You Have an "air" About You

Grades: 4-6
Subjects: Communication Arts and Science
Approximate Time: 1 week
Montana Standards: Communication Arts: 5, Science 1 and 2

Objectives: Students will

- Learn about the composition of air
- Learn the about important role of the ozone layer
- Be familiarized with the interaction of air quality and it's correlation to agriculture

Needed:

- Small house plant
- Medium size clay pot
- Plastic liter beverage bottle
- An orange cut in half
- Stick of incense
- Matches
- Can of aerosol spray
- Bucket

Keywords:

- **Gas:** the form of a substance in which it can expand indefinitely
- **Carbon Dioxide**: a gas made up of one carbon and two oxygen atoms
- **Exhaust**: waste gases produced from an internal combustion engine (auto, plane, etc.).
- **Smog:** a mixture of smoke, dust, and fog in the atmosphere
- **Ozone**: a pungent smelling form of oxygen in the atmosphere
- **Fossil Fuels**: any combustible organic material, as oil, coal, or natural gas, derived from the remains of former life.

Brief Description:

Air is composed of many gases. Some of these are nitrogen, oxygen, and carbon dioxide. Animals use oxygen for breathing and plants use carbon dioxide for their food production (photosynthesis). The nitrogen in the air is an important source of plant food. The burning of fuels, such as gasoline, in a car produces an exhaust which is made up of carbon containing compounds called hydrocarbons. The burning of wood produces smoke which also contains gases.

Ozone is naturally formed when normal oxygen molecules in the air are electrifies by lightning, creating the acrid smell that covers an area after a thunderstorm. Such natural ozone deposits in the lower atmosphere are minimal, and short lived. In the upper atmosphere, an ozone layer

protects us from the ultra-violet rays of the sun, but there is an unnatural way to make ozone. Ozone is a by-product of burning fossil fuels, primarily emissions from gasoline-powered vehicles.

Air pollution is causing increased plant and animal losses each year. The combination of fog, smoke, exhaust fumes and dust is called smog. The invisible chemical compounds, such as sulfur dioxide, ozone and nitrogen dioxide, are the most injurious to plants. The smoke does add to the dust and other particles collecting in the atmosphere. This causes some reduction in light intensity and could have serious effects over a long period of time. The agricultural losses in the United States from air pollution are estimated to be over $500 million annually. The lack of oxygen in the air makes it difficult for animals to breathe and act normally. The ozone gas is harmful to their lungs. The lack of carbon dioxide is detrimental to plants because they cannot produce enough food for themselves to live.

Lesson:

1. Have the students write a story about having to live in a plastic bubble with a plant as their oxygen supply or with oxygen tank and explain what their life would be like. Have them list the activities they would not be able to do anymore. Maybe the students know someone who has asthma or other breathing problems which limit their activities and wish to discuss the effects air pollution causes them.
2. Plant a house plant in a medium size clay pot. Invert the bottom ¾ of a plastic liter beverage bottle over the plant. After a week water droplets should form on the walls of the bottle. Ask the students how the water got there?
3. Use the "Smell Detective Game"
    a. Ask four students to volunteer to participate in the activity. Place them in one of each of the classroom's corners. When the class is ready to begin, have the student with the orange take it out of it's Ziploc bag, light the incense and have the student with the can of aerosol to spray it for approximately 30 seconds
    b. Have class members raise their hands when they can smell a scent. On their worksheets they can record which scent they smelled first, second, etc. Run the exercise for about 2 minutes
    c. Have student discuss their results

Assessment:

1. How do you think that scents travel in the air
2. If you can smell it, are you breathing it?
3. What scents might cause your eyes to burn?
4. How do you think what's in the air effects us as humans?
5. How do you think what's in the air effects plant life?