

Lesson 2: The Air Around Us

Getting Started

✿ Questions to Explore

- How does the weather affect living things?
- Why does the weather change?
- Why do we study and observe weather?
- How is weather measured?



Facts and Definitions

- **Air pressure** is the weight of air pressing down on the Earth.
- Warm air is lighter than cold air, so it rises.
- Low air pressure means stormy weather is coming.
- High air pressure means clear weather is coming.
- A barometer is a tool that is used to measure changes in air pressure.

⦿ Skills

- Observe the force of air pressure pushing on objects. (S)
- Describe weather using quantitative measures of temperature, wind direction, wind speed, and precipitation. (S)

✂ Materials

- | | |
|--|-------------------------|
| • "Barometer Tri-Fold" pg (kit) | • markers |
| • <i>The Kids' Book of Weather Forecasting</i> by Mark Breen and Kathleen Friestad | • nail (kit) |
| • 14 oz empty metal can (kit) | • paper lunch bag (kit) |
| • balloons (kit) | • rubber bands (kit) |
| • card stock (kit) | • ruler (kit) |
| • half-gallon cardboard milk carton | • straw (kit) |
| | • tape |

Introduction

In this lesson, your child will learn about how air pressure is connected to weather and will make his own barometer to measure air pressure. He will begin collecting air pressure data and will make predictions about weather based on them.

Ask your child to describe air. What is it? What does it feel like? Sound like? Smell like? Look like? How does he know air is all around us?

Reminder:

- Fill out your weather log each day as outlined in Lesson 1.

Activities

Activity 1: Air is There!

Give your child a paper lunch bag, and tell him to blow air into it. When the bag is full, help him to quickly close it without letting all the air out. Ask, "What's inside the bag?" and "What will happen if you flatten the bag? Will that air come out?" Help your child understand that air takes up space (as in inside the bag) and has weight.

Now, follow the instructions and pose the question provided in the first paragraph on p. 18 in *The Kids' Book of Weather Forecasting*. Once you've finished this demonstration, read the remaining two paragraphs on the page to your child to explain that air behaves like the water did in the demonstration.

Explain to your child that air is heavy. We call the weight of the air pushing down on the Earth **air pressure**. Air pressure changes if you go up or down. If your child has ever been on a plane, his ears may have hurt. This is because as we go higher there is less air above us, and it is not as heavy. Our ears are very sensitive to pressure, so they may hurt or feel uncomfortable as air pressure changes.

Tell your child that he is going to learn more about air pressure and then make his own tool to measure it.

Reading and Questions

Ask your child to read the following pages in *The Kids' Book of Weather Forecasting*:

p. 16 ("The Atmosphere: An Ocean of Air")

p. 21 ("Weather Words")

p. 23 ("Reading Your Barometer")

Then he should answer the following questions.

1. What do we call the air that surrounds the Earth?

The atmosphere

2. What do meteorologists use to measure air pressure?

A barometer

3. What kind of weather can we expect when the air pressure is rising?

Clear, sunny weather

4. What kind of weather can we expect when the air pressure is falling?

Stormy weather

Activity 2: Building a Barometer

For this activity, your child will follow the instructions on the "Building a Barometer" page to create his own barometer. Be sure to save your child's barometer for the final project.

NOTE: For best results, keep the barometer in your house away from sunlight and air-conditioning vents.

SAFETY NOTE: Be careful when stretching the balloon across the top of the can. The edge is sharp and children might need assistance. Also be sure to cut off enough of the balloon so that it stretches more easily over the top of the can.

Activity 3: What's the Pressure?

Give your child the "Tracking the Air Pressure" page, and explain that he is going to use his barometer to measure the air pressure for the next nine days when he's collecting weather data for his "Weather Log." Both should be completed at the same time each day.

Explain that he will observe whether the air pressure is rising, falling, or remaining steady (no change) and then will predict the weather based on his observation. Show him the green graphic on p. 24 in the book. It provides an easy way for him to remember what changes in air pressure usually mean.

Wrapping Up

Encourage your child to share his barometer with family members and friends. Ask him to also share what he now knows about air pressure and how it helps us predict the weather.

Life Application

As your child watches or listens to weather reports, tell him to listen for information about air pressure.

Building a Barometer

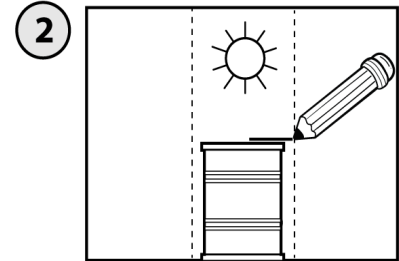
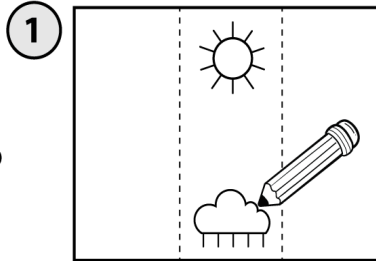
Materials:

- balloon (a 12" balloon, when inflated)
- empty metal can (14 or 15 oz)
- markers
- straight straw
- scissors
- ruler
- rubber bands
- tape
- barometer tri-fold page

Directions:

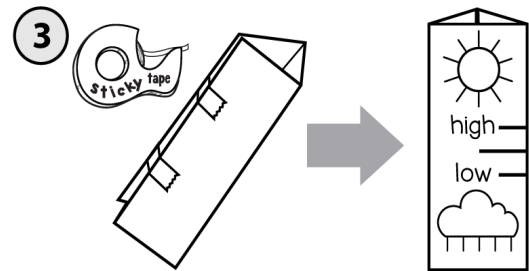
Step 1

On the center section of your page, before you fold, draw a sun on the top and a cloud with rain on the bottom.



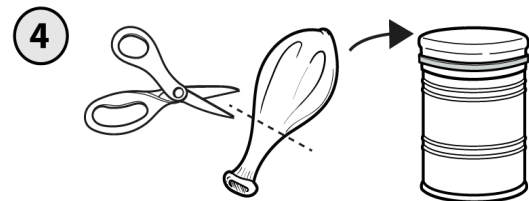
Step 2

Take your empty metal can and lay it down on the edge of the center section that has the sun and cloud. The bottom of the can should be at the bottom of the page where the cloud is. Draw a line at the top of the can as shown in image 2. Use a ruler to measure an inch above the line, mark it, and label it "high." Measure an inch below the line, mark it, and label it "low."



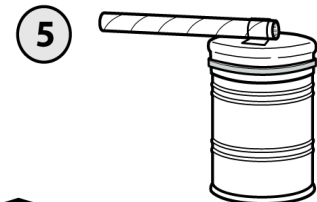
Step 3

Fold the piece of card stock along the dotted line to create a "stand" by taping the ends together.



Step 4

Cut the neck off of the balloon with the scissors and discard the neck. Try to cut a little below where the balloon starts to get big. Stretch the balloon to cover the top of the can. Pull it down tightly to create an airtight seal. There should be no bubble on the top of the can. The balloon should be flat and tight, like a drum. Secure the balloon in place with one or two rubber bands.

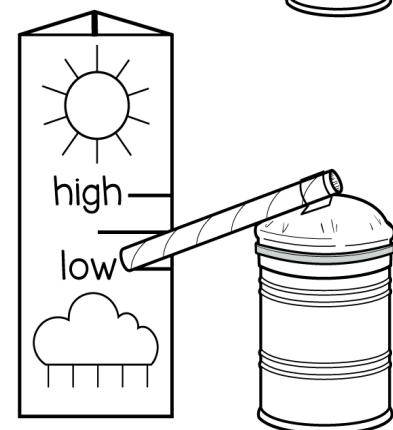


Step 5

Measure the straw and cut it to be about 6 or 7 inches long. Tape it to the center of the balloon.

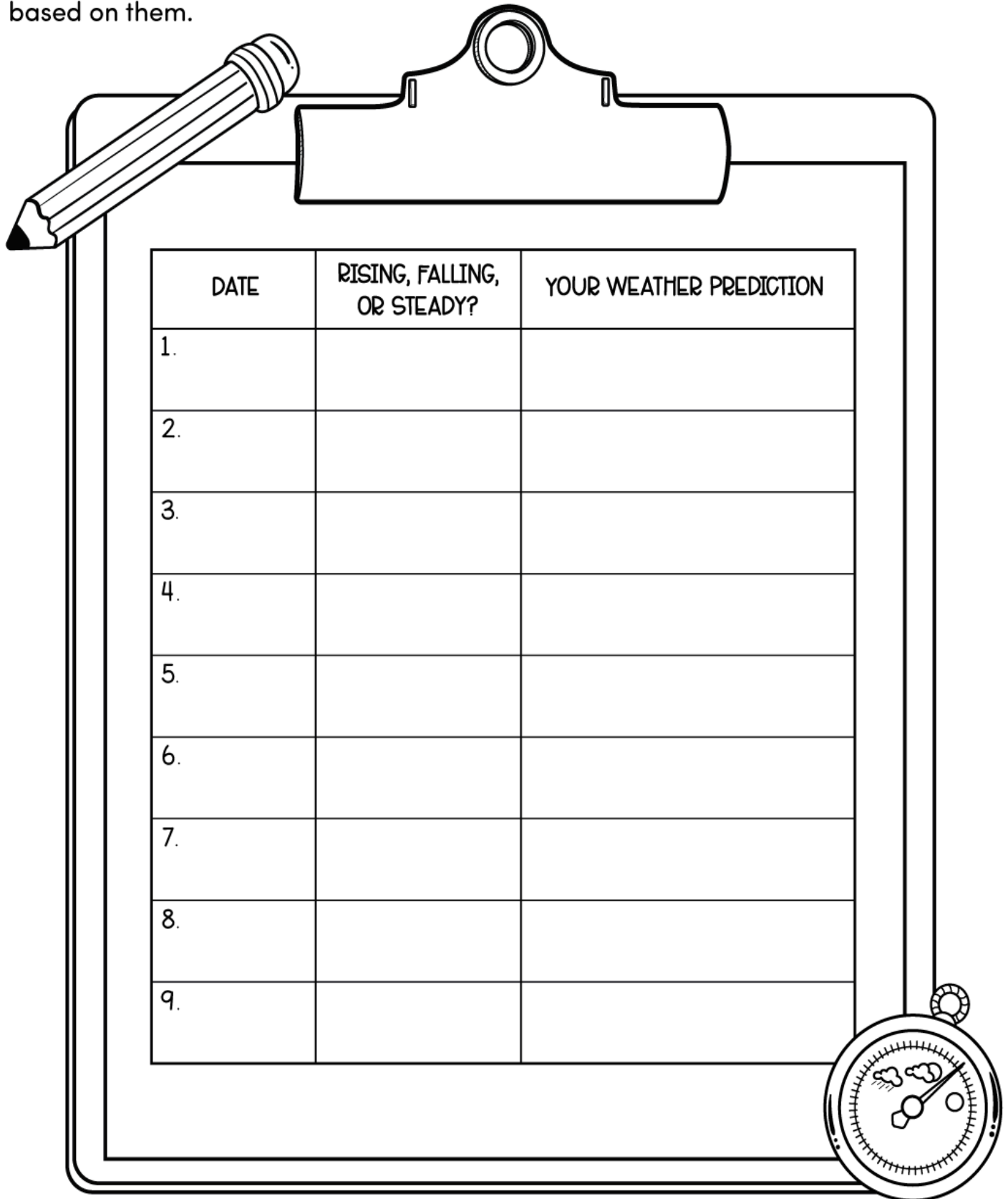
How Does It Work?

As the air pressure outside gets lighter, the air inside pushes the balloon up and causes the end of the straw to go down. As the air gets heavier (cooler), the balloon goes down and causes the straw to rise, indicating higher air pressure.



Tracking the Air Pressure

Directions: Record the changes in air pressure each day and predict the weather based on them.



A clipboard with a pencil and a barometer illustration. The clipboard has a large rectangular sheet of paper with a table. The table has three columns: 'DATE', 'RISING, FALLING, OR STEADY?', and 'YOUR WEATHER PREDICTION'. There are nine rows, numbered 1 through 9. A barometer illustration is in the bottom right corner of the clipboard.

DATE	RISING, FALLING, OR STEADY?	YOUR WEATHER PREDICTION
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		