Middle School Lesson Plans

These kinesthetic and interactive lesson plans were largely developed by the Environmental Protection Agency to teach students about air quality and wildfire smoke preparedness. Please visit the EPA education site for more resources and projects for your classroom.

Lessons

What's Up There Besides Air?

Air Strips Lesson Plan

Particle Pollution Activity Paper Wad Game

Student IAQ School Assessment

Do It Yourself Box Fan Filters for Clean Air In Your Home: Teach students about how wildfire smoke affects indoor air quality and how they can make a cost effective air cleaner for their family, Information sheet available here

What's Up There Besides Air?

EPA

JUNE 2024

Grade: 5
Subject: Science, Language Arts
NGSS (DCI) Connections: ESS3.C
Time: 1 to 2 Class Periods

Student Objectives

- Define air pollution.
- Demonstrate the presence of air pollution in the air around us.
- Hypothesize on the sources of air pollution in the air around us.

Materials

- Notebook and pencil for each student
- A milk carton for each student, team or group of students
- Double-sided carpet tape
- Waterproof marker
- Directional compass
- Magnifying glass
- Colored pencils, markers or crayons
- Flashlight (optional)
- Posters (optional)

Background Information

Clean air is healthy for us to breathe. However, air can become polluted - that is, made dirty with particles and gases - making the air unhealthy. In general, air pollution is any visible or invisible particle or gas found in the air that is not part of the standard composition of air.

Some air pollution is from natural sources, but much of it comes from human-related activities such as car exhaust, factory emissions, and products that we use. It is important to note that both indoor air and outdoor air can be polluted. This lesson is focused on outdoor air. Air pollutants can be in one of two forms: particulate or gaseous. Particle pollution is in the form of small solids or droplets. Dust, smoke, sand, ash, smog and pollen are examples of particle pollution. Particle pollution is often easy for us to notice because it can make the air look dirty or smell unusual. Sometimes we can see particle pollution when it settles out of the air and accumulates on surfaces - our cars can be covered with yellow pollen, outdoor surfaces can be covered with dust and statues can become dirty from deposited soot.

Gaseous air pollutants are in the form of a gas: carbon monoxide, radon, ozone, and sulfur dioxide are a few examples. Some gaseous pollutants are invisible and odorless, making them more difficult to detect than particle pollution. Two such invisible pollutants are carbon monoxide and radon.

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Background Info (Cont.)

Others are more obvious because we can smell them or immediately feel their effects. Gaseous pollutants can combine with water vapor and other elements to create other pollutants. For example, ozone is created by an interaction of volatile organic compounds (VOCs), nitrogen oxides, natural atmospheric gases, and sunlight.

How do we know when air pollutants are present? As mentioned previously, sometimes we can see them or smell them. Other times we might experience noticeable effects of the pollutants, such as difficulty breathing when there's a lot of ozone in the air or watery eyes when there is excessive pollen in the air.

We can also obtain air quality information from apps, websites, government agencies, the news media and social media to inform us of the air quality conditions or forecast. You can check your air at AirqualityNow.gov or download the AirNow app.

Setting the Stage

What is Air Pollution?

- Students will discover ways in which they can tell that the air is polluted, learn that there are both particulate and gaseous air pollutants, and define (in their own words) the term "air pollution".
- The class will take a "walking" field trip outside in the area around the school or learning environment. Each student should have a notebook and pencil or pen for recording their observations. (*NOTE: This does not work as well immediately after a rain, because the air and surfaces have been cleansed of most air pollution.*)
- Before going outside, students should respond to the following in their notebooks using the NASA Kids air pollution site (https://climatekids.nasa.gov/air-pollution/):
  - *What causes air pollution? (solid and liquid particles and gases suspended/floating in the air)*
  - *Why is it important to keep track of pollutants in the air? (because they can be harmful to people and the environment)*
- Now take the students outside. Have students "smell" the air. Ask them if it smells clean, the way it does right after it rains, or if they can detect any other smells. Ask students to record what they smell in their notebooks.
- Ask students to look at the air, both right around them and toward the horizon. Is it clear or hazy? Ask them to record their observations in their notebooks.

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Setting the Stage (Cont.)

- Have students inspect objects in the vicinity to see if they can find any physical evidence of air pollutants (*stationary objects that collect dust, dirt, etc.*) and record their descriptions in their notebooks.
- When they have finished the field trip, return to the classroom and ask the students to share their findings. Ask them the following questions:
    - *Do you think polluted air always contains the same pollutants? (No) What observations tell you this? (Deposited pollutants look different, sometimes I sneeze when I go outside and sometimes I don't, etc.)*
    - *Do you think air pollutants are particles or gases? Why? (They can be either. Some we can see; some we can smell.)*
    - *You mentioned several things that you smelled or saw that let you know the air contained pollutants. Which indicate the presence of particulate air pollutants and which indicate the presence of gaseous air pollutants? (Deposited particles indicate particle pollution; smells indicate gaseous or particulate pollutants.)*
- Ask students to write a definition of the term "air pollution" in their notebooks.

Activity

Catching Particle Pollutants
Students will collect particle pollutants to demonstrate the presence of particle pollution have the carton labeled in the correct orientations.

1. Label the catchers 1, 2, 3, etc.
2. Place the cartons in various spots around the school, using the compass to make sure that N is facing north, etc. (*NOTE: Write on the bottom of carton the location where it is placed.*) Make a list showing where each catcher was placed.
3. Have students write their predictions about which side will "collect" more pollutants and explain their rationale.
4. After a few days, collect the cartons and examine them. On a chart write the location where the carton was placed, how much particulate matter was stuck to the tape, what it looked like (use a magnifying glass), and the direction from which the majority of the pollutants came, etc.

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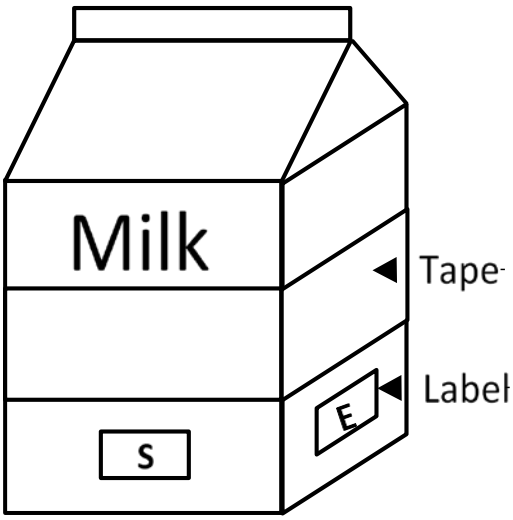
Extension



- Create and share a simple map that shows all the locations where the cartons were placed, with potential pollutant sources identified (*traffic, pollen sources, factories, etc.*)
- Use colored pencils, markers, or crayons, to indicate the relative amount of particulate matter "collected" at each of the locations. This can be done as a group or students can individually create these maps.
- Discuss possible reasons more particles were caught in some locations than in others (*proximity to road, exposure, wind direction, etc.*).
- Have students write a paragraph in their notebooks that lays out the observed air pollutants and hypothesizes on where they may have originated.
- Turn off the lights in the room. Ask the students if they think that the air in the classroom is clean. Shine a bright flashlight in the dark room and ask students to observe what they see around the beam of light. Have each student draw and describe in writing what they saw. Discuss their findings. Ask the students what senses were used and what senses were not used and why.
- Have the students make a collage using pictures cut from magazines. On one half of the paper, glue pictures of people or things polluting the air. On the other half, show pictures of people cleaning up and taking care of the earth.
- Have students write a cinquain (5-line stanza) on the topic of air pollution.
- Have students work in groups to create a "Don't Pollute" poster. They can make up their own catchy slogan. Display the posters around the school.
- Have the students create an opinion survey and ask older students or adults what they think are the biggest contributors to air pollution. Have the students record only what that individual thinks is the largest contributor. Have the students bring the results back to class and discuss their findings.

Air Strips Lesson Plan

EPA
JUNE 2024

Grades: 6-8
Subject: Science
NGSS Connections: ESS3.C
Time: 2 Class Periods (1 Week Apart)

Student Objectives

Define particulate matter.

- Collect particulate matter from the air in test areas around the school.
- Analyze the particles collected and draw conclusions about the airborne particulate pollutants.

Materials

- Poster board or cardboard
- Scissors
- Rulers
- Clear tape (e.g. packing tape)
- String
- Magnifying glasses
- Hole punch
- Permanent markers
- Optional: compasses, dissecting microscope, balance, quarter
- Student directions sheet (included)
- Air strips template (included)

Background Information

Our atmosphere is almost completely made up of invisible gases. Most major air pollutants are also invisible gases, although large amounts of them concentrated in areas such as cities can be seen as haze or smog.

The air we breathe indoors and outdoors always contains particulate matter (PM). Some particles, such as dust, dirt, soot, or smoke, are large enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope. Particulate matter can accumulate on surfaces such as buildings and other structures.

Particulate matter is made up of tiny particles of solid matter and/or droplets of liquid. Natural sources include volcanic ash, pollen, and dust blown about by the wind. Diesel fuel burned by vehicles on the road, as well as coal and oil burned by power plants and industries, are the chief sources of human-made particulate pollutants. However, not all sources are large-scale. The use of wood in fireplaces and wood- burning stoves can also produce significant amounts of particulate matter in localized areas. The U.S Environmental Protection Agency provides information on types of wood-burning appliances. If you choose to heat your home with wood, use the cleanest wood-burning appliance – these are marked with EPA-certified and EPA-qualified labels.

Particulate matter can be harmful to plant life and to animals and human life when the pollutants are inhaled. Smaller particles, (10 micrometers in diameter or smaller), pose the greatest health problems since these smaller particles generally pass through the nose and throat and enter the lungs. Because it can have harmful and serious effects, particulate matter is one of the six criteria pollutants – a pollutant for which the federal government has established laws and air quality standards.

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Air Strips Lesson Plan

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Setting the Stage

- Ask students to respond to the journal prompt: "Can we see air pollution? Explain your reasoning in 2-4 sentences."
- Define PM for students by sharing the "Background Information."
- Engage students in a classroom discussion about visible air pollution. Ask a few students who are comfortable doing so to share their journal responses. Encourage the class to give examples of visible air pollutants (e.g., smoke, dust, smog, etc.), drawing from facts in the background information and journal responses.

Activity

1. Make an air strip for yourself. Use this strip to show the students how their finished product should look, then use it as a control in step 4 for comparison with the test strips exposed to the air for 1 week.
2. Give each student a copy of the student directions sheet (included) and an air strip template (included). Provide the materials to make the strips and have the students follow the directions. *NOTE: Each student should make at least one air strip, more if there is time.*
3. Have the students hang the strips at different places around the school, both inside (e.g., hallways, cafeteria, bathrooms, classrooms, gym, kitchen, etc.) and outside (e.g., trees, walkways, entrances, etc.). Give each student tape to secure the air strip's string to a stable surface at the selected sites. The air strips should be able to move freely without bumping other surfaces. *NOTE: All air strips should be carefully labeled with date, location, and student's name.*
4. Have the students check the weather forecast to make sure that the air strips will not get wet in the rain. If the forecast calls for rain, bring the air strips in for that period of time before returning them outdoors.
5. After one week, have the students collect the strips. Tell them to be careful not to touch the sticky side of the tape.
6. Have the students visually compare the control air strip to the air strips used to collect particulate matter.
7. Distribute magnifying glasses and have the students try to identify as many particles on the tape as possible. Dust, ash/soot and/or other particles may be present. Depending upon the time of year, pollen may also have been collected. *OPTIONAL: You may choose to have the students use dissecting microscopes instead of, or in addition to, magnifying glasses.*
8. Ask the students to draw conclusions about the particulate air pollutants in the test areas. Are there differences in the particles based on where the air strips were placed?
9. Have each student develop a chart or graph using the information gathered by the class and write a summary paragraph about the activity.

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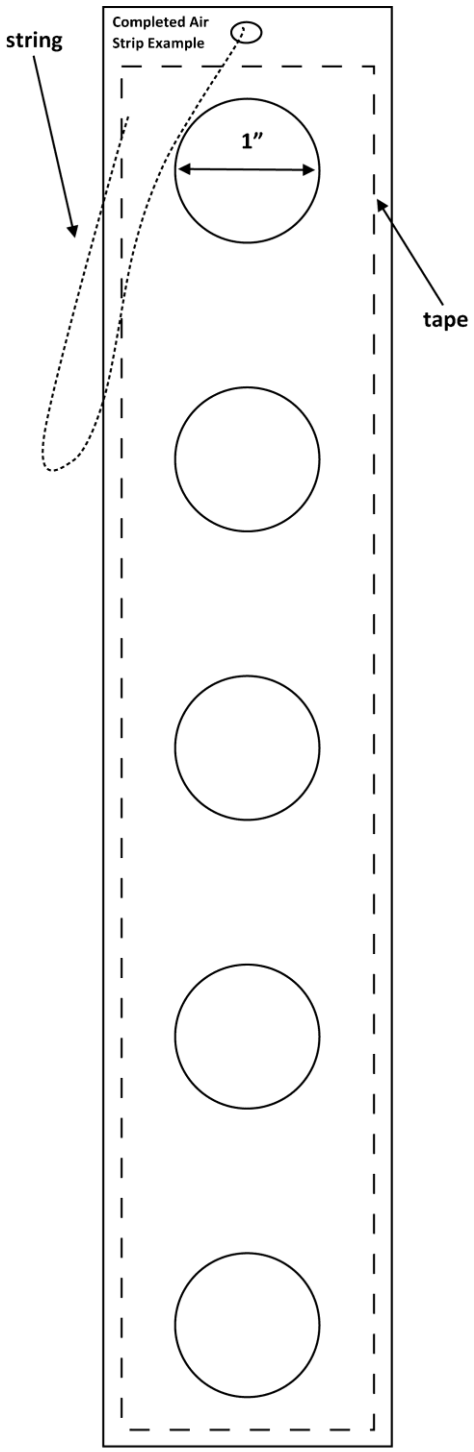
Student Directions

1. Cut out an air strip template (provided on page 5). Be sure to cut out the 5 circles in the center of the template strip.
2. Place the template on a piece of posterboard or cardboard. Trace around the outside of the template and each circle. Cut out the rectangular air strip. *Note*: *If you don't have a copy of the template, you can use a ruler to measure a rectangle that is 2 inches wide and 10 inches long on your posterboard or cardboard.*
3. Cut out the circles you traced on the posterboard or carboard. *Note: If you don't have a template, use a ruler to find a round object with a 1-inch diameter or use a compass to draw the circles*. *A quarter is about 1 inch in diameter.)*
4. Use a hole punch to put a small hole in one end of the strip. Tie a string through the hole; the string will be used to hang the strip at a selected site.
5. Put a long piece of clear tape over one side of the strip. Be sure to completely cover all 5 holes. (Depending upon the width of the tape, you may need 2 or more pieces.) The sticky side of the tape will collect particulate matter from the air. Make sure you do not touch the sticky side of the tape over the holes.
6. Before hanging the air strip at a selected site, use a permanent marker to write the date, location, and your name on the top edge of the strip.



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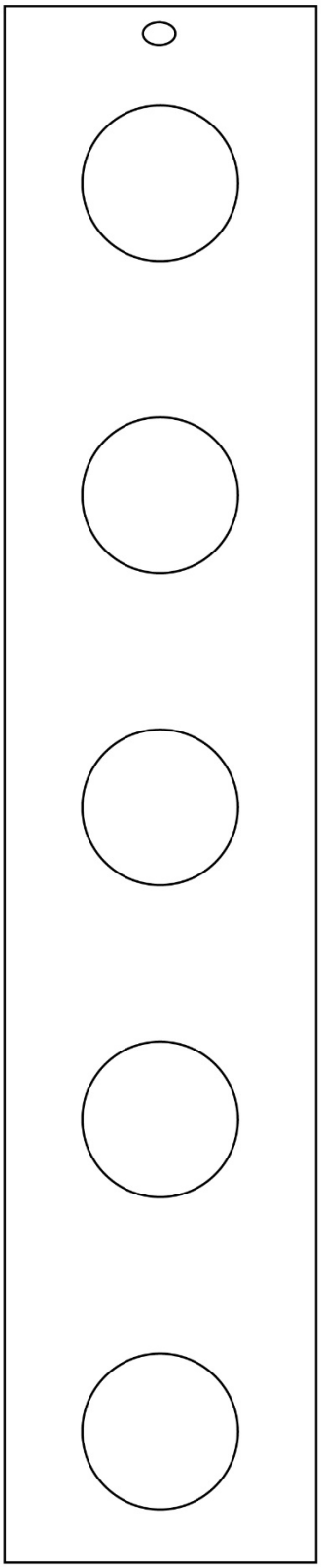
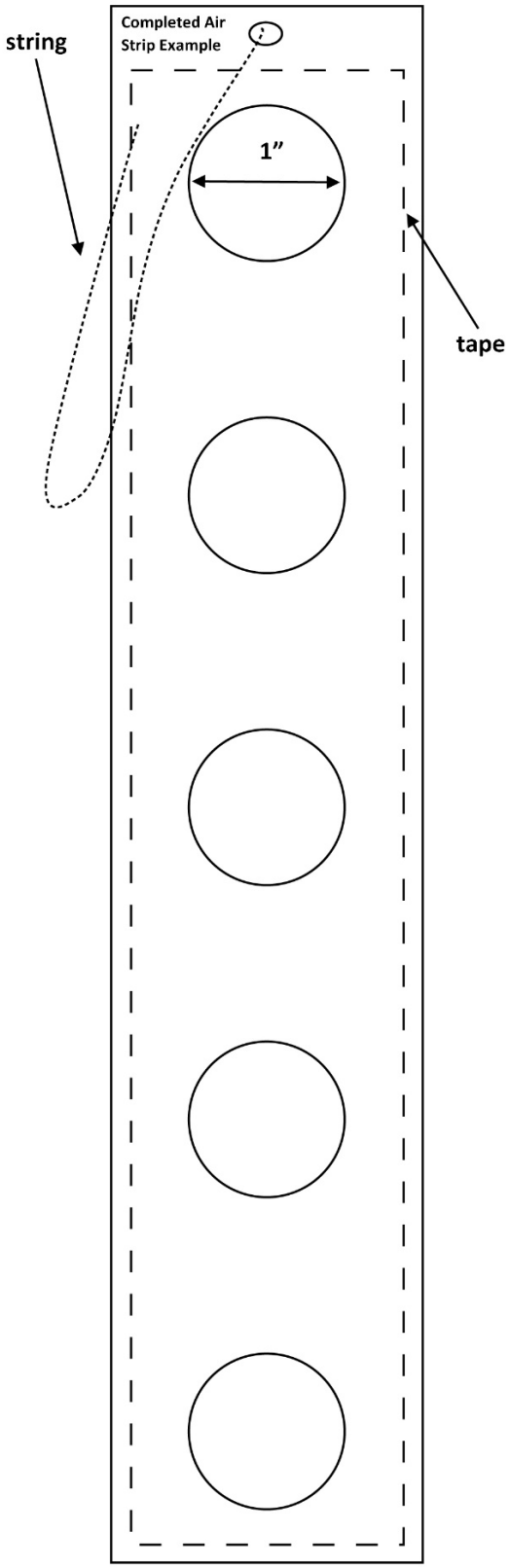
Extension

- Place air strips in a variety of other places for a week. Have the students compare the PM collected from the different areas.
- Hang new air strips daily and compare them to determine if the day of the week makes a difference in the amount of PM collected. Have the students consider possible factors such as weather, industrial schedules, etc.

Air Strip Template





Particle Pollution Activity – Paper Wad Game

EPA
JUNE 2024

Grades: 6-8
Subject: Science
NGSS Connections: ESS3.C, MS-LS1-3
Time: 15 minutes

Student Objectives

- Define particle pollution.
- Discuss potential sources of particle pollution.
- Identify health problems associated with particle pollution and how our bodies work to protect us.

Materials

- Swim noodle
- Golf ball
- Grain of sand
- Baseball-size paper wads (25 +/- paper wads depending on the number of participants) – these represent coarse particles in particle pollution.
- Marble-size paper wads (50 +/- paper wads depending on the number of participants) – these represent fine particles in particle pollution.

Background Information

In this activity, students pretend to be cilia, tiny hairs that protect and filter out particles in the lungs. As cilia, participants wave their arms and smack away particle pollution in the form of paper wads.

Particle pollution, also called particulate matter (PM), is a combination of tiny solid and liquid materials found in the air. Examples include dust, pollen, mold, and even metals. Potential sources include industries, power plants, automobiles, fires, construction sites, and unpaved roads.

Air monitoring stations throughout the US measure particle pollution of various ranges, but most monitor for $PM_{2.5}$ and PM_{10}.

- $PM_{2.5}$ - "fine particles" that are smaller than 2.5 microns in diameter.
- PM_{10} - "coarse particles" that are smaller than 10 microns in diameter.

The largest fine particle (measuring 2.5 microns in diameter) is almost 30 times smaller than the average human hair (averaging 70 microns in diameter).

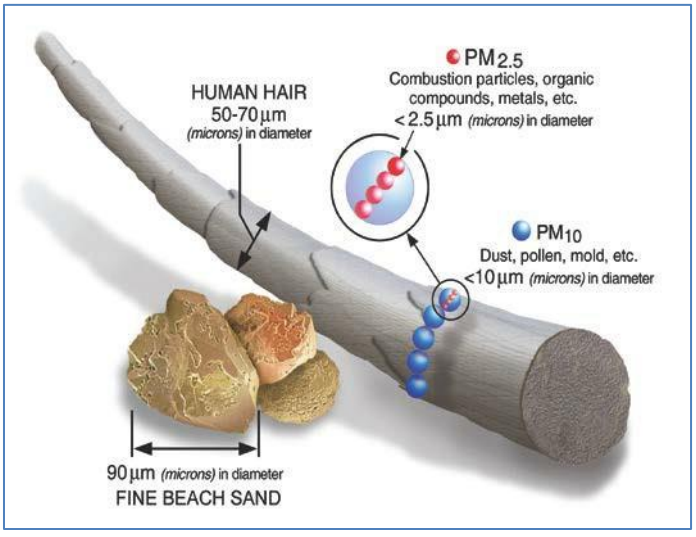


Image courtesy of the U.S. EPA

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Particle Pollution Activity – Paper Wad Game

EPA
JUNE 2024

Setting the Stage

- Tell students that they are going to play a game where each of them will pretend to be cilia - tiny hairs in the lungs that filter out dust and other particles we breathe in. They will have to block particles (paper balls) from going past them!
- Lead a discussion with students about how we know air pollution exists. Are air pollutants visible, can we use any of our senses to detect some or all of them?
- Have students give examples of visible air pollutants (e.g., smoke, dust, smog, etc.).
- Define PM for the students by sharing the "Background Information" above. This information can also be found on the EPA website; the link is listed in the additional resources section at the end of this document.
- Use the materials you collected as props to model the relative size of particulate matter for students. Tell them the swim noodle represents a strand of human hair, the golf ball represents PM_{10} and the grain of sand represents $PM_{2.5}$ "fine particles" in the image.

Activity

1. Have students stand in an open area (outside, gym, etc.) at least an arms-length distance from one another. Tell them they are the cilia in lungs.
2. As cilia, students are responsible for protecting the lungs from particle pollution (paper wads). Tell cilia (participants) to wave their arms and if a paper wad comes near them to smack it away. Depending on the size of the group, you may need another volunteer to help you throw particle pollution (paper wads) at the cilia (students).
3. After throwing particle pollution (paper wads) at the cilia (students), ask them if it was easy or difficult protecting the lungs from the coarse particle pollution (paper wads).
4. Tell the cilia (students) that they now will be protecting the lungs from fine particles ($PM_{2.5}$ in the image). *NOTE: you will only be using the marble-sized paper wads during this section of the activity.*
5. Tell the cilia (students) to again wave their arms and if a paper wad comes near them to smack it away. Again, depending on the size of the group, you may need another volunteer to help you throw particle pollution (paper wads) at the cilia (students)

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Activity (cont.)

6. After throwing particle pollution (paper wads) at the cilia (students) ask them if it was easy or difficult protecting the lungs from the fine particle pollution (paper wads). Ask students if it was easier or more difficult protecting the lungs from the coarse particles or fine particles.

7. Collect all the paper wads. Tell the cilia (students) that they now will be protecting the lungs from fine and coarse particles in particle pollution. *NOTE: you will be throwing both the baseball-sized paper wads and marble-sized paper wads in this section of the activity.*

8. Tell the cilia (students) to again wave their arms and if a paper wad comes near them to smack it away.

9. Discuss ways to reduce particle pollution. Examples include:
   - prohibiting smoking indoors,
   - reducing use of candles, woodstoves, and fireplaces,
   - only burning dry, seasoned wood in fireplaces and wood stoves,
   - ensuring woodstoves are EPA-certified (and replacing woodstoves that are not EPA-certified),
   - never burning garbage, and
   - using public transportation, carpooling, biking, or walking to reduce automobile emissions.

Additional Resources

Reference

U.S. EPA. *Particulate Matter: Basic Information*. https://www.epa.gov/pm-pollution

Teens Health. *Lungs and Respiratory System*. https://kidshealth.org/en/teens/lungs.html

Air Quality Flag PROGRAM

Student Indoor Air Quality Assessment

Most people know that outdoor air pollution can damage their health, but many do not know that indoor air pollution can also have harmful effects. Good indoor air reduces triggers for allergies and asthma, which contributes to a favorable learning environment. This section will help your school identify practices that impact indoor air quality and start you thinking about how you can modify these practices to improve it.

School Name: _____ **Date:** _____

Conducted By:
Please include adminstrators, teachers, school staff, students and parents involved in this assessment.

Name	**Title and/or Grade Level**
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

School Population:

Students: _____ Staff: _____

Most of the Student Indoor Air Quality Assessment sections are designed so students can do the majority of the investigations with some help from teachers and staff. Due to the technical nature of maintaining heating, ventilation and air conditioning systems (HVAC) and the location of building components, school building engineers or maintenance staff may have to do the bulk of this section.

A. General Indoor Air Quality Information

		YES	NO
1.	Does your school have an indoor air quality plan?		
2.	Does your school have a medical emergency plan that includes asthma/allergies?		
3.	Does your school/district have a policy addressing student self-medication?		
4.	Are students with asthma allowed to carry and use their rescue inhalers?		
5.	Does the school provide staff development for dealing with asthma/allergies?		
6.	Are your school vehicles, buildings and grounds "Smoke Free"?		
7.	Does your school have a regular cleaning schedule, and is it followed?		
8.	Is indoor air quality or information on asthma/allergies included in the curriculum?		
	If yes, at what grades, and in what subjects, is it included?		
9.	Have regularly occupied (45 minutes/day or more) spaces at or below ground level been tested for radon?		
	If a radon problem existed, have appropriate corrective measures been taken?		
10.	Have areas containing asbestos been identified and has asbestos been properly removed or contained?		

B. Indoor Air Quality Checklists

The following walk-through checklists (pages 3-5) are adapted from *EPA's Indoor Air Quality Tools for Schools*. They will give you a quick overview of conditions that affect the quality of air within your school. Use your senses of sight, smell, touch and hearing while doing your walk-through. You may want to refer to the *Indoor Air Quality Tools for Schools Kit* (http://www.epa.gov/iaq/schools/actionkit.html) for some helpful hints.

C. Action Plan

Based on the information you gathered from this assessment, what recommendations do you have for the school to improve its chemical management program? Use the chart on page 6 to brainstorm and organize ideas for action.

Indoor Inspection of Classrooms, Hallways, Offices, Staff Lounge, Auditorium and Gym

Indoor Air Quality Checklist

Make a copy and complete this checklist for each of the following rooms/areas: classrooms, offices, hallways, staff lounge, auditorium and gym.

Room #/Name: _____	Date of Assessment: _____		
	YES	NO	Observation
Is the temperature within acceptable ranges for the season (68°-78°F)?			
Is the relative humidity within acceptable ranges (33-55%)?			
Is the air exchange adequate?			
Are air supply and exhaust vents clear?			
Is area generally free from odors?			
Are there signs of ongoing water damage?			
Are there signs of mold or mildew?			
Is the area clean and relatively dust free?			
Is the area free of pests or any signs of them?			
Is there any sign of food or food waste lying around?			
Are trash cans emptied daily?			
Are chemicals and art supplies stored and handled in such way to reduce fumes?*			
If there are animals in the classroom: • Are cages cleaned regularly and waste disposed of regularly?			
• Is animal food stored in tightly sealed containers?			
Are teachers and staff aware of students' asthma/ allergies?			
Do occupants report health concerns?			
Is the paint peeling or flaking?**			
Do you have any other observations?			

* Under fume hood or tightly capped during storage.

**If your school was built before 1978, you may have a lead paint issue.

Indoor Inspection of Bathrooms, Locker Rooms, Plumbing/Utility Room, Janitorial Supply Closets, Kitchen and Furnace Room

Indoor Air Quality Checklist

Make a copy and complete this checklist for each of the following rooms/areas: bathrooms, locker rooms, plumbing or utility room, janitorial supply closets, kitchens and the furnace room.

Only Part 1 of the checklist has to be completed for bathrooms, locker rooms and plumbing/utility rooms. Both Parts 1 and 2 of the checklist should be completed for kitchens and the furnace room.

Room #/Name: _____	Date of Assessment: _____		
Part 1	**YES**	**NO**	**Observation**
Do rooms have operating exhaust fans?			
If yes, are the fans clean?			
Do all drains have traps?			
Are all drain traps filled with water?			
Are any of the water faucets or pipes leaking?*			
Are there any signs of ongoing water damage?			
Are there signs of mold or mildew?			
Are odorous or "hazardous" house cleaning chemicals used with adequate ventilation and/or only when school is unoccupied?			
Is the paint flaking or peeling?			
Part 2	**YES**	**NO**	**Observation**
Are combustion gas or fuel odors present?			
Do appliances have flues (furnaces, water heaters, etc.) or exhaust hoods (kitchen ranges, dishwashers, etc.)?			
Are all flue components free from leaks, disconnections and deterioration?			
Is soot or grease noticeable on outside of flue or vent?			
Are exhaust fans being used when appliances are in operation?			
Are exhaust vents and filters clean?			

Outdoor Inspection

Air Quality Checklist

Inspect outdoor areas of school grounds and complete checklist.

Date of Assessment: _____			
Air Intakes	**YES**	**NO**	**Observation**
Are ventilation units on?			
• If yes, is air flowing into the outdoor air intake?			
Are outdoor air intakes free from blockage or obstruction?			
Are bird or animal droppings near air intakes?			
Are sources of vehicle exhaust accumulation (parking, loading docks, bus loading, etc.) located near or upwind of air intakes?			
Does painting, roofing or maintenance of exterior building take place in the vicinity of air intakes when school is occupied?			
Are plumbing stacks at least 10 feet away from air intakes?			
Ground Level	**YES**	**NO**	**Observation**
Are vehicles adjacent to the building allowed to idle for longer than 3 minutes?			
Are garbage dumpsters located near air intakes or windows and doors that are frequently open?			
Are other potential sources of air contamination (chimneys, stacks, industry) located near the building?			
Does the area around the building have good site drainage?			
Do sprinklers over spray the building and air intakes or allow water to pool near the building?			
Do all entrances have clean "walk-off" mats to collect shoe dust and dirt?			
Is paint outside peeling or flaking?			
Roof	**YES**	**NO**	**Observation**
Is the roof in good repair?			
Is there evidence of water pooling on the roof?			
Are exhaust fans operating and air flowing out?			
Is there any evidence of bird or animal nests or droppings?			
Do you have any other observations?			

Indoor Air Quality Assessment: Ideas for Action

Based on the information you gathered from the Indoor Air Quality Assessment, what action ideas do you have to improve the air quality in and around your school? Use this sheet to record your ideas.

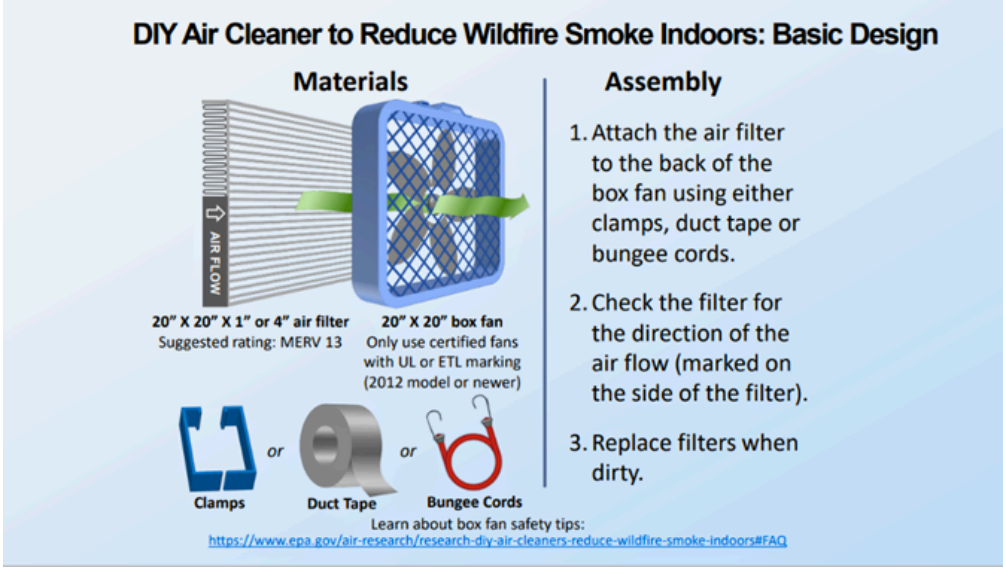
Section	General Ideas	Classroom Connections/ Lesson Plan Ideas	Community Involvement/ Activity Ideas	Outside Sources (organizations, community members, professionals)
A. General Indoor Air Quality Information				
B. Indoor Air Quality Checklists				

DIY Air Cleaner Instructions

Smoke from wildfires in Montana can affect indoor as well as outdoor air quality, putting people's health at risk from exposure to particulate matter and other pollutants. When outdoor air is unhealthy, a HEPA air cleaner is recommended for your home. If a HEPA air cleaner is not available, a DIY Air Cleaner is an inexpensive and effective alternative to achieving cleaner indoor air.

The Basic Design for a DIY Air Cleaner is inexpensive, easy to build, and effective in small and medium sized rooms. The second image is a more complex design that will improve the effectiveness of the DIY cleaner.

How to Video from the Washington Department of Ecology for a Basic Box Fan DIY Cleaner: https://youtu.be/4qr1Aj6Di7w?si=4gPDUKMCg7rI9Pxx



Two filters taped with cardboard to form a triangle against the fan (video from the Confederated Tribes of the Colville Reservation): https://youtu.be/ukyF2xm8cws?si=MDCv25sGtbr4V0MX