



A PROGRAM OF GEORGIA COMMUTE OPTIONS

# How Dirty is the Air We Breathe?

## Georgia Commute Schools K-2<sup>ND</sup> Lesson Plan

### Lesson Background

*Grades:* K-2<sup>nd</sup>

*Length of Lesson:* Three class periods, each approximately 45 minutes

*Materials:*

- ➔ Double-sided masking tape
- ➔ Half-gallon or larger milk cartons filled with sand (optional)
- ➔ White paper
- ➔ Markers, crayons, or colored pencils

*Student Handouts:*

- ➔ Handout 1: Pollution Testers – Our Plan
- ➔ Handout 2: Pollution Testers – What We Found
- ➔ Handout 3: How Dirty is the Air We Breathe – My Idea to Help
- ➔ Handout 4: Final Assessment – Clean Air at Our School

Throughout this document, you will see items highlighted in various colors to indicate alignment to specific standards. Each color corresponds to a different framework component—**Disciplinary Core Ideas (DCIs)**, **Science and Engineering Practices (SEPs)**, **Crosscutting Concepts (CCCs)**, or **Georgia Health Standards**. Highlighted text may appear in directions, prompts, or other instructional text to help quickly identify where these standards connections occur throughout the lesson.



## EDUCATION STANDARDS

<b>Anchoring Phenomenon</b>	Air feels cleaner or dirtier depending on where you are.
<b>Georgia Standards of Excellence</b>	<p><a href="#">S2E3</a>: Obtain, evaluate, and communicate information about how weather, plants, animals, and humans cause changes to the environment.</p> <p><a href="#">Performance Expectation: K-ESS3-3</a>. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.</p>
<b>Next Generation Science Standards</b>	<p><b>Science and Engineering Practices (SEPs):</b>  <b>Obtaining, Evaluating, and Communicating Information</b>            Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas.  <a href="#">Appendix F Science and Engineering Practices in the NGSS, page 15</a></p> <p><b>Disciplinary Core Ideas (DCIs): ESS3.C Human Impacts on Earth Systems</b>            Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. <a href="#">Appendix E – Progressions within the Next Generation Science Standards, page 3</a></p> <p><b>Crosscutting Concepts (CCCs): Cause and Effect</b>            Events have causes that generate observable patterns.  <a href="#">Appendix G – Crosscutting Concepts, page 5 &amp; 15</a></p>
<b>Reading &amp; Writing Skills</b>	<p><b>Reading Skills:</b></p> <ul style="list-style-type: none"> <li>➤ Identify key details in a text or image.</li> <li>➤ Make connections between text and personal experiences.</li> <li>➤ Compare information from pictures and short readings to classroom findings.</li> <li>➤ Follow multi-step directions in procedural text.</li> </ul> <p><b>Writing Skills:</b></p> <ul style="list-style-type: none"> <li>➤ Draw and label observations.</li> <li>➤ Use simple sentence frames to describe cause and effect.</li> <li>➤ Record and communicate ideas in short written reflections.</li> <li>➤ Contribute a page to a class book.</li> </ul>
<b>Health and Physical Education Standards</b>	<p><a href="#">HEK.5</a>: Students will demonstrate the ability to use decision-making skills to enhance health.</p> <p><a href="#">HE1.5</a>: Students will demonstrate the ability to use decision-making skills to enhance health.</p> <p><a href="#">HE2.5</a>: Students will demonstrate the ability to use decision-making skills to enhance health.</p> <p><a href="#">HE2.5.c</a>: Explain the potential positive and negative outcomes of health-related decisions.</p>

# Big Idea: Air Pollution & Health

## Overview

Students will make pollution testers, collect samples of air pollution outdoors, and discuss how air pollution can affect health and what they can do to reduce air pollution. Students will view a 3-minute video about air pollution, draw observations of the air pollution testers, and engage in whole- and small-group discussions about causes and effects of air pollution.

## Vocabulary

The vocabulary section of a lesson plan provides key terms and definitions that support student comprehension and engagement with the lesson content. Teachers can reference this section to introduce new words during instruction, reinforce understanding through activities, or provide background information to support differentiated learning.

- **Air:** the mixture of gases that surrounds the Earth
- **Health:** the condition of your body and mind
- **Invisible:** impossible to see
- **Pollution:** something that has harmful effects

## Engage: Air Pollution Introduction & Discussion (15 minutes)

1. Begin with a local image, like a picture of your school playground, the pickup line, or a nearby park. Ask: *"What do you see in this picture?"* Listen for possible answers such as trees, cars, sky, and people. Ask students, *"What do you not see?"* Listen for possible answers such as breathing, air is all around us, but we can't see it.
2. Ask students:
  - a. *Have you ever smelled something strong outside?*
  - b. *Have you seen smoke or dust in the air?*
  - c. *Have you ever coughed or sneezed when walking by someone?*

Listen for possible answers, such as sharing stories to build relevance and tap into their wealth of knowledge of lived experiences.

3. Use your senses to notice something in the air. Ask students:

*"What do you think might be floating in the air that we can't see?"* Listen for possible answers such as germs, breath, etc.

*"Do you think the air smells the same everywhere?"* Listen for possible answers like maybe, yes/no.

*"Where do you think the air might be clean or dirty around our school?"* Listen for possible answers such as near the cafeteria, bus stop, car line, parking lot, dumpsters, construction, mowing, etc.



4. Share with students that air is all around us, even though we can't see it. Sometimes, the air can carry tiny things like dust, smoke, or gases. When there are too many of these things, we call it pollution. Pollution can make the air dirty and harder to breathe. We are going to explore more about air, what is in the air, and how it can make us feel inside.
5. Next, show students a picture of Atlanta or another community on a clear day versus a smoggy day.
6. Facilitate a class discussion to probe students' prior ideas about air pollution. Use the slides and ask what they think they know already and what questions they have about air pollution. Ask the students the following questions:

**Q Can you see air pollution?**

**A** Answer: Most air pollution is totally invisible to us. However, when a lot of air pollution gets concentrated, it can be seen as something called smog.

**Q When we look outside, the sky looks blue. So where is the dirty air?**

**A** Answer: The air pollution is in the atmosphere in invisible gases.

**Q Near our school, where might the air be clean or dirty?**

**A** Answer: Cleaner areas might be trees/garden area, playground away from cars, inner courtyard/back sidewalk, open field where air moves, and others. Dirtier areas might be car line/parking lot, bus loop, along the street/traffic, near dumpsters/vents, by construction or mowing areas, others.

**Q How might dirty air make us feel?**

**A** Answer: It might make us feel sick. Air pollution can damage people's health and hurt their lungs and heart, and even cause cancer. Asthma, a condition that makes it hard to breathe, can be triggered by air pollution.

**Q What could people do to keep the air clean?**

**A** Answer: Turn off car engines (no idling), ride the bus or carpool, walk/bike with an adult for short trips, turn off lights/electronics to save energy, plant and care for trees/gardens, avoid burning leaves or trash, use rakes instead of leaf blowers, and others.



## LIVED EXPERIENCES

Connect to students' lived experiences by sharing a picture of Atlanta or your city, the school entrance, and the pickup line at your school's campus, and invite students to connect the provided image to their own experiences. This helps them see that their observations matter and sets the stage for bringing their own funds of knowledge into the discussion.

## Explore: Day 1 – Hands-on Activity – Creating & Using Air Pollution Testers (40 minutes)

- Explain to students that air is all around us, even though we can't see it. Sometimes, the air can carry tiny things like dust, smoke, or gases. When there are too many of these things, we call it pollution. Pollution can make the air dirty and harder to breathe.

Ask students, "So how can we find out where the air is clean or dirty around our school?"

Tell students that we are going to make something called an air pollution tester. It's a simple tool that helps us see what might be floating in the air, even if we can't see it right away.

### Planning for the Air Pollution Testers (Plan)

- As a class, brainstorm possible test spots (bus loop, car line, sidewalk, trees/wooded area, near doors, playground). Ask students to choose 2-4 locations and predict which will collect more dust.
- Ask students to record what they think will happen on the **Student Handout 1: Pollution Testers - Our Plan**.

### Setting Up the Air Pollution Testers (Build & Place)

- Divide the students into groups. Provide double-sided masking tape and the sand-filled milk carton.

**Note** – Kindergarten and 1st grade teachers may consider providing pre-done pollution testers to save time.

- Have each group wrap the tape around the sand-filled milk carton, and make sure the tape is securely attached. It may be useful to make one milk carton "air pollution tester" ahead of time to demonstrate to the students what the final setup will look like.

**Note** – As an alternative tester, lightly spread petroleum jelly (Vaseline) on a paper plate. Punch a small hole, tie on a string/yarn, and hang it (face out) at the selected locations.



- Take the class outside, and have the students place the milk cartons outdoors on posts, fences, walls, and/or windowsills in various locations.
- If possible, place some milk cartons or double-sided tape in a protected location away from roads. Try to pick places where the milk cartons won't be knocked over by the weather, people, or animals.
- Leave the testers to collect air pollution for 24-72 hours.

15. Direct students to return to the **Student Handout 1: Pollution Testers – Our Plan**. Ask them to draw a picture of the pollution tester (milk carton with masking tape) and where they put it outside. Tell students that the class will return tomorrow to collect the pollution testers and learn more about air pollution. Ask them to talk with their adult caregivers, friends, teammates, or other people outside of school in the evening about how air pollution impacts them.








## Explore: Day 2 - Collecting the Air Pollution Testers Data (30 minutes)

16. After 24-72 hours, collect the milk cartons and double-sided pieces of tape, and make labels of the tester locations.
17. Have students remove the tape from the milk cartons and lay the tape, exposed side up, on white paper. Place location labels next to each corresponding sample.
18. Have the class examine the air pollution collected on the testers.
19. Using the **Student Handout 2: Pollution Testers - What We Found**, have students draw what they see on the masking tape. Ask students to use a different color to show the tiny pieces of pollution, called particulate matter (like dust or dirt in the air). Direct students to fill in the sentence stems.



### STUDENT SUPPORT

Remember that when talking about pollution, define it simply as “stuff in the air that doesn’t belong and can have harmful effects,” such as dust, tiny bits of dirt, pet hair, or plant seeds or pollen. On their air testers, students will likely notice these larger bits. Very tiny pieces (called particles) may be too small to see, but the visible pieces help students understand that air can carry things we don’t always notice.

20. Discuss the findings and allow students to continue to fill in their **Student Handout 2: Pollution Testers – What We Found**.
-  Look at your tape. Is it cleaner or dirtier than the other groups’ tape?
  -  Where is the air the dirtiest?
  -  *Possible Answers: Near busy roads, near factories.*
  -  Why do you think these areas might have the most air pollution?
  -  Answer: ***Because humans driving cars and factories produce pollution.***
  -  Is there a difference between tape that was collected near a parking lot versus tape that was collected near the playground or where more trees are located?
  -  Answer: *The tape closer to the parking lot is darker, therefore it collected more air pollution.*



- ❓ Is there a difference between tape that was collected near a parking lot versus tape that was collected near the playground or where more trees are located?
- 🗨️ Answer: *The tape closer to the parking lot is darker, therefore it collected more air pollution.*
- ❓ Discuss possible health effects of breathing air pollution.
- 🗨️ Answer: ***We have seen air pollution on our tape when we didn't see any in the air. Clean air is important for us to breathe to be healthy. Breathing in dirty or polluted air can make us less healthy - it can make it harder to breathe, and some pollutants can make heart or lung problems worse.***

## Explain: View Air Pollution Video (10 minutes)

Ask students to define air (a mix of gases) and pollution (something that can impact the health of living things). Keep the health content simple: "Breathing clean air helps our lungs."



### STUDENT SUPPORT

To support sensemaking, read a short section of *Why Is Coco Orange?* or display a single picture spread. Use it to highlight that some air pollution is **too small to see**, then connect to your testers: "These can catch things our eyes might miss."

Book hyperlink: <https://www.airnow.gov/publications/why-is-coco-orange/why-is-coco-orange-picture-book/>

Show students the Learning Junction's "Air Pollution" Video for Kids by clicking on the link below. Ask them to listen for **causes and effects of air pollution**. Another way to phrase this could be to ask for things that are helpful or hurtful to our air.

Video hyperlink:

[https://www.youtube.com/watch?v=t7Q7y\\_xjR5E](https://www.youtube.com/watch?v=t7Q7y_xjR5E).

Video length:

2 minutes and 57 seconds.



### STUDENT SUPPORT

For younger students, you might consider skipping this video as there is more complicated content, such as ozone, discussed that is not specifically covered in this lesson. In place of the video, **facilitate a conversation related to the causes and possible effects of air**.



## Elaborate: Solutions to Air Pollution (15 minutes)

21. Show students the slide with pictures of human activities that cause air pollution. Ask students to share some of the possible causes of air pollution that they can think of. Summarize some of the human causes of air pollution that the class has discussed: gas-powered lawn mowers, driving gas-powered vehicles, emissions from factories, burning waste, dust from construction and roads, etc.
22. **Ask students to think about (propose) simple solutions for school-day life: walking with an adult, bus/carpool, “no idling” in the car line, and turning off things when not in use. Draw and write one solution** in the **Student Handout 3: How Dirty is the Air We Breathe - My Idea to Help**.
23. **Have students share their ideas in a whole-class discussion or with an elbow partner.**
24. **If time allows, consider creating a class book. Have each student draw and write one page to put into the class book. Title the book, *Solutions to Air Pollution*, and keep it on your class bookshelf. Read it aloud to the whole group.**



### STUDENT SUPPORT

For younger students, you might consider skipping this video as there is more complicated content, such as ozone, discussed that is not specifically covered in this lesson. In place of the video, **facilitate a conversation related to the causes and possible effects of air pollution by showing still images** like cars with visible exhaust, factories with smoke, trees, or smog. These images can be pulled directly as still images from the video. **Ask students to observe, describe, and predict using what they see.**

To support students, consider using the following prompts and guide student discussion towards the expected student responses:

- Q** What do you notice about the air in this picture? What might be making the air look smoky or gray?  
**A** Possible Answers: There's smoke from the car! Maybe the factory is making it smoky. The air looks dirty.
- Q** What are some things people do that cause smoke or smells to go into the air?  
**A** Possible Answers: Drive cars. Cook food on a grill. Have campfires.
- Q** How does that change the air?  
**A** Possible Answers: It makes it stinky. It makes the sky look foggy. It might make it hard to breathe.
- Q** What are some ways we can help keep the air clean?  
**A** Possible Answers: Ride bikes instead of cars. Plant trees! Don't make too much smoke. Turn off the car when you stop.

Another idea is to have students **draw a “cause and effect” picture** (e.g., car → smoke → coughing person).

- ➔ Use simple sentence frames:
  - » When people \_\_\_\_, the air gets \_\_\_\_.
  - » If we \_\_\_\_, the air stays clean.





## HEALTH AND PHYSICAL EDUCATION CONNECTION

To support student sensemaking, consider creating a mini anchor chart (student-facing) with the following information:

- ➔ **Stop.** What is happening right now that could make someone healthy or unhealthy? (HE5.5.a)
- ➔ **Think.** Who could you ask to help you make a good choice? (HE3.5.b)
- ➔ **Choose.** What choices do you have? What could happen if you pick each one? (HE5.5.c)
- ➔ **Reflect.** After you choose, what might happen? How would it make you feel? (HE3.5.d)



## STUDENT SUPPORT

K support:

Use icons/photos (👉 stop, 🤔 think, 🙋 choose, ✅ check).

1st/2nd support:

- ➔ Add quick sentence frames (below) and connect to your real school spots.

Use the following sentence frames for each grade level:

- ➔ K: "I choose \_\_\_\_ because \_\_\_\_."
- ➔ 1: "I choose \_\_\_\_ because it helps our air/lungs by \_\_\_\_."
- ➔ 2: "If we \_\_\_\_, a helpful outcome is \_\_\_\_; a hurtful outcome is \_\_\_\_."



## Evaluate: Final Assessment – Clean Air at Our School

(15 minutes)

Provide students time to complete the final assessment to show what they have learned throughout the unit using the **Student Handout 4: Final Assessment - Clean Air at Our School**. Alternatively, you may ask students to reflect on the lesson. **Ask students the questions listed in the final assessment and have them communicate their thoughts with a partner.**



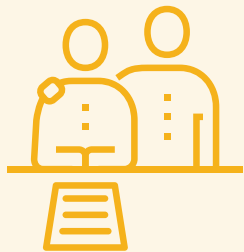
### HEALTH AND PHYSICAL EDUCATION CONNECTION

Do a Walking Route Choice outside (5 min). Mark two routes from the classroom to the playground:

- ➔ Route A: along the car loop
- ➔ Route B: along the inner sidewalk/trees

Students Stop–Think–Choose–Check, then walk the healthier route. Debrief: “How did this choice help our health today?”

Another option is to walk both routes as a class and then discuss which students would choose and why.



### STUDENT SUPPORT

A possible second-grade extension for the Walking Route Choice is to ask students to explain the positive and negative outcomes of each decision. They may do this by creating a T chart or discussing it as a class.

## Optional Assessment Questions

The optional assessment questions section offers suggested prompts that can be used to check for understanding, guide student reflection, or spark class discussion. Teachers may choose to use these questions during whole-group conversations, small-group work, or as formative checks throughout the lesson.

❶ Where does the air seem to be the dirtiest? Why?

❶ *Answer:* Near busy roads or factories, because cars and factories are major sources of pollution. Listen for students identifying **how humans impact air quality through daily activities**.

❷ Do you think dirty air is good or bad for your health? Why?

❷ *Answer:* Clean air is important for us to breathe to be healthy. Breathing in dirty or polluted air can make **us less healthy – it can make it harder to breathe, and some pollutants can make heart or lung problems worse**.

❸ What can we do to keep our air clean?

❸ *Possible Answers:* **People could drive less and walk more, such as to school, with adults. We can turn off lights, TVs, and computers when we're not using them; this saves energy and keeps the air cleaner. Factories could reduce their pollution.**

## Potential Local Field Trip Ideas

### West Atlanta Watershed Alliance Outdoor Activity Center

<https://wawa-online.org/about/>

The West Atlanta Watershed Alliance Outdoor Activity Center hosts environmental education programming, a nature preserve, and an outdoor activity center. Students can learn about the organization's origins as a community environmental justice organization and what they can do to advocate and protect their local environment.

## Additional Resources

### AirNow CoCo Orange Picture Book

<https://www.airnow.gov/publications/why-is-coco-orange/why-is-coco-orange-picture-book/>

This picture book from the EPA is available as a free downloadable PDF. Read how Coco the chameleon and his friends at Lizard Lick Elementary solve the mystery of why Coco can't change colors and why his asthma is acting up. The book teaches about air quality and how to stay healthy when the air quality is bad. This book is for all children, especially those with asthma, and their caretakers. Ages 4-8.

### AirNow Clean Air and Dirty Air

<https://www.airnow.gov/education/students/clean-and-dirty-air-part-one/>

This resource is written for students and provides background information on clean and dirty air. It helps students identify if air is clean or dirty and introduces them to the Environmental Protection Agency (EPA).



### **Atlanta Regional Commission (ARC) Air Quality Page**

<https://atlantaregional.org/natural-resources/air-quality/air-quality/>

This resource is written for adults and provides background information on air quality and air quality standards in Atlanta.

### **ARC Interactive Air Quality Map**

<https://atlregional.github.io/DASH/arees.html>

Using data from the Atlanta Roadside Emissions Exposure Study (AREES), ARC created this interactive map that depicts air quality throughout the 20-county Atlanta region, focusing on particulate matter concentrations resulting from the transportation system. This resource could be used by teachers to learn more about air quality in their neighborhoods, or with students to prompt discussions around local air quality.

### **Climate Kids**

<https://climatekids.nasa.gov/air-pollution/>

A general resource that provides information about climate dynamics in a manner that is approachable for younger audiences.

*This lesson was designed as a part of the K-12 curriculum focusing on the relationship between human activity, transportation, air pollution, and health by Georgia Commute Schools. If you liked the curriculum, please leave a rating and review on [our Teachers Pay Teachers page](#).*

*For more information about our programs, visit [gacommuteoptions.com/schools](https://gacommuteoptions.com/schools).*