

# Indoor Air Pollution

## 4-H Project:

Health

## Life Skill:

Preventing disease

## National Education Standard:

NSK-4.6 Organisms and their Environment

## Success Indicator:

Describe indoor air pollution and how it spreads.

## Time Involved:

30–45 minutes (for both activities)

## Suggested Group Size:

2–20 children

**I**ndoor air pollution is increasingly recognized as a human health hazard. This activity demonstrates how visible and invisible pollutants can spread through the indoor environment, and encourages children to think about how they can reduce pollution where they live.

## Getting started

**R**ead through the lesson and gather the necessary materials. If you need more information about the topic, refer to the “Background Information”. Before the activity, check your meeting location to determine whether you will need extra materials to cover any windows (see “Do the Activity – #4”).

## Do the Activity

### Activity 1

## Observing Indoor Air Pollution

1. Use the following questions to introduce the activity:
  - How can we explore the air around us?
  - What is air pollution? Can people see air pollution? Why or why not?
  - Can the air inside our homes, schools, or office buildings be polluted? Why or why not?
  - How could we look for pollution in our room?
2. Explain that first you will look at some visible indoor air pollution. Divide children into groups of three and have groups position themselves evenly around the room.
3. Give each group a flashlight, heavy white paper (or poster board), magnifying glass, notebook and pencil.
4. Cover the windows and turn off the lights to make the room as dark as possible.
5. Tell the groups to turn on their flashlights towards the center of the room, hold the flashlight steady and look at the particles in the beam. The white paper can be used as a backdrop to help see the particles.
6. Use the magnifying glass to see and study the particles.
7. Draw pictures of the different types of particles in the notebook.
8. Repeat steps 5–7 with the flashlight beam held near the ceiling.
9. Repeat steps 5–7 again with the beam held near the floor.
10. Turn the lights on and share observations. Have the children refer to their notes and discuss the following:
  - Which particles were larger?
  - Where are most of the particles located?
  - How were the particles near the ceiling different from the particles near the floor?
  - Were there more particles near the doors and windows or near a blank wall?
  - What about the middle of the room?
  - Why do you think it was that way?



### Materials Needed

- Heavyweight white paper or poster board (1 for each group)
- Flashlights (1 for each group)
- Magnifying glasses (1 for each group)
- Notebook and pencil (1 for each group)
- 1 electric fan
- 1 onion, cut up, in a tightly sealed plastic bag
- Wristwatch or stopwatch with a second hand

This online “bonus” activity is part of the *Exploring the Treasures of 4-H* curriculum. © 2005, National 4-H Cooperative Curriculum System.

See [www.n4hccs.org/exploring4h](http://www.n4hccs.org/exploring4h) for more information.

## Activity 2

### How Indoor Pollution Spreads

1. Space individual children 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 children 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. (Optional: blindfolds might be fun!)
4. Tell the children 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 child has detected the “pollution”.
9. Restart the stopwatch.
10. Ask the “monitoring instruments” to lower their hands when they can no longer smell the onion “pollution”.
11. Record how long it takes for fresh air to sweep the “pollution” from the room.
12. Have the children open their eyes. Refer to your notes and discuss:
  - 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?

### Talking it Over

#### Share What You Did:

- 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 these activities?

#### Process What’s Important:

- Why does it matter if the air is polluted?
- How could the air pollution in the room be reduced?

#### Generalize to Your Life:

- 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?

#### Apply What You Learned:

- How can we lower the air pollution in our cities?
- What are some ways you could reduce indoor air pollution at home?

### Activity Summary

Pollution can be a problem when it spreads through a building. Reducing indoor air pollution can reduce or eliminate health problems caused by breathing impure air

## Polluting the Air



We all know about the effects of outdoor air pollution. Not only is it a health hazard for humans, animals and plants; it also makes the air stink and turn dark. Indoor air pollution is not usually as visible as outdoor pollution, but its health hazards can be every bit as worrisome.

Poor indoor air quality can cause a number of human ailments. Pollutants in the air can decrease the amount of oxygen in the blood, harm lungs and central nervous systems, cause or worsen respiratory diseases and in extreme cases, cause death.

Mold, building materials, household furnishings, secondhand smoke, small gas leaks, paints, pesticides, aerosols, air conditioners, household cleaners and dust have all been linked to poor indoor air quality. Tightly sealed buildings that prevent fresh outside air from replacing polluted indoor air can cause “sick buildings” full of sick people.

The average North American person spends about 80 percent of his/her time indoors—working, cooking, going to school, eating, sleeping, watching television, shopping, and so on. Obviously, indoor air quality becomes more important as people spend more time indoors, but how is it possible to detect indoor air pollutants that can be made of odorless particles that are too small to see? Understanding some of the causes of indoor air pollution and how it can spread through a building can be an important first step in finding ways to reduce its dangerous effects on people.

### More Challenges



1. Smear a thin layer of petroleum jelly on plain white paper plates and place them in different locations around the building for 24 hours. Study the particles stuck to the jelly, using a microscope or magnifying lens if possible. What do you see? Do the particles differ from those in the light beam?
2. Place thin slices of boiled potato (on paper plates) in various locations around the building for a week or two. Examine the slices every day with a magnifying glass. Note any changes in shape, color, and/or smell. Besides particles of air pollutants, what other growths or living colonies are on the potato? What are these organisms?
3. Collect newspaper articles about air pollution for several weeks. What do you notice about the information in these articles? Is there an air pollution problem in our city? In our state? Why do you think so? How does outdoor air pollution affect indoor air pollution? Talk about what you can do to fight air pollution in your community.



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