

Creating a Rain Gauge

Overarching question – How can I make an instrument that measures the amount of rain?

Supplies

For each rain gauge made, you will need

1 2-Liter soda bottles with even, symmetrical sides

sand

water

ruler

permanent marker

scissors

plastic mailing/ insulation tape

****Warning – An adult needs to be responsible for the cutting and taping of the bottle.****

Directions

1. Cut the top 1/3 of the bottle off. Set aside.
2. Fill the bottom of the bottle with sand to even out the curved areas. The sand also acts as an anchor.
3. Fill the bottle with enough water to reach the very top of the sand. This is your base line for measurements.
4. With the ruler and marker, make measuring markers along the side of the bottle starting at the base line. Use smaller measurements to get a more accurate reading.
5. Invert the top of the bottle onto the bottle. Tape the edges to hold it together as well as prevent cuts from the sharp edges. The top of the bottle serves as a funnel and prevents evaporation.
6. Rain gauge complete!!!!
7. Set the rain gauge outside in a spot free from trees and buildings. To compare the effects of tree leaves and branches on falling rain, a second rain gauge could be placed under a tree.
8. Monitor rain fall amounts. It is best to check the measurements at the same time of day for a more accurate reading. Collect Data on Weather Log.

Extension Questions for Students

- Why was the inverted lid taped? (2 reasons – to hold it in place and for safety)
- Why was sand placed in the bottle? (2 reasons – to help create a base line and to serve as an anchor)
- How does the top of the bottle aid in collecting information? (2 reasons – to serve as a funnel and to prevent evaporation)
- Why was the rain gauge placed away from trees and buildings? (so that

when it rains, the trees and buildings don't block the rain, causing the measurements to be incorrect)

Levels of Inquiry

Confirmation – Provide the students with the overarching question and the procedure. Place several instrument artifacts around the room so that students can check their progress.

Structured - Provide the students with the overarching question and the procedure. Allow students to discover the finished product on their own.

Guided – Provide the students with the overarching question and materials. Students are to create and write their own procedures and determine which materials to utilize. Allow students to discover the finished product on their own.

Open - Students are given a scenario where the instrument is needed, but not identified. From this scenario, students are to generate an overarching question. From that point, students are to create and write their own procedures and determine which materials to utilize. Allow students to discover the finished product on their own.

Possible scenario – George wants to plant a small garden in his backyard. He is monitoring the rain fall to decide which plants to plant. Create an overarching question to help George discover which plants would thrive in his garden.

Extensions

Idea One – Create a class weather station with handmade anemometers, rain gauges, barometers, and wind vanes. Monitor the weather and collect data at the same time of day. With the data, create charts and graphs, either by hand or by graphing software, such as Excel. (T)

Idea Two – Create a class blog that details the weather conditions for the school, including the weather data collected from the class weather station. (T)

Common Core (Grades 6-8)

L6-8RST3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

L6-8RST7: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

L6-8WHST2: Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

- a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
- b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.
- c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
- d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
- e. Establish and maintain a formal style and objective tone.

f. Provide a concluding statement or section that follows from and supports the information or explanation presented.

Georgia Performance Standards

S6E4. Students will understand how the distribution of land and oceans affects climate and weather.

a. Demonstrate that land and water absorb and lose heat at different rates and explain the resulting effects on weather patterns.