

**LESSON: Graphing with Rain Gauges****GRADE: 3****OBJECTIVES:****Mathematics****Measurement & Data****Represent & interpret data**

- **3.MD.3** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*

**Science****3-ESS2 Earth's Systems**

- **3-ESS2-1** Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

**MATERIALS & RESOURCES:**

- Recycle a 2 liter soda bottle (with straight sides)
- Scissors or sharp utility knife (and plenty of caution)
- Plastic ruler or ruler marked on paper w/permanent marker
- Paper and pencil for recording data
- Graph paper
- Colored pencils or markers
- Access to internet

**PRESENTATION:**

Tell students they are going to learn how to make a rain gauge with which to measure and record data. Ask them to think of experiments using rain gauges. Measuring different environments (under plants, on slopes, various locations...) is a good place to begin. Discuss the differences in rainfall across the nation or world. With students determine which season will be described by the data collected. It is possible to graph historical data and skip the rain gauge, but way more interesting to build and use it!

**DIRECTIONS:**

1. Start with a 2-liter soda bottle (with straight sides) and cut off the top about four inches down.
2. Place stones or gravel in the bottom of the bottle up to where the sides are straight. (This will add weigh to the gauge and make it more stable.)
3. Next, tape a ruler to the side to the bottle with the zero mark about a half-inch above the gravel. (If you cannot spare your ruler, once it's taped on, mark the bottle with a permanent marker every half-inch and remove it.)
4. Pour enough water into the bottle to fill it to the zero mark on the ruler. Now, invert the top of the bottle (the portion you cut off earlier) and put it into the bottom portion so it looks like a funnel. Now, you're ready to collect some rain- and data.
5. Place the gauge in an open area away from trees or buildings, which may affect the amount of rain that falls into the bottle. Wait for a rainstorm and afterward, to read your gauge, note the number on your ruler closest to the level of the liquid. Use  $\frac{1}{4}$ " increments of measure when possible. Add the increments to determine the total amount as a way for students to become more familiar with measurement.
6. Record the measurements on a bar or picture graph.
  - Data should be recorded for an entire season in order to “describe typical weather conditions expected during a particular season.”
7. Graph data from historical records. Many websites are available, this is a good resource: [Wunderground.com](http://www.wunderground.com)  
[http://www.wunderground.com/history/airport/KDSM/2012/1/1/MonthlyHistory.html?req\\_city=NA&req\\_state=NA&req\\_statename=NA](http://www.wunderground.com/history/airport/KDSM/2012/1/1/MonthlyHistory.html?req_city=NA&req_state=NA&req_statename=NA)  
Scroll down to month calendar where daily precipitation amounts can be gathered for entire month on one page. Various months, years, and locations can be researched from this site. Decide which season to describe and graph data for that season.
8. In addition to measuring rain amounts, these rain gauges can be used to conduct more experiments: place one or more cartons on a slope plane and a level plane in order to measure if there is any difference, place one or more cartons under plants, trees or other structures to determine any difference in amount of rain reaching the Earth. Students could design other experiments depending on what they want to learn by graphing data.

**TIME:** **90 min +**  
(Months if using rain gauge to collect data for entire season.)

Lesson idea from-<http://www.naturenet.com/naturenetnews/crafts.htm#May2006> (Adapted from Canada's weatheroffice.com)

## **PROCESSING THROUGH THE SIX PILLARS:**

### **WHAT HAPPENED?**

- What happened as you were making your rain gauge?
- How long did it take to see the water rise in the rain gauge?

### **SO WHAT?**

- Why is it important to know how much rain falls?
- What would happen if there no rain fell for a very long time? Or too much rain? Do you think there's much difference in rain amounts in different seasons?

### **NOW WHAT?**

- As good citizens, it is important to conserve water. What are some ways water can be conserved? Who can help?