INDOOR AIR QUALITY PROBLEM SOLVING WHEEL

1 Turn to the symptoms of the problem (blue) or to the instructions (yellow) in the window below.

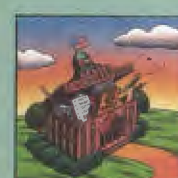
How to use this Wheel

2 Read notes below, then check sections indicated by a yellow pointer.

- If you think this is an emergency, see the two yellow sections to the right.
- If not an emergency, place the blue section that best describes the symptoms of the problem (e.g., odors) in the window above.
- Read the notes below and answer all the questions in the sections indicated by a yellow pointer. Your answer will suggest potential corrective actions.
- See the light blue window for notes on questions that end with * or **. Turn if needed.
- Communicate with occupants as noted in the light blue window below.

3 If all potential causes with yellow pointers have been checked yet problem remains, check other potential causes or seek professional assistance.

EPA



Communicate

- Notify building occupants (and parents of minors) if the problem cannot be resolved quickly and the investigation will be ongoing.
- Provide a final report of the outcome to building occupants (and parents of minors).
- See EPA publications for more communication guidance.

Local Exhaust

- Is the exhaust system turned on?
- Is the exhaust fan turned on?
- Are exhaust systems used consistently in special areas (e.g., in science labs or technical shops)?
- Does exhaust move air back into the room rather than outside?*
- Is a sufficient amount of air being exhausted?**
- Is exhaust ductwork blocked?
- Is a sufficient quantity of air entering the room?*

Biological Sources

- Do you see or smell mold?
- Are there signs of rodents or pests?
- Are there animals or pets in classrooms?
- Is condensation often present on windows or cold surfaces?
- Do you see wet or frequently damp areas?
- Is indoor relative humidity above 60%?

Excess moisture can cause mold, dust mites, and bacteria to flourish. Moist or wet materials should be dried within 24-48 hours to avoid mold growth or replaced if mold already exists.

Housekeeping Sources

- Do complaints occur during or just after housekeeping activities?
- Are chemical or cleaning products used near the complaint area?
- Are any new cleaning products or procedures being used?
- Have there been recent changes in housekeeping procedures?
- Are housekeeping products sufficiently diluted or used based on manufacturers' directions?
- Are products stored in sealed containers and/or in rooms with adequate ventilation?
- Are paints, markers, or other art supplies capped or closed?

Outdoor Sources

- Are sources of odors or pollutants (e.g., vehicle exhaust, stored chemicals, or trash bins) located near outdoor air intakes, windows, or doors?
- Are there sources nearby or upwind:
  - Exhaust from traffic, loading docks, or flues?
  - Industrial, agricultural, or lawn care activity?
  - Construction activity?
- Are pollen levels high?

Building Sources

- Has there been recent painting, roofing, remodeling, or construction?
- Were pesticides applied recently?
- Has new furniture, flooring, or equipment been installed?
- Are solvents or other chemicals stored in poorly sealed containers?
- Are areas in the building overly dusty?
- Are combustion appliances used in rooms without adequate ventilation?

Air Temperature & Humidity

- Is the thermostat set properly?
- Is air flowing from the vent too cool or too warm?
- Are drafts or direct sunlight causing discomfort?
- Is humidity too high or low? (Recommended range is 30-60% relative humidity.)
- Does condensation frequently form on windows or other cold surfaces?
- Is there an objectionable odor?

Outdoor Air Supply

- Is the ventilation system on?
- Is the airflow from vents sufficient?
- Is the airflow through outdoor intakes sufficient?*
- Are the fans turned on?
- Are outdoor air intakes, vents, or ducts blocked?
- Are outdoor air intakes near pollutant sources (e.g., idling vehicles or dumpsters)?
- Is outdoor air supply at least 15 cfm per person?**
- Is carbon dioxide (CO_2) in the area more than 700 ppm above outdoor concentrations?

Air Handling Unit

- Is the system turned on?
- Is the airflow from vents sufficient?*
- Are the fans turned on?
- Are filters clean and properly installed?
- Are dampers operating correctly?
- Is there moisture, debris, or mold in or near the unit?
- Are drain pans clean and sloped toward the drain?
- Do coils need to be cleaned?
- Is combustion equipment properly vented without flue leaks or backdrafting?

Diagnosed inf... clusters of serio...

Cough; congestion; chest tightness; shortness of breath; fever, chills, and/or fatigue

Swelling, itching, or irritated eyes, or throat; congestion

Headache, lethargy, nausea, drowsiness, and dizziness

Temperature or humidity problems (occupant discomfort)

Odors

What to do in an emergency

...n emergency

INDOOR AIR QUALITY PROBLEM SOLVING WHEEL

1 Turn to the symptoms of the problem (blue) or to the instructions (yellow) in the window below.

Identifying an emergency

2 Read notes below, then check sections indicated by a yellow pointer.

Emergencies are situations in which limited time is available to avert serious health problems or property damage, such as:

- Life-threatening situations, such as hazardous materials spills.
- When occupants show symptoms of carbon monoxide poisoning (headaches, lethargy, nausea, drowsiness, dizziness, and unusual fatigue or confusion).
- When occupants show widespread breathing difficulties such as shortness of breath, chest tightness, or respiratory irritation.
- Diagnosed Legionnaire's disease or tuberculosis.

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Communi

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How to us

in an emergency

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Outdoor Sources

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- Are there sources nearby or upwind:
  - Exhaust from traffic, loading docks, or flues?
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- Are pollen levels high?

Building Sources

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- Does condensation frequently form on windows or other cold surfaces?
- Is there an objectionable odor?

Outdoor Air Supply

- Is the ventilation system on?
- Is the airflow through vents sufficient?*
- Is the airflow from vents sufficient?*
- Are the fans turned on?
- Are outdoor intakes, vents, or ducts blocked? (e.g., dining vehicles or dumpsters)?
- Is outdoor air supply at least 15 cfm per person?**
- Is carbon dioxide (CO_2) in the area more than 700 ppm above outdoor concentrations?

Air Handling Unit

- Is the system turned on?
- Is the airflow from vents sufficient?*
- Are the fans turned on?
- Are filters clean and properly installed?
- Are dampers operating correctly?
- Is there moisture, debris, or mold in or near the unit?
- Are drain pans clean and sloped toward the drain?
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Diagnosed infection or clusters of serious health problems

Cough, congestion, chest tightness, shortness of breath, fever, chills, and/or fatigue

Swelling, itching, or irritated eyes, nose, or throat; congestion

Headache, lethargy, nausea, drowsiness, and dizziness

Temperature or humidity problems (occupant discomfort)

Odors

INDOOR AIR QUALITY PROBLEM SOLVING WHEEL

1 Turn to the symptoms of the problem (blue) or to the instructions (yellow) in the window below.

What to do in an emergency

2 Read notes below, then check sections indicated by a yellow pointer.

- Immediately seek medical or public health assistance (e.g., from local or state health department).
- Evacuate affected areas, if warranted.
- When appropriate, such as for carbon monoxide poisoning or chemical spills, ventilate the affected areas with large amounts of outside air (use temporary fans if needed).
- Inform building occupants and parents of minors of the problem, and maintain clear communications.

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EPA

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  - Construction activity?
- Are pollen levels high?

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- Is the airflow through outdoor intakes sufficient?*
- Are the fans turned on?
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- Are outdoor air intakes near pollutant sources (e.g., idling vehicles or dumpsters)?
- Is outdoor air supply at least 15 cfm per person?**
- Is carbon dioxide (CO_2) in the area more than 700 ppm above outdoor concentrations?

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- Do coils need to be cleaned?
- Is combustion equipment properly vented without flue leaks or backdrafting?

...irflow, use special ...ke or a piece of tissue. ...ke near openings between the adjacent areas (openings include ...d plumbing passageways, and leaky ...dows). Release smoke near vents and ...the airflow direction, if any. Do not ...he on or move quickly ...ear puffs of smoke.

- Notify b... (and parents... cannot be resolv...
- Provide a final rep...
- S...

Identifying an em...

How to use this Wheel

Temperature or humidity problems (occupant discomfort)

Headache, lethargy, nausea, drowsiness, and dizziness

Swelling, itching, or irritated eyes, ... or throat; congestion

Cough; congestion; chest tightness; shortness of breath; fever, chills, ... fatigue

Diagnosed infection or clusters of serious health problems

INDOOR AIR QUALITY PROBLEM SOLVING WHEEL

1 Turn to the symptoms of the problem (blue) or to the instructions (yellow) in the window below.

Odors

2 Read notes below, then check sections indicated by a yellow pointer.

Notes

Start with the most logical odor source. If odors do not seem to be coming from the immediate area, use chemical smoke to track airflows from adjacent areas from which the odors may be emanating. Also, remember that your nose often becomes used to most odors. "Reset" your nose often with clean air to more effectively track odors with your nose.

Biological Sources

- Do you see or smell mold?
- Are there signs of rodents or pests?
- Are there animals or pets in classrooms?
- Is condensation often present on windows or cold surfaces?
- Do you see wet or frequently damp areas?
- Is indoor relative humidity above 60%?

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Housekeeping Sources

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- Have there been recent changes in housekeeping procedures?
- Are housekeeping products sufficiently diluted or used based on manufacturers' directions?
- Are products stored in sealed containers and/or in rooms with adequate ventilation?
- Are paints, markers, or other art supplies capped or closed?

Outdoor Sources

- Are sources of odors or pollutants (e.g., vehicle exhaust, stored chemicals, or trash bins) located near outdoor air intakes, windows, or doors?
- Are there sources nearby or upwind:
  - Exhaust from traffic, loading docks, or fleets?
  - Industrial, agricultural or lawn care activity?
  - Construction activity?
- Are pollen levels high?

Building Sources

- Has there been recent painting, roofing, remodeling, or construction?
- Were pesticides applied recently?
- Has new furniture, flooring, or equipment been installed?
- Are solvents or other chemicals stored in poorly sealed containers?
- Are areas in the building overly dusty?
- Are combustion appliances used in rooms without adequate ventilation?

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- Is the thermostat set properly?
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- Is humidity too high or low? (Recommended range is 30-60% relative humidity.)
- Does condensation frequently form on windows or other cold surfaces?
- Is there an objectionable odor?

Outdoor Air Supply

- Is the ventilation system turned on?*
- Is the airflow from vents sufficient?*
- Are the fans turned on?
- Are outdoor intakes, vents, or ducts blocked (e.g., idling vehicles or dumpsters)?
- Is outdoor air supply at least 15 cm per person?**
- Is carbon dioxide (CO_2) in the area more than 700 ppm above outdoor concentrations?

Air Handling Unit

- Is the system turned on?
- Is the airflow from vents sufficient?*
- Are the fans turned on?
- Are filters clean and properly installed?
- Are dampers operating correctly?
- Is there moisture, debris, or mold in or near the unit?
- Are drain pans clean and sloped toward the drain?
- Do coils need to be cleaned?
- Is combustion equipment properly vented without flue leaks or backdrafting?

Local Exhaust

- Is the exhaust system turned on?
- Is the exhaust fan turned on?
- Are exhaust systems used consistently in special areas (e.g., in science labs or technical shops)?
- Does exhaust move air back into the room rather than outside?*
- Is a sufficient amount of air being exhausted?**
- Is exhaust ductwork blocked?
- Is a sufficient quantity of air entering the room?*

3 If all potential causes with yellow pointers have been checked yet problem remains, check other potential causes or seek professional assistance.

EPA

***Airflow**

To detect airflow, use special chemical smoke or a piece of tissue. Release puffs of smoke near openings between the complaint area and adjacent areas (openings include cracks, ducts, wiring and plumbing passageways, and leaky or open doors and windows). Release smoke near vents and grilles to determine airflow direction, if any. Do not breathe on or move quickly near puffs of smoke.

Identifying an emergency

What to do in an

How to use this Wheel

Diagnosed infection or clusters of **ous health problems**

Cough; congestion; chest tightness; shortness of breath; fever, chills, and/or fatigue

Headache, lethargy, nausea, drowsiness, and dizziness

Smelling, itching, or irritated **nose, throat, congestion**

or humidity problems **discomfort)**

INDOOR AIR QUALITY PROBLEM SOLVING WHEEL

1 Turn to the symptoms of the problem (blue) or to the instructions (yellow) in the window below.

Temperature or humidity problems (occupant discomfort)

2 Read notes below, then check sections indicated by a yellow pointer.

Notes

Due to wide differences in personal comfort levels and clothing, typically up to 20% of people in a space may be uncomfortable to some degree—so don't expect to obtain 100% satisfaction. Also, occupant discomfort may result from other factors such as glare, noise, poor ergonomics, or job or home stress.

3 If all potential causes with yellow pointers have been checked yet problem remains, check other potential causes or seek professional assistance.

EPA

•Airflo

To detect airflow, use chemical smoke or a piece Release puffs of smoke near openi complaint area and adjacent areas (cracks, ducts, wiring and plumbing pass or open doors and windows). Release sm grilles to determine airflow direction, breathe on or move quickly near puffs of smoke.

Local Exhaust

- Is the exhaust system turned on?
- Is the exhaust fan turned on?
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- Does exhaust move air back into the room rather than outside?*
- Is a sufficient amount of air being exhausted?**
- Is exhaust ductwork blocked?
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Biological Sources

- Do you see or smell mold?
- Are there signs of rodents or pests?
- Are there animals or pets in classrooms?
- Is condensation often present on windows or cold surfaces?
- Do you see wet or frequently damp areas?
- Is indoor relative humidity above 60%?

Excess moisture can cause mold, dust mites, and bacteria to flourish. Moist or wet materials should be dried within 24-48 hours to avoid mold growth or replaced if mold already exists.

Housekeeping Sources

- Do complaints occur during or just after housekeeping activities?
- Are chemical or cleaning products used near the complaint area?
- Are any new cleaning products or procedures being used?
- Have there been recent changes in housekeeping procedures?
- Are housekeeping products sufficiently diluted or used based on manufacturers' directions?
- Are products stored in sealed containers and/or in rooms with adequate ventilation?
- Are paints, markers, or other art supplies capped or closed?

Outdoor Sources

- Are sources of odors or pollutants (e.g., vehicle exhaust, stored chemicals, or trash bins) located near outdoor air intakes, windows, or doors?
  - Exhaust from traffic, loading docks, or idling?
  - Industrial, agricultural, or lawn care activity?
  - Construction activity?
- Are pollen levels high?

Building Sources

- Has there been recent painting, roofing, remodeling, or construction?
- Were pesticides applied recently?
- Has new furniture, flooring, or equipment been installed?
- Are solvents or other chemicals stored in poorly sealed containers?
- Are areas in the building overly dusty?
- Are combustion appliances used in rooms without adequate ventilation?

Air Temperature & Humidity

- Is the thermostat set properly?
- Is air flowing from the vent too cool or too warm?
- Is humidity too high or low? (Recommended range is 30-60% relative humidity.)
- Are drafts or direct sunlight causing discomfort?
- Does condensation frequently form on windows or other cold surfaces?
- Is there an objectionable odor?

Outdoor Air Supply

- Is the ventilation system on?
- Is the airflow through outdoor intakes sufficient?*
- Is the airflow from vents sufficient?*
- Are the fans turned on?
- Are filters clean and properly installed?
- Are dampers operating correctly?
- Is there moisture, debris, or mold in or near the unit?
- Are drain pans clean and sloped toward the drain?
- Do coils need to be cleaned?
- Is combustion equipment properly vented without flue leaks or backdrafting?

Air Handling Unit

- Is the system turned on?
- Is the airflow from vents sufficient?*
- Are the fans turned on?
- Are filters clean and properly installed?
- Are dampers operating correctly?
- Is there moisture, debris, or mold in or near the unit?
- Are drain pans clean and sloped toward the drain?
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Odors

Swelling, itching, or irritated eyes, nose, or throat; congestion

Cough, congestion, chest tightness, shortness of breath, fever, chills, and/or fatigue

Diagnosed infection or clusters of serious health problems

How to use this Wheel

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INDOOR AIR QUALITY PROBLEM SOLVING WHEEL

1 Turn to the symptoms of the problem (blue) or to the instructions (yellow) in the window below.

Headache, lethargy, nausea, drowsiness, and dizziness

2 Read notes below, then check sections indicated by a yellow pointer.

Notes

If onset was sudden or severe, check for carbon monoxide poisoning (see the yellow section "What to do in an emergency"). Note if symptoms dissipate after leaving the building or room. Since these symptoms have many potential causes, check for adequate ventilation or unusual pollutant sources in the building or room.

3 If all potential causes with yellow pointers have been checked yet problem remains, check other potential causes or seek professional assistance.

EPA

Biological Sources

- Do you see or smell mold?
- Are there signs of rodents or pests?
- Are there animals or pets in classrooms?
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Outdoor Sources

- Are sources of odors or pollutants (e.g., vehicle exhaust, stored chemicals, or trash bins) located near outdoor air intakes, windows, or doors?
- Are there sources nearby or upwind:
  - Exhaust from traffic, loading docks, or fuels?
  - Industrial, agricultural, or lawn care activity?
  - Construction activity?
- Are pollen levels high?

Building Sources

- Has there been recent painting, roofing, remodeling, or construction?
- Were pesticides applied recently?
- Has new furniture, flooring, or equipment been installed?
- Are solvents or other chemicals stored in poorly sealed containers?
- Are areas in the building overly dusty?
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- Is humidity too high or low? (Recommended range is 30-60% relative humidity.)
- Does condensation frequently form on windows or other cold surfaces?
- Is there an objectionable odor?

Outdoor Air Supply

- Is the ventilation system on?
- Is the airflow through vents sufficient?*
- Is the airflow through outdoor intakes sufficient?*
- Are the fans turned on?
- Are outdoor intakes, vents, or ducts blocked? (e.g., idling vehicles or dumpsters)?
- Is exhaust from nearby pollutant sources drawn into outdoor air intakes?
- Is outdoor air supply at least 15 cfm per person?**
- Is carbon dioxide (CO_2) in the area more than 700 ppm above outdoor concentrations?

Air Handling Unit

- Is the system turned on?
- Is the airflow from vents sufficient?*
- Are the fans turned on?
- Are filters clean and properly installed?
- Are dampers operating correctly?
- Is there moisture, debris, or mold in or near the unit?
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Local Exhaust

- Is the exhaust system turned on?
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- Does exhaust move air back into the room rather than outside?*
- Is a sufficient amount of air being exhausted?**
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Volume

Pods are designed
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or open doors and wi
grilles to deter
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Temperature or hu
(occupan

Odors

What to do in an emergency

Identifying an emergency

How to use this Wheel

ching, or irritated
oat; congestion

Cough; congestion; chest tightness; shortness of breath; fever, chills, and/or fatigue

Pulmonary infection or serious health problems

clusters

INDOOR AIR QUALITY PROBLEM SOLVING WHEEL

1 Turn to the symptoms of the problem (blue) or to the instructions (yellow) in the window below.

Swelling, itching, or irritated eyes, nose, or throat; congestion

2 Read notes below, then check sections indicated by a yellow pointer

Notes

May be an allergic reaction, if only a small number are affected (check "Biological Sources" first); more likely to be irritation response if a large number are affected (check "Housekeeping Sources," "Outdoor Sources," or "Building Sources" first). Symptoms may disappear when occupant is away from the building. Check for strong pollutant sources in the area/room (e.g., paint, solvent, adhesive, aerosol products, cleaners, petroleum products, printing, cooking). Check for any new pollutant sources in use. Also see symptoms to right.

Biological Sources

- Do you see or smell mold?
- Are there signs of rodents or pests?
- Are there animals or pets in classrooms?
- Is condensation often present on windows or cold surfaces?
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- Does condensation frequently form on windows or other cold surfaces?
- Is there an objectionable odor?

Outdoor Air Supply

- Is the ventilation system on?
- Is the airflow adequate?*
- Is the airflow from vents sufficient?*
- Are the fans turned on?
- Are outdoor intakes, vents, or ducts blocked (e.g., damp vehicles or dumpsters)?
- Are outdoor air intakes near pollutant sources (e.g., idling vehicles or dumpsters)?
- Is outdoor air supply at least 15 cfm per person?**
- Is carbon dioxide (CO_2) in the area more than 700 ppm above outdoor concentrations?

Air Handling Unit

- Is the system turned on?
- Is the airflow from vents sufficient?*
- Are the fans turned on?
- Are filters clean and properly installed?
- Are dampers operating correctly?
- Is there moisture, debris, or mold in or near the unit?
- Are drain pans clean and sloped toward the drain?
- Do coils need to be cleaned?
- Is combustion equipment properly vented without flue leaks or backdrafting?

Local Exhaust

- Is the exhaust system turned on?
- Is the exhaust fan turned on?
- Are exhaust systems used consistently in special areas (e.g., in science labs or technical shops)?
- Does exhaust move air back into the room rather than outside?*
- Is a sufficient amount of air being exhausted?**
- Is exhaust ductwork blocked?
- Is a sufficient quantity of air entering the room?*

3 If all potential causes with yellow pointers have been checked yet problem remains, check other potential causes or seek professional assistance.

EPA

****Air Volume**

Flowhoods are designed to measure airflow at grilles and diffusers. Pilot tubes are designed to measure air velocity in ducts; air velocity is then used to calculate airflow. While flowhoods are more expensive to purchase than pilot tubes, they are easier to use and can be used to measure airflow in ducts by summing the airflows from all vents connected to a given duct.

Headache, lethar... drowsiness, a...

...chest tightness; shortness ...ills, and/or fatigue

Diagnosed infection or clusters of serious health problems

Temperature or humidity problems (occupant discomfort)

Odors

How to use this Wheel

Identifying an emergency

What to do in an emergency

INDOOR AIR QUALITY PROBLEM SOLVING WHEEL

1 Turn to the symptoms of the problem (blue) or to the instructions (yellow) in the window below.

Cough; congestion; chest tightness; shortness of breath; fever, chills, and/or fatigue

2 Read notes below, then check sections indicated by a yellow pointer

Notes

Check for microbial contamination in the Air Handling Unit and ductwork. A medical evaluation can help identify possible causes, such as carbon monoxide poisoning, hypersensitivity pneumonitis, or humidifier fever. Also see symptoms to left.

3 If all potential causes with yellow pointers have been checked yet problem remains, check other potential causes or seek professional assistance.

EPA

Swelling, itching, eyes, nose, or th

ed infection or s health problems

How to use this Wheel

Identifying an emergency

What to do in an emergency

Odors

Temperature or humidity problems (continued) Occupant discomfort

Headache, lethargy, nausea, drowsiness, and dizziness

Local Exhaust

- Is the exhaust system turned on?
- Is the exhaust fan turned on?
- Are exhaust systems used consistently in special areas (e.g., in science labs or technical shops)?
- Does exhaust move air back into the room rather than outside?*
- Is a sufficient amount of air being exhausted?**
- Is exhaust ductwork blocked?
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Biological Sources

- Do you see or smell mold?
- Are there signs of rodents or pests?
- Are there animals or pets in classrooms?
- Is condensation often present on windows or cold surfaces?
- Do you see wet or frequently damp areas?
- Is indoor relative humidity above 60%?

Excess moisture can cause mold, dust mites, and bacteria to flourish. Moist or wet materials should be dried within 24-48 hours to avoid mold growth or replaced if mold already exists.

Housekeeping Sources

- Do complaints occur during or just after housekeeping activities?
- Are chemical or cleaning products used near the complaint area?
- Are any new cleaning products or procedures being used?
- Have there been recent changes in housekeeping procedures?
- Are housekeeping products sufficiently diluted or used based on manufacturers' directions?
- Are products stored in sealed containers and/or in rooms with adequate ventilation?
- Are paints, markers, or other art supplies capped or closed?

Outdoor Sources

- Are sources of odors or pollutants (e.g., vehicle exhaust, stored chemicals, or trash bins) located near outdoor air intakes, windows, or doors?
- Are there sources nearby or upwind:
  - Exhaust from traffic, loading docks, or fleets?
  - Industrial, agricultural, or lawn care activity?
  - Construction activity?
- Are pollen levels high?

Building Sources

- Has there been recent painting, roofing, remodeling, or construction?
- Were pesticides applied recently?
- Has new furniture, flooring, or equipment been installed?
- Are solvents or other chemicals stored in poorly sealed containers?
- Are areas in the building overly dusty?
- Are combustion appliances used in rooms without adequate ventilation?

Air Temperature & Humidity

- Is the thermostat set properly?
- Is air flowing from the vent too cool or too warm?
- Are drafts or direct sunlight causing discomfort?
- Is humidity too high or low? (Recommended range is 30-60% relative humidity.)
- Does condensation frequently form on windows or other cold surfaces?
- Is there an objectionable odor?

Outdoor Air Supply

- Is the ventilation system on?
- Is the airflow through outdoor intakes sufficient?*
- Is the airflow through vents sufficient?
- Are the fans turned on?
- Are outdoor intakes near pollutant sources (e.g., idling vehicles or dumpsters)?
- Is outdoor air supply at least 15 cfm per person?**
- Is carbon dioxide (CO_2) in the area more than 700 ppm above outdoor concentrations?

Air Handling Unit

- Is the system turned on?
- Is the airflow from vents sufficient?*
- Are the fans turned on?
- Are filters clean and properly installed?
- Are dampers operating correctly?
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Diagnosed infection or clusters of serious health problems

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Notes

May be Legionnaire's disease or histoplasmosis related to bacteria or mold found in the building or near outdoor air intakes. Contact your local or state health department for guidance.

3 If all potential causes with yellow pointers have been checked yet problem remains, check other potential causes or seek professional assistance.

EPA

Cough; congestion; chest ... of breath; fever, ch...

Swelling, itching, or irritated eyes, nose, or throat; congestion

Headache, lethargy, nausea, drowsiness, and dizziness

Temperature or humidity problems (occupant discomfort)

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What to do in an emergency

Identifying an emergency

...use this Wheel

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...mmunicate
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...of minors) if the problem
...d quickly and the investigation
...will be ongoing.
...t of the outcome to building occupants
...ld parents of minors).
EPA publications for more
...mmunication guidance.

Flowhoo...
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Indoor Air Quality

Problem Solving Wheel

Spatial Patterns of Complaints

Widespread, no apparent spatial pattern	• Check ventilation and temperature for entire building. • Check outdoor air quality and outdoor sources. • Identify sources that are spread throughout the building (e.g., cleaning materials, contaminated HVAC systems, overcrowding, furnishings). • Check for general distribution of a source throughout the ventilation system. • Consider explanations other than air contaminants.
Localized (e.g., affecting individual rooms, zones, or air handling systems)	• Check ventilation and temperature within the complaint area. • Identify pollutant sources that may affect the complaint area (e.g., copy room, storage closet, smoking lounge, mold/moisture). • Check for contamination of the local HVAC system.
Individual(s)	• Check for drafts, radiant heat (gain or loss), and other localized temperature control or ventilation problems near the affected individual(s). • Check local sources (see above) and consider that common sources may affect only susceptible individuals. • Consider the possibility that individual complaints may have different causes. If symptoms continue when occupants leave the building, there may be non-building related causes.

Important...

This Wheel provides an easy, step-by-step process for identifying and resolving common indoor air quality (IAQ) problems. It is important that this Wheel be used in conjunction with more detailed guidance. Call 800-438-4318 or visit www.epa.gov/iaq for a **free** copy of the *IAQ TfS* Kit or I-BEAM.

Indoor Air Quality Tools for Schools (IAQ TfS) Kit
EPA 402/K-07/008

IAQ Building Education and Assessment Model
(I-BEAM)
EPA 402-C-01-001
I-BEAM is comprehensive, state-of-the-art software that provides guidance for managing IAQ in large buildings.

The tables to the left and right can be helpful in defining the complaint area and in determining patterns in the timing of symptoms. The complaint area may need to be revised as the investigation continues. Keep in mind that symptoms may result from a combination of minor problems. Using this Wheel will not necessarily identify or resolve all problems caused by indoor air pollution.

Timing Patterns of Complaints

Symptoms begin and/or are worst at the start of the day or occupied period	• Review the operation procedures for the HVAC system. Pollutants from building materials or from the HVAC system itself may build up during unoccupied periods.
Symptoms worsen over the course of the occupied period	• Investigate whether ventilation is adequate to handle routine activities or equipment operation within the building, and that temperature and humidity are properly controlled.
Intermittent symptoms	• Look for daily, weekly, or seasonal cycles or weather-related patterns in maintenance or cleaning activities. • Check linkage to other events in and around the school. • Make sure the HVAC system is operating properly, including during extreme weather.
Single occurance of symptoms	• Consider spills and other isolated events as sources.
Recent onset of symptoms	• Check for recent changes or events (e.g., remodeling, renovation, redecorating, HVAC system adjustments, leaks, or spills).
Symptoms relieved on leaving the school, either immediately, overnight, or (in some cases) after extended periods away from the building	• Consider that the problems may be building-associated, though not necessarily due to air quality. Other stressors (e.g., lighting, noise) may be involved.

For more information and to view or order publications on indoor air quality topics, visit the National Service Center for Environmental Publication Web site at www.epa.gov/nscep or www.epa.gov/iaq.

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Indoor Air Quality (IAQ)