



3.3 RAIN

OBJECTIVES

The students

- Invent and make rain gauges.
- Measure and record the depth of rainfall.
- Compare the depth of rain falling in different places.

CLIMATE EDUCATION FRAMEWORK

- 3-5Weather.A.1 By measuring weather conditions (temperature, amount and kind of precipitation, amount and kinds of clouds, wind direction and wind speed), scientists learn how the weather changes from day to day, month to month, and during the year.
- 3-5Climate.A.3 Many tropical Pacific islands have a wet season and a dry season.

BACKGROUND

Start this activity on a rainy day after the students have begun to record wind and weather condition data.

This activity introduces the measurement of rainfall. Equally important, it helps the students discover that certain procedures in operating a measuring instrument work better than others and that these procedures must be standardized if consistent data are to be collected.

Gauges

Rain gauges are made from tin cans, milk cartons, and other kinds of containers that have straight sides and flat bottoms.

Location and Measurement

Initially students set up rain gauges at various places on the school grounds. They will discover that the *best* place for a rain gauge is in a location where there are no obstructions and it will not be bothered. Gauges under roofs and trees and on the sides of buildings get less water than gauges that are in the open. Once a place is found for a gauge, it should be kept there. Measurements should be made at the same time each day, water depth should be measured the same way, and the gauge should be emptied after each reading.

Gauges that are in accessible areas are likely to be vandalized. Suggestions for protecting gauges should be offered only as a last resort. Here is a place for students to be very inventive and develop respect for other student's projects.

Building Student Understandings

In grade 3 the first objective is for students to begin to understand that what is being measured is the depth of the rain that falls in a given area. Secondly, the objective is for students to recognize that so long as the container has a flat bottom and straight sides, the depth of water collected will be the same no matter what the surface area or size of the container's opening may be.

Records

Records of rainfall are kept in the Weather Center and on a class graph. Have the students discuss ways of measuring water depth and how to graph these data. Report depth of rainfall in inches or centimeters to correspond to local weather reports.

Irregular Containers

The problem involved in using irregular containers (containers with rounded bottoms, indented sides, or conical shapes) is not confronted here. These problems will be dealt with next year. All containers used as gauges should have straight sides (tin cans, milk cartons).

Depth of Rainfall

In this activity the students discover that during the same rainfall, straight-sided containers collect about the same depth of water no matter how large their opening. Treat this as a fact. Explanation will likewise emerge next year.

STUDENT ROLES

Inventor
Meteorologist

MATERIALS

tin cans with straight sides
wax coated cardboard containers with straight sides
other straight-sided containers as available
stiff wire such as coat-hanger wire
rulers
waterproof or duct tape
pliers
strips of construction paper to act as dip sticks
glue
pencil
Working Dictionary
Student Page 3.3A DAILY RAINFALL
Student Page 3.3B CM-GRID

PRODUCTS

Rain gauges
Rainfall data
Class graph of weekly or monthly rainfall
Working Definition of rain

PROCEDURES

1. **On a rainy day introduce the collection of rainfall data to the students.**
Ask such questions as
 - How could you measure how much rain falls?
 - If you put a container outside in the rain, what do you think will happen?
 - How is the amount of rain reported locally—on TV, the internet, and/or in the newspaper?
✓ Have the students report back. Measurements are stated in inches or centimeters of rainfall.
2. **Have the students put straight-sided cans of different sizes in a place where they will get the same depth of rain. Leave them long enough to collect a measurable amount of rain.**
3. **Have the students invent a way to measure the depth of water in inches. If needed, demonstrate a dipstick method of putting a strip of construction paper in the can and measuring the depth.**
4. **Compare the depths of water measured.**
Ask such questions as
 - What happened when you put the cans in the rain?
 - How do the depths of water compare?
✓ They will be about the same depth.
 - Could you use the depth of the water to tell how much rain has fallen?
 - Can you think of other situations where you use depth when you talk about the amount of liquid you have?
✓ How deep is the water in a tide pool? How deep is the ocean?
5. **Have the students invent rain gauges. Discuss with the students how they will use their gauges.**
Ask questions such
 - When should you check the gauge? Why?
 - How often should you measure the water in the gauge?
 - Should all gauges be checked at the same time or at different times? Why?
 - After you have measured the water in the gauge, should you leave the gauge full? Should you empty it? Why?
6. **Discuss with the students where they are going to put their rain gauges and help secure them.**
7. **After the first measured rain have the students collect and record their data.**
Compare data and ask such questions as
 - Did every group measure the same depth of rain in their gauge?
 - Did any groups get more than others? Why?
 - What are you trying to measure?

- ✓Get at the idea that you want to get a measure of the water falling directly from the sky, not from a rainspout or off the roof.
 - Does anyone want to change the location of their gauge? Why?
- 8. After the second rain, establish standards for the rain gauge with the students.**
Ask such questions as
- Did every group measure the same depth of rain?
 - ✓Measurements should now be about the same.
 - Which groups got the most rain? Why?
 - Where were their gauges located?
 - What do you want your gauges to measure?
 - Where are the best kinds of places to locate rain gauges?
- 9. Have the students again relocate the rain gauges and begin data collection. Keep a class record in the Weather Center on SP3.3 DAILY RAINFALL. Add this job to the Responsibility Chart.**
- 10. Make a class bar graph of the rainfall each week and add a discussion of the rainfall to the monthly weather summary. See Activity 3.6 Monthly Weather Summary.**
- 11. Help the students construct a working definition for rain and record it in their Working Dictionary. Introduce the term *precipitation* if appropriate.**
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EXTENSION

- Help the students organize to measure, record, and compare the depth of rain that falls at their home.



**DAILY
RAINFALL
SP 3.3A**

Name: _____

Date: _____

DATE	Amount of Rain

DATE	Amount of Rain

DATE	Amount of Rain

