

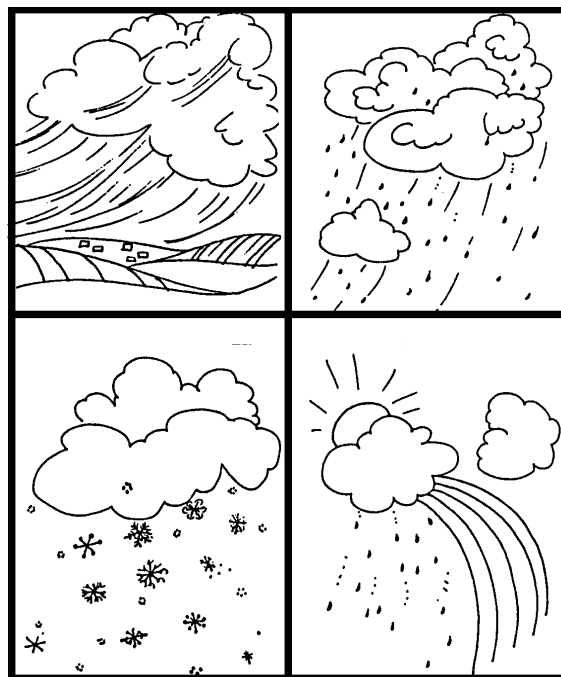


# Water Cycle

The Earth's Gift



## FIRST GRADE ATMOSPHERE



1 WEEK  
LESSON PLANS AND  
ACTIVITIES

## WATER CYCLE OVERVIEW OF FIRST GRADE

### WATER

#### WEEK 1.

PRE: *Investigating the water cycle.*

LAB: *Experiencing surface tension.*

POST: *Discovering how water is used by humans.*

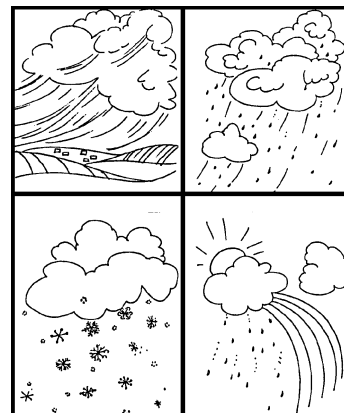
### OCEANS

#### WEEK 2.

PRE: *Discovering bodies of fresh and salt water.*

LAB: *Dissolving salt in water.*

POST: *Exploring how the oceans became salty.*



### ATMOSPHERE

#### WEEK 3.

PRE: *Discovering that air is all around us.*

LAB: *Experimenting with air.*

POST: *Demonstrating the movement of air.*

### WEATHER

#### WEEK 4.

PRE: *Comparing hot and cold.*

LAB: *Discovering how to use a thermometer.*

POST: *Understanding that the weather changes everywhere.*

## WATER CYCLE - ATMOSPHERE (1)

### PRE LAB

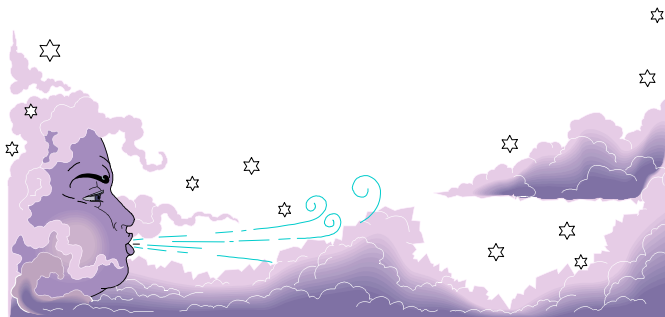
Students use a worksheet to explore the atmosphere.

### OBJECTIVES:

1. Discovering that air is all around us.
2. Exploring the components of the atmosphere.

### VOCABULARY:

air  
atmosphere  
heat  
moisture  
sun  
water  
wind



### MATERIALS:

*Air is All Around You* by Franklyn M. Branley,  
worksheet  
crayons

### BACKGROUND:

The atmosphere is the envelope of gases that surrounds the Earth. This envelope is part of the “spheres,” including lithosphere (rock) and hydrosphere (water). The major elements in the atmosphere include heat (from the Sun) and moisture. Varying amounts of solar radiation (heat) and moisture cause different types of air pressure to form, which assist wind to form. The moving of the Earth itself, also “pushes” wind to move in certain directions. The Sun's rays heats up the water and land, creates moisture and pressure over a region. These differences in air pressure cause the wind to move and when all these elements meet in different forms, they cause different types of weather.

Air is composed of many gases like oxygen, carbon dioxide, nitrogen, and argon. Gases like oxygen and nitrogen are elements, but some gases like carbon dioxide are compounds.

At about 100 kilometers (60 miles) the atmosphere is very thin, which is almost impossible to breathe without artificial air. Beyond the atmosphere there is no air at all. The bulk of the air is found in the lower portions of the atmosphere.

## PROCEDURE:

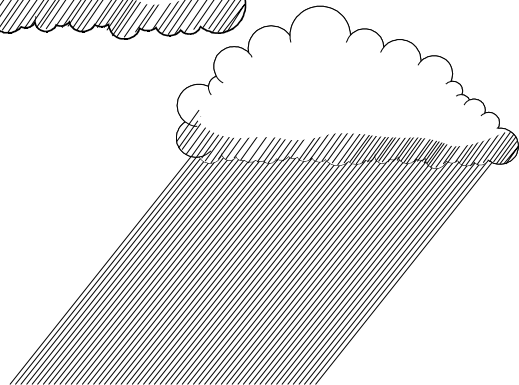
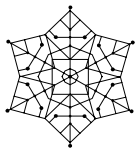
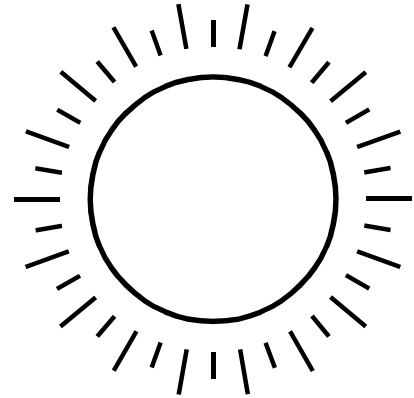
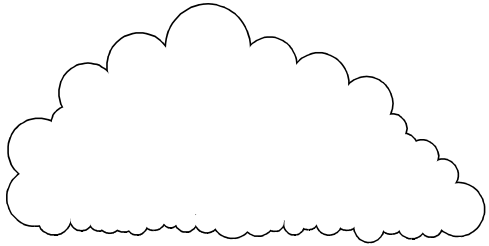
1. Ask the students if people can live with no atmosphere (about 120 km). No, people need air to live. More specifically, we need the oxygen that is present in air.

2. Introduce the word "atmosphere" to students. Emphasize with the students that the Sun is not in our atmosphere, but it heats up the air, which causes movement of the atmosphere. Use the worksheet to review some of the different forms of air and moisture we experience in the atmosphere. Remember, there would be no rain or snow without an atmosphere. All of our weather is only within the lower part of the atmosphere. Cumulus clouds are the fluffy white ones, nimbus refer to clouds that are gray and usually mean rain.

3. The recommended book *Air is All Around You* is an introduction to the study of the atmosphere. Throughout the book there are many experiments that can be done during class or as homework assignments.

## WATER CYCLE - ATMOSPHERE (1)

PRE



SUN  
CUMULUS  
NIMBUS  
RAIN  
SNOW

## WATER CYCLE - ATMOSPHERE (1)

### LAB

Students use pinwheels to move air.

### OBJECTIVES:

1. Discovering that air is all around us.
2. Experimenting with air.

### VOCABULARY:

air  
atmosphere

### MATERIALS:

pinwheels  
plastic grocery bags

### BACKGROUND:

Pure air is colorless, odorless, and tasteless. It is made up of nitrogen (78%), oxygen (21%) and argon (0.09%). The remaining 0.1% is made up of carbon dioxide and a number of other trace gases. The water vapor content (not included in these figures) varies widely.

Air is found everywhere that first graders are likely to venture. It is concentrated near the surface of the Earth, but gets thinner at mountain tops. Air is not usually found inside the earth's crust, unless it is trapped in caves. The higher you get up in the atmosphere the less air you find, until there is a point where there is no air.

If you go in an airplane you need to bring a source of air, because the air is so thin and does not contain enough oxygen. However, airplanes can still fly because the air flowing over the top of the wing (which is curved) is going faster than the air passing over the bottom of the wing (which is straight). When air goes faster, the air pressure is less. Therefore, air is pushing up on the bottom more than it is pushing down on the top, and the plane rises. First graders can probably handle an explanation that simply says that air going fast over the top of the wing lifts the wing.

This lab will try and prove that air is something that you can capture and hold. Although air is all around us, young children don't quite understand that meaning.

### PROCEDURE:

1. The first experiment for students is to prove that there is air. Catch some air in a plastic grocery bag and close it. It will blow up. Ask the children what is in the bag, and tell them that this is one way of knowing that there is air in a particular place. Ask them if



they can think of places in the room where there is no air. Give each a bag and have them check it out. Discuss what they found. Emphasize that air is everywhere. We need air to live.

2. The second part of this activity will have students experiment with a pinwheel. They will observe that air can make a pinwheel move without blowing on it. Ask the students to find out which way they can move to make the air move the pinwheel the fastest. Give them some clues. Tell them to move the pinwheels side by side, up and down, twirl around, move it in a figure eight, ellipse, or any other movement. (Twirling around tends to produce the fastest motion). You may want to do some of this exercise outside and then inside without wind.

## WATER CYCLE - ATMOSPHERE (1)

### POST LAB

Students observe moisture and convection.

### OBJECTIVES:

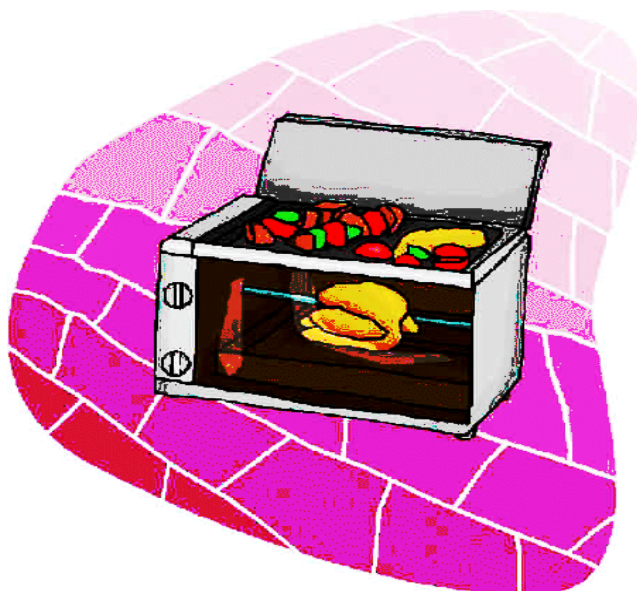
1. Demonstrating the movement of air.
2. Learning that wind is the movement of air.

### VOCABULARY:

air  
cold air  
convection  
hot air  
moisture  
wind

### MATERIALS:

convection chamber  
incense  
plant with clear plastic bag  
balloon  
mirror  
graduated cylinder



### BACKGROUND:

Air is all around us, and moving air is called wind. Wind is caused by cool air that moves in to replace rising warmer air. Warmer air rises because the same number of molecules takes up more space. Because it is less dense, the warm air floats on colder air.

A convection oven uses the principle of moving heated air throughout the oven, which cooks evenly from the top and bottom. A conventional stove cooks from the bottom up.

### PROCEDURE:

Demonstrate the following to emphasize moisture, wind, heat, and air.

1. **MOISTURE DEMONSTRATION:** Discuss the sources of water in air. Show condensation by putting a plastic bag over a plant a day before you show students. Moisture will accumulate on the plastic bag. Note that this is one reason why forests feel



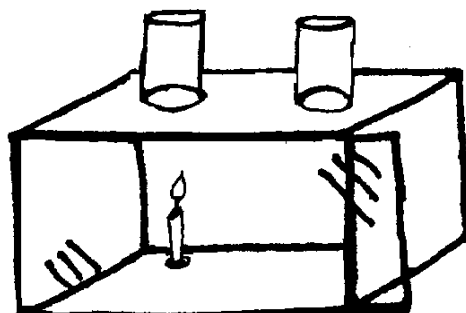
wetter than deserts. Breathe on a mirror to show that you can get moisture from air.

**2. WIND AND HEAT CONVECTION DEMONSTRATION:** Place a candle underneath one hole in the convection chamber (directions below). Place the chimneys (cardboard tubes from toilet paper rolls) over the holes. Stick pins into incense cones so that you can hang the cone in the top of the chimney opposite the candle. Light the candle. Wait a minute or so, then light the incense.

Hot air rises over the candle and pulls in cool air. The smoke from the incense will travel through the box because the incense is at the cool air inlet. (As the incense burns down, it may get hot enough for smoke to rise from it. If this happens, replace it with a new cone.) Explain that this box shows how wind is formed. The candle is a hot area on the earth, and cool surrounding air is being pulled in.

**3. MAKING A CONVECTION CHAMBER:**  
MATERIALS: cardboard tubes, box (small wooden is ideal), glass cover

A convection chamber illustrates the movement of cold and hot air. Hot air rises over the candle and pulls in cool air. The smoke from the incense will travel through the box because the incense is at the cool air inlet. As the incense burns down, it may get hot enough for smoke to rise from it. If this happens, replace it with a new cone. This box shows how wind is formed. The candle is a hot area on the earth, and cool surrounding air is being pulled in.



**4. AIR DEMONSTRATION:** Put a balloon over the top of a flask. The result will be more dramatic if the flask is cooled first. Place the flask in the hot water. The balloon will blow up.

Ask the students why the balloon blew up. Most will say that the air came in through the rubber or glass.) Try to lead the discussion so that they figure out that the air already inside the flask expanded (got bigger) so it took up more room.