	TIVITY 15: ECONOMIZERS			
	Confirmed proper economizer settings based on design specifications or local practices	•		
NO	TE: The dry-bulb is typically set at 65°F or lower.			
3у.	Checked that sensor on the economizer is shielded from direct sunlight Ensured that dampers operate properly (for outside air, return air,	•	۵	
	exhaust/relief air, and recirculated air), per the design specifications			
load Dry- and	TE: Economizers use varying amounts of cool outdoor air to assist with the color the room or rooms. There are two types of economizers, dry-bulb and enti-bulb economizers vary the amount of outdoor air based on outdoor temperal enthalpy economizers vary the amount of outdoor air based on outdoor temperal humidity level	halpy ture,	2.	

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