20 MINUTE ACTIVITY: AIR POLLUTION SIMULATION

OVERVIEW:

Air pollution occurs when harmful chemicals, gases, and particles enter the air, causing damaging the Earth’s natural cycles and threatening our planet’s ecosystems. Air pollution comes from many different sources, and can cause serious problems to human, animal and plant health. This activity is a fun and interactive way to learn more about the sources of air pollution, to visualize the effect it has on us and the environment, and to discuss actions we can take every day to reduce air pollution.

MATERIAL CHECKLIST

- Litter Observation and Audit Report (PDF)
- Watercolors / Paint / Food Coloring
  - Colors: Red, Blue, Yellow, Green
- Clear cups (fill half way with water)
- Droppers or paint brushes
- Pitcher with water

ACTIVITY STEPS:

The purpose of this simulation is to make us aware about how we all contribute to air pollution through our everyday habits. The clean cups of water represent clean, unpolluted air. The drops of food coloring/paint we will be adding represent different types of air pollutants.

The following colors represent different types of air pollutants:

- Red= Pollutants from vehicles (car and truck exhaust)
  - Carbon Monoxide (CO)
  - Nitrogen Dioxide (NO2)
  - Particulate Matter (PM)
  - Sulfur Dioxide (SO2)
  - Volatile Organic Compounds (VOCs)

- Blue= Pollutants from consumer products and paints
  - Volatile Organic Compounds (VOCs)

For more activities, resources and ways to take action, please visit gradesofgreen.org.
- **Yellow** = Pollutants from power plants and industrial processes
  - Carbon Dioxide (CO2)
  - Nitrogen Dioxide (NO2)
  - Sulfur Dioxide (SO2)
  - Particulate Matter (PM)
  - Volatile Organic Compounds (VOCs)

1. Divide students into groups of 3-6. Give each group a clear bowl or cup of water (fill only half way). Also provide each student a paint brush or dropper for adding drops of paint/food coloring.

2. Ask students to raise their hand if they participated in the activities below. For every student that raises their hand in each round, add one drop of the food coloring in their group’s communal cup:

   - You showered and got ready for school. Add one drop of blue and one drop of yellow food coloring to your cup if this activity applies to you.
     - **Blue** = Pollutants emitted by soap, shampoo, deodorant, hair spray, and nail polish.
     - **Yellow** = Pollutants emitted by combustion used to heat the water for the shower.

   - To get to school, you rode in a bus or a car. Add one drop of red food coloring to your cup if this activity applies to you.
     - **Red** = Pollutants emitted by the engine in your school bus or car.

   - At nutrition or recess, you ate a snack that was packaged in a disposable wrapper or baggie, like a granola bar or bag of chips.
     - **Yellow** = Pollutants emitted by the burning of fossil fuels to produce the packaging of your snack.

   - At lunchtime, you got lunch from the cafeteria. Add one drop of yellow food coloring to your cup if this activity applies to you.
     - **Yellow** = Pollutants emitted by cooking lunch, polystyrene trays, and plastic utensils.

   - Going home, you took the bus or rode in a car. Add one drop of red food coloring to your cup if this activity applies to you.
     - **Red** = Pollutants emitted by the engine in your school bus or car.

   - At home, you watched television, played video games, or listened to music for over an hour. Add one drop of yellow food coloring to your cup if this activity applies to you.
     - **Yellow** = Pollutants emitted by the burning of fossil fuels to produce electricity.

   - You showered and got ready for bed. Add one drop of blue and one drop of yellow food coloring to your cup if this activity applies to you.

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- **Blue**= Pollutants emitted by soap, shampoo, and deodorant.
- **Yellow**= Pollutants emitted by combustion used to heat the water for the shower.

3. Ask students to observe their cups, which represent air quality after one day of their group’s everyday actions, and discuss the questions below:

- What color is the water? Would the water be dirtier or clearer if only one person had added drops to the cup?
- Give an example of how poor air quality could affect human health, and an example of how it could affect an ecosystem’s health.
- How is air pollution an example of a global problem? What type of action would be needed to improve global water quality?
- What other sources of air pollution can you think of?

4. This activity demonstrated that our air is polluted because of the chemical compounds emitted by cars, factories, and even products that we use every day, and when all of these chemicals mix it can create poor air quality. Air pollution causes health problems, especially respiratory (breathing) problems, and is also harmful to the Earth’s ecosystems. However, there are many actions we can take collectively to improve air quality.

5. Ask each student group to brainstorm and write down ways they can help reduce air pollution. For examples, see the “Take Action” section below.

6. Go around the room and ask each group to report the top 3 actions they can take to reduce air pollution. Use the pitcher to add water and fill their cups ¾ of the way. Ask them to observe the color now that it has been diluted. Discuss together, what would happen to the air if we all changed our everyday habits?

**TAKE ACTION:**

Many necessary activities in modern society cause pollution, but the Earth’s ecosystems have their own built-in way of recycling waste and renewing resources, including diluting the pollution caused by humans. The problem is that today, we create more pollution than our ecosystems can handle, which is why we need to take collective actions to decrease pollution.

Let students know that there are many ways they can help to reduce air pollution, such as the examples below:

- Reuse consumer products such as clothing, containers and boxes so that more don’t have to be produced in factories.
- Create “No Idle Zones” on campus by asking parents and school bus drivers to turn off the engine if they are waiting in school pick up lines.
- Open the windows in your house each day, and take off your shoes before entering your house to keep the air quality healthy.
- Switch your household cleaning products to non-toxic green cleaning supplies.
- Ask your family to get an air purifier. This helps remove particulates from the air that create poor air quality.
- Walk/wheel/ride to school instead of driving.

For more activities, resources and ways to take action, please visit gradesofgreen.org.
• Eat a meatless meal. Worldwide, livestock-farming is responsible for no less then 18% of total greenhouse gas emissions. Greenhouse gas emissions through meat production and associated land-use changes are one of the most important causes of climate change. Skipping one meal of meat a week is more effective at cutting CO2 than switching to a hybrid car (and cheaper, too!).

RECOMMENDED GRADES OF GREEN ACTIVITIES

❖ Walk/Bike/Ride to School
❖ No Idle Zones
❖ Meatless Meals
❖ Green Cleaning Supplies