

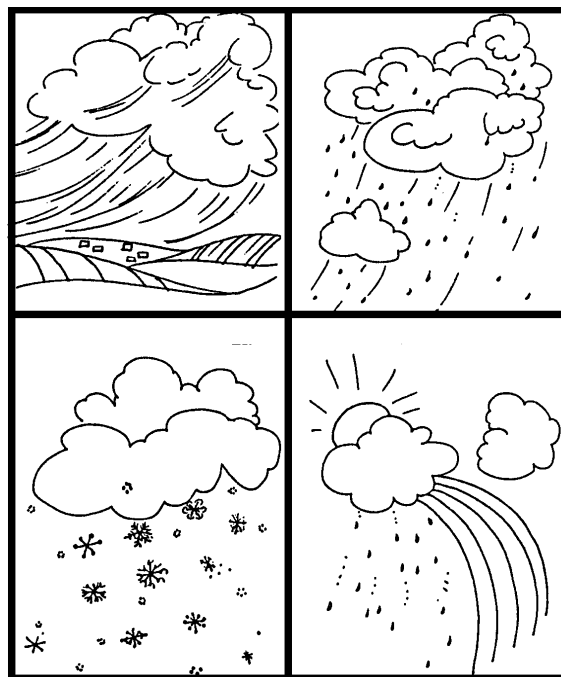


Water Cycle

The Earth's Gift



FIFTH GRADE ATMOSPHERE



1 WEEK
LESSON PLANS AND
ACTIVITIES

WATER CYCLE OVERVIEW OF FIFTH GRADE

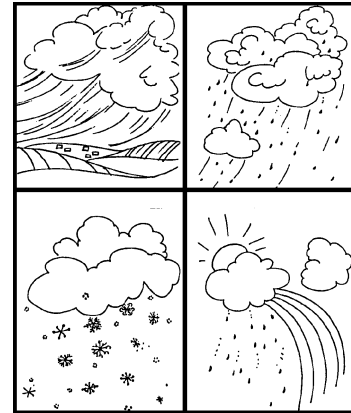
WATER

WEEK 1.

PRE: *Analyzing why water is important.*

LAB: *Comparing the density of water to that of other liquids.*

POST: *Exploring how water is used in our society.*



OCEANS

WEEK 2.

PRE: *Distinguishing between fresh and salt water.*

LAB: *Exploring what lies under the oceans.*

POST: *Exploring estuarine systems.*

ATMOSPHERE

WEEK 3.

PRE: *Analyzing the composition of air.*

LAB: *Discovering that some components of air can be depleted.*

POST: *Distinguishing amongst different pollutants.*

WEATHER

WEEK 4.

PRE: *Comparing the different layers of the atmosphere.*

LAB: *Classifying clouds.*

POST: *Comparing an artist's interpretation of clouds.*

WATER CYCLE - ATMOSPHERE (5)

PRE LAB

OBJECTIVES:

1. Exploring components of air.
2. Analyzing the composition of air.

VOCABULARY:

argon
atmosphere
carbon dioxide
nitrogen
oxygen

MATERIALS:

Periodic Table Placemat

BACKGROUND:

Air takes up space, has weight, is made of a mixture of different gases, and changes with the altitude. The atmosphere is the envelope surrounding the Earth that contains air. Air is a mixture of the following gases: nitrogen, oxygen, argon, carbon dioxide, hydrogen, and various other rare gases.

The percentage of carbon dioxide varies somewhat because of the presence of vegetation. There are also traces of ammonia, hydrogen sulfide, oxides, sulfur dioxide, and other gases. The percentage of dry air does not vary much with location on the earth's surface. However, the pressure of air changes greatly with the altitude. The average pressure at sea level and 45 degrees latitude is 760 mm Hg, at 4.8 Km it is about 400 mm Hg, at 16 Km it is about 40 mm Hg, and at 48 Km it is only 0.1 mm Hg.

PROCEDURE:

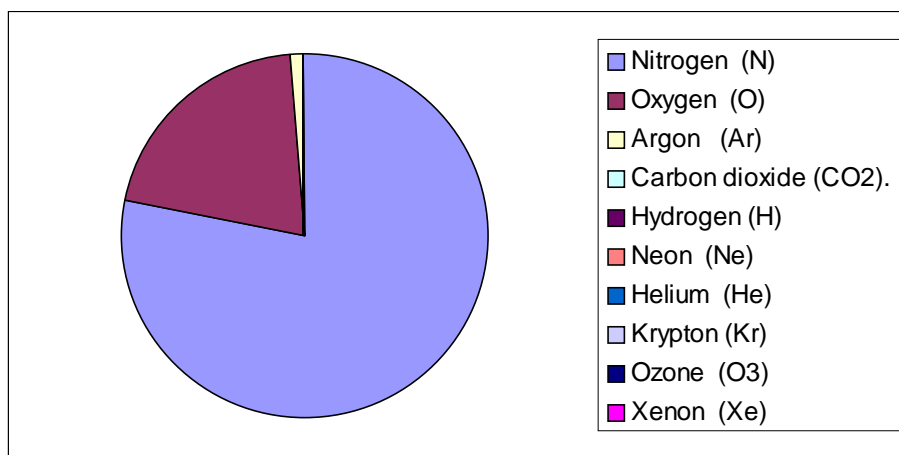
1. You may want students to use the Periodic Table Placemats and find the elements abbreviation. Write the following table on the board:

Students use a pie chart to compare the components of air.



Nitrogen (N)	78.03
Oxygen (O)	20.99
Argon (Ar)	.94
Carbon dioxide (CO ₂)	.035
Hydrogen (H)	.01
Neon (Ne)	.012
Helium (He)	.0005
Krypton (Kr)	.0001
Ozone (O ₃)	.00006
Xenon (Xe)	.000009

2. You may want to make a pie chart or bar graph using the data from the table showing the different components of air. Note that only Nitrogen, Oxygen, and Argon can be seen on a normal pie chart.

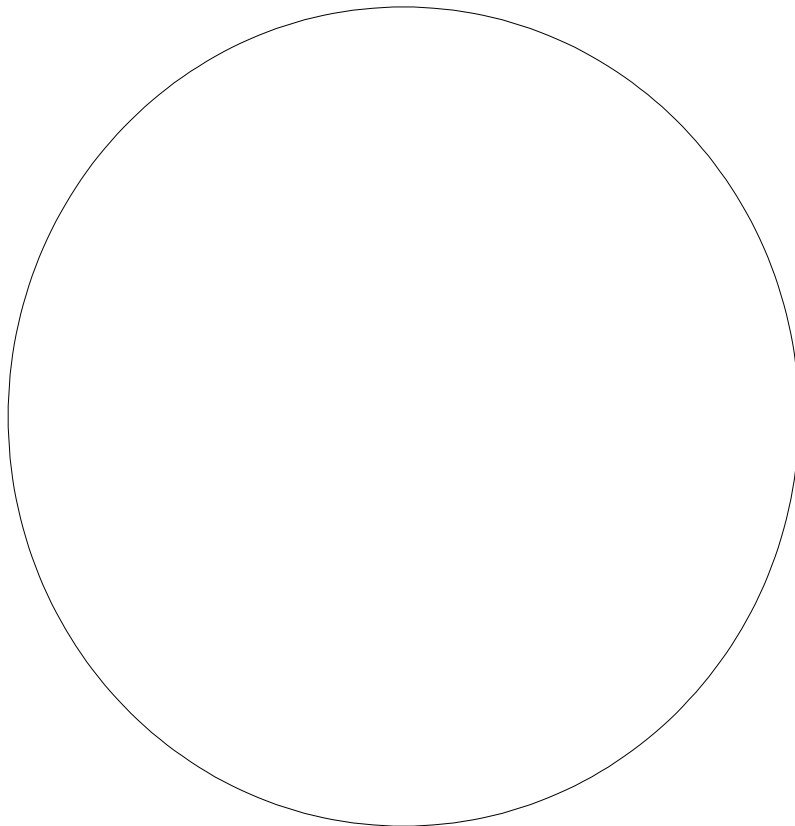


WATER CYCLE - ATMOSPHERE (5) PRE

COMPONENTS OF AIR

The following is a table of the percentage of the different compounds and elements found in air at the surface of the Earth. Make a pie chart of the percentage. Make a legend. Think about how you can represent the gases that are a very small percentage of the total.

Nitrogen (N)	78.03%
Oxygen (O)	20.99%
Argon (Ar)	.94%
Carbon dioxide (CO ₂)	.035 -.04%
Hydrogen (H)	.01%
Neon (Ne)	.012%
Helium (He)	.0005%
Krypton (Kr)	.0001%
Ozone (O ₃)	.00006%
Xenon (Xe)	.000009%



WATER CYCLE - ATMOSPHERE (5)

LAB

Students create pollution.

OBJECTIVES:

1. Discovering that some components of air can be depleted.
2. Experimenting with air pollution.

VOCABULARY:

atmosphere
carbon
oxygen
pollution

MATERIALS:

beaker or glass jar
candle
matches
tray
water
leaves
clay (to hold candle)



BACKGROUND:

Humans can alter the atmosphere by their activities on the surface of the Earth. There are six major pollutants that are commonly recognized including: sulfur oxides, particulate matter, carbon monoxide, nitrogen oxides, hydrocarbons, and photochemical oxidants. The problems that they cause will be discussed during the Post Lab. It is staggering to imagine that over 200,000,000 tons of pollutants are emitted into the air annually just by the people of the United States.

This is just a simple way to focus students attention that we put substances into the atmosphere. Much of it is cleaned by rain or moved by wind. Scientists do not agree on what all these pollutants are doing to our atmosphere. Some say we are totally destroying our atmosphere real soon, others think nothing will happen. The studies are very difficult to decipher, and it is even harder for non-scientists to come up with an answer. The answer probably lies somewhere between the two extremes. Remember your students may one day vote on issues like this, that need a careful understanding of the problem.

PROCEDURE:

1. Air has several components and this lab will illustrate that air can be chemically depleted of some of its gases. Oxygen is needed for fire to burn and Experiment 1 shows students that the candle will burn as long as there is oxygen present, but will go out when depleted of oxygen.

2. Make sure you go over the dangers of matches. You may want to divide the class so you watch them performing the experiment at each table.

3. The second experiment points out that you can add components to air. When you burn a match, the fire burns the match itself into particulate matter (soot).

4. In the third experiment, the burning of the leaves is causing carbon to be placed in the atmosphere. Notice there will be water vapor that is released which is not harmful.

WATER CYCLE - ATMOSPHERE (5)

PROBLEM: How is air polluted?

PREDICTION: _____

CAREFULLY DO THESE EXPERIMENTS: LISTEN TO YOUR INSTRUCTOR

EXPERIMENT 1.

MATERIALS: beaker or glass jar, candle, matches, tray, water

1. Place the candle in the middle of the tray.
2. Pour water to cover about 1 cm of the tray.
3. Light the candle and cover it with the jar.
4. Watch the water level as the flame goes out.



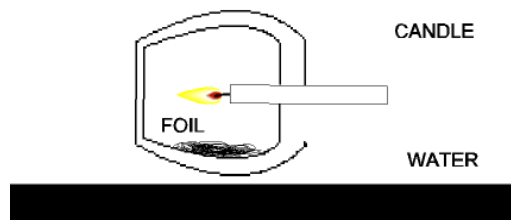
Describe what happens. _____

DO THE FOLLOWING EXPERIMENTS OVER THE TRAY WITH WATER.

EXPERIMENT II.

MATERIALS: candle, jar, foil, tray, water

1. Place a candle inside a horizontally held jar with aluminum foil below the candle.
2. Hold the candle horizontally in the jar.
3. Let it burn for 1 minute.
4. Cool the bottle, then see if you have residue in the bottle.



What did you find?

EXPERIMENT III.

With the same jar, put a few pieces of leaves on the bottom of the jar. After your instructor approves, place a match or candle to the leaves. What happens?

CONCLUSION: Does all burning create pollution? _____

WATER CYCLE - ATMOSPHERE (5)

POST LAB

Students explain how illustrations can help people become aware of air pollution.

OBJECTIVES:

1. Comparing different air pollutants.
2. Distinguishing amongst different pollutants.

VOCABULARY:

pollution
particulate

MATERIALS:

worksheet

BACKGROUND:

Pollutants in the air slowly attack the environment. Awareness of the problem and what it actually causes can help students get an idea of what is happening to the surroundings.

Pollution in the air can cause serious problems. Problems that results from air pollution are numerous including damage to plants, animals, and people. The problems that are caused by the six major pollutants are as follows:

SULFUR OXIDES: leaf and tree injury, irritate upper respiratory tract in humans, corrode metals, disintegrate book pages and leather, destroy plants, and erodes statues.

PARTICULATE MATTER (SOLID): obscures vision, lung illness, grime on buildings and personal belongings; erode metals

CARBON MONOXIDE: causes headaches, dizziness, nausea; absorbed in blood; impairs mental processes

NITROGEN OXIDES: causes leaf damage; irritates eyes and nose; stunts plants, cause brown pungent irritating haze, corrode metals; damage rubber

HYDROCARBONS: may be carcinogenic (cancer producing); retard plant growth, cause abnormal leaf and bud development

PHOTOCHEMICAL OXIDANTS: (ozone and resultant chemical products) discolor upper surface of leaves of many crops, trees and shrubs; damages and fades textiles; reduces physical activity; deterioration of rubber; irritant to the lungs; irritates eyes, nose, and throat; induce cough.

Most of the pollution is caused by transportation (including cars) and fuel combustion in stationary sources such as power generation. It has been estimated that



over 12 billion dollars is spent on air pollution damage annually in the United States.

PROCEDURE:

1. This lesson is a continuation of pollution in our atmosphere. Outline the major pollutants and then ask students their suggestions on how to keep the atmosphere clean.

2. Use the pictures of the worksheet to discuss using “cartoons” to help converge an environmental message. Go over each of the pictures and see if students can write a paragraph on a separate piece of paper, on each of the pictures as an interpretation.

3. The first picture looks at pollution from a factory that emits particular matter. The factory could be operated by coal or oil without a way to trap pollutants before they get into the atmosphere.

The second picture looks at exhaust from automobiles and the damage that can be done to the local trees and environment. Carbon monoxide is being emitted into the atmosphere.

The third picture is more representative of air pollution in general. The factory represents air pollution being emitted with the Earth trying to prevent it.

The fourth picture is a message that if we as people do nothing to stop pollution, we will become extinct like the dinosaurs.

The fifth picture is referring to pollution that people do inside their body (lungs) and that it also has an effect on other living organisms.

4. You may want students to design their own pollution poster and have a prize for the winner.

WATER CYCLE - ATMOSPHERE (5)

