

5. Adventures in Climate and Health: Air Detectives: Dive into the facts of Indoor Air Quality



Student Objectives:

- The students will learn what indoor air quality is
- The students will learn indoor air quality impacts
- The students will understand how to make air quality improvements.

Lesson Plan:

This lesson teaches students to be aware of factors that impact indoor air quality and steps they can do to reduce indoor air pollution.

Materials Required:

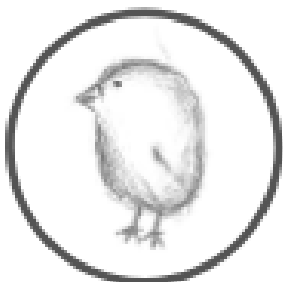
Fan, onion (cut up), baggie, timer, assessment tool and markers, visuals of pollution

Key vocabulary:

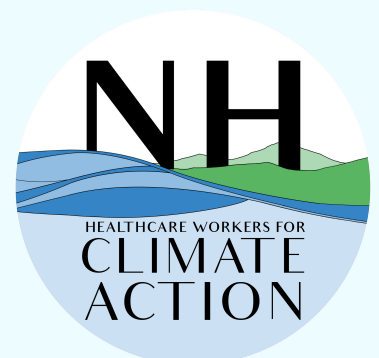
Pollutants: a substance that pollutes the environment

Fumes: gas, smoke, or vapor that smells strongly or is dangerous to breathe

Ventilation: bringing fresh air to a room, building, etc.



**Climate and Health Initiative
for Children
in Kearsarge & Sunapee**



Background Information:

The quality of the air we breathe impacts our health, comfort, and wellbeing. Air pollution brings down the air quality. It's caused by substances in the air like pollen, cooking, chemical fumes, pet dander, smoke, burning candles, and other things that we may not be able to see or smell. Exhaust from a bus and smoke from a fire are two examples of pollution that we can see and smell. Mold, fumes cleaning products, paint fumes, and tobacco smoke are examples of pollution that we might not see but can smell. Indoor air pollutants can cause respiratory problems, allergies, asthma attacks, headaches, dizziness, and fatigue. When we breathe those sources in, they can travel deep into our lungs. The more and longer we breathe these things in, the more likely we are to start feeling not well. For people with breathing problems like asthma, even breathing in polluted air for a short while can cause problems.

Maintaining good indoor air quality is important for our health and wellbeing. Being aware of air quality and taking steps to reduce indoor air pollution is important. Windows should be open when possible and fans or air purifiers used to circulate and filter the air. Simple steps that everyone can do to reduce indoor air pollution include keeping living spaces clean and free from dust, opening windows for ventilation, avoiding smoke, using natural cleaning products, and keeping shoes at the door to prevent tracking in outdoor pollutants, and minimizing clutter. Steps adults can take include using ventilation when cooking, properly maintaining heating, ventilation, and air conditioning systems, and monitoring the air quality with specialized tools to inform steps they need to take to make improvements.

Certain plants, such as spider plants, snake plants, and peace lilies, can help improve indoor air quality by absorbing pollutants and releasing oxygen. Having plants in the classroom and home is another simple step that everyone can do to reduce indoor air pollution.



While there are special tools to monitor the indoor air quality, there are simple checks that can be done to evaluate the indoor space for things children can control to prevent or mitigate air pollution.

Is the indoor space well-ventilated with proper airflow and access to fresh outdoor air?

Is the indoor space clean and dust free?

Is the indoor space free of clutter?

Are shoes left on a mat at the door?

Are cleaning and art products free of toxic chemicals?

Are there indoor plants that can help improve air quality?

Is smoking strictly prohibited?

Are there any gas stoves, fireplaces, or unvented heaters?

Procedure:

1. Fill out K and W on the KWL chart
2. Talk with the students about what their ideas are for reducing indoor air pollution. Then read the second paragraph in the lesson background and tell them they will be assessing their classroom space based on this information.
3. Handout the classroom assessment tool to the students with a marker. Have the students work in pairs to complete the tool by evaluating their indoor classroom for prevention of air pollution. Once they have completed the assessment, have the students report back and make suggestions to improve the environment. Should additional action be taken based on the score?

Scoring:

- 0-5 points: Low indoor air pollution risk. The indoor environment is relatively safe from air pollution.
- 6-10 points: Moderate indoor air pollution risk. Some preventive measures may be necessary.
- 11-20 points: High indoor air pollution risk. Urgent actions should be taken to improve air quality.

3. Tell the students the next activity is for them to use their sense of smell to detect when a new substance (unharmful) is introduced to the environment. The goal of the activity is to see how long it takes for the smell to spread throughout the space, and how long it takes to get rid of it.

Activity:

1. Space individual students evenly around the room. They will be indoor air pollution monitoring instruments.
2. Place a fan in the front of the room and turn it on. Show the students the onion in the closed bag.
3. Ask the “monitoring instruments” to close their eyes tightly and use only their sense of smell for this activity.
4. Tell the students to raise their hands as soon as they detect onion smell “pollution” and to leave their hands up as long as they continue to smell it.
5. In front of the fan, open the bag with the cut onion.
6. Use a stopwatch or watch with a second hand to time how long it takes for all of the “monitoring instruments” to detect the “pollution.”
7. Record how long it took for indoor air pollution to spread through the room. (Allow the fan to continue to run.)
8. Close and seal the bag as soon as each student has detected the “pollution”. Please put the bag in a drawer or outside.
9. If possible, open a window and place the fan so that it is blowing in fresh air from outside. If available, run a portable HEPA air cleaner on high.
10. Restart the stopwatch.
11. Ask the “monitoring instruments” to lower their hands when they can no longer smell the onion “pollution”.
12. Record how long it takes for fresh air to sweep the “pollution” from the room.
13. Have the students open their eyes.
14. Talk with the students about the discussion points on the following page.
15. Fill out the L of the KWL chart.

Discussion Questions

- Which took longer: spreading indoor air pollution or replacing it with fresh air?
- Why do you think it worked that way?
- What does that tell them about indoor air pollution?
- Do we have to see pollution for it to exist? Give an example to explain your answer.
- What did you notice about indoor air pollution during this activity?
- Why does it matter if the air is polluted?
- How could the air pollution in the room be reduced?
- Are certain people more sensitive than others to pollution? Why?
- If we lower air pollution outside, will there be less pollution inside? Why do you think so?

Discussion Points

The onion is an example of a pollutant (aka, “source”). As demonstrated in this activity, when dealing with an indoor air quality problem, there are three general strategies:

- **Source Control:** Closing up the bag is an example of source control—this is usually the best way to address air quality problems. If there are sources of pollutants in the home or classroom, it’s best to eliminate them. If not possible, minimize use.
- **Improve Ventilation:** Indoor air is 3-4 times more polluted than outdoor air. Opening up a door or window to draw in fresh, outdoor air will reduce indoor air pollutants. Increase ventilation when the source can not be completely eliminated.
- **Clean the Air:** Using a portable air cleaner or upgrading the air filter in your furnace or central heating, ventilation and air-conditioning (HVAC) system can help to improve air quality. Portable HEPA air cleaners are a great way to reduce pollutants from a specific room.

While we were able to smell the pollutant in this exercise, there are many pollutants we cannot smell or see. We can improve our indoor air quality by being mindful about potential sources of air pollutants, but also proactively ventilating and cleaning the air.