



How Wet Did It Get?

Lesson Plan

Overview

Children will measure the rainfall/snowfall on the playground on a rainy/snowy day with a rain/snow gauge. Children will draw a bar graph representing the amount of water that fell. Children will also observe a satellite image of the clouds and local weather system on the day that it rains/snows. This lesson can also be used as a precursor to [Wet Weather](#), an [intermediate](#) level lesson in the [Seasonal Changes](#) module.

Suggested Lesson Sequence	Please see the Earth Systems Foundations module description.
Lesson Level	Entry
Science Connections	<ul style="list-style-type: none"> Students will measure snowfall/rainfall on school playgrounds
Math Connections	<ul style="list-style-type: none"> Students will measure rainfall/snowfall in centimeters using a rain gauge Students will make a bar graph of the total amount of rainfall/snowfall
Technology Connections	<ul style="list-style-type: none"> Students will construct a gauge to measure rainfall and/or snowfall in centimeters Students will learn that satellites can view clouds Students will observe a satellite image of a weather system that produces rain/snow in their location
Lesson Assessment Tools	Assessment and Summary Table (Word) Assessment Activity Description Authentic Assessment

Materials

Powerpoint Reader ([Windows](#) / [Mac](#)), [Quicktime Player](#), and [Adobe Reader](#)

Plastic jar (e.g. peanut butter jar) with equal diameter from top to bottom

Indelible marker

Rain Gauge activity sheet ([Acrobat](#))

How Wet Did It Get? activity sheet ([Word](#))

How Wet Did It Get? interactive slide show ([Powerpoint](#))

Meet Pixel the Satellite animated movie ([Quicktime](#))

About the slideshow: This slideshow is not meant for students to read through on their own. It is intended to be viewed together, to outline and illustrate a discussion of the lesson's themes, led by the teacher. You might have a different student read each slide's text.

Vocabulary

Centimeter: a unit of length often used to measure small objects. Most pieces of chalk are about one centimeter across. 100 centimeters equals 1 meter.

Clouds: objects in the sky made out of ice crystals or water droplets.

Estimate: a measurement that is not exact.

Exact: a very high detail of measurement.

Gauge: an instrument used to measure something.

Liquid: a wet substance that can easily flow.

Precipitation: water that falls from the sky to the ground. Precipitation can be in the form of snow (solid water crystals), ice (solid water crystals), or rain (liquid water).

Rain: liquid water that falls from clouds.

Snow: solid water that falls from clouds. Snow is made of flakes, or water crystals, that each have 6 points.

Solid: a substance that does not flow easily and can stand alone in its form.

Procedure

I. Assessing Prior Knowledge

Begin a classroom discussion about the last time it rained or snowed outside. Sample starter questions could include: Can students remember the last time it rained or snowed? What special clothing did they wear the last time it rained or snowed, to keep dry? As the discussion progresses, have students begin to think about how they could tell how much water fell the last time it rained. In the case of snow, probe students' knowledge of snow as a form of water. How can the students tell that snow is made of water?

II. Contextual Preparation

In this lesson, students will take measurements of precipitation on their own playground, and then learn that the clouds which dropped this precipitation can be seen by a satellite orbiting overhead. To introduce the concept that that clouds can be seen using satellites orbiting around the Earth, you might play the [Meet Pixel the Satellite](#) Quicktime movie for your students. Its transcript is below.

"1. Hi kids, I'm Pixel the Satellite. 2. I spend my days and nights orbiting the Earth, gathering photos and other information about our planet's many interesting places and living things. 3. From up here, I can see

that the Earth is one connected system: 4. see how the Earth looks from hundreds of miles high in the sky? (shows the Earth, in close up view, scans around it for a moment, with Pixel narrating the scene, 5. "Here's the Land of North America, the Atlantic Ocean, and some clouds here and there") 6. Together with your teacher, I'll be your guide as we look closer at the Earth and its many related parts. 7. As for now, I'm off to snap some pictures of some lakes, a few mountains, and maybe even your home town! (short pause) 8. See you soo-oon!" (fades off into orbit around Earth)

"Pixel" makes specific mention of clouds that can be seen from the vantage point of outer space. After completing this movie, display the [How Wet Did It Get](#) interactive slide show. This slide show motivates students to make measurements of rainfall/snowfall on their own playground. During the discussion, you may also wish to introduce and discuss the vocabulary words with your students.

III. Student Activities

1. To measure rain/snow fall, the children should first construct a rain/snow gauge. This may be done as a class or the teacher may choose to have children make their own gauges. First, children will need a clean, empty plastic jar (e.g. peanut butter jar). Make sure the diameter of the jar opening is the same size as the base of the jar.
2. Using the template on the [Rain Gauge](#) activity sheet, cut out the template for the metric ruler. This template will be used to mark the jar in centimeters with an indelible marker. This template will also be used to help children read and graph the rainfall amount (see step #4).
3. Place the plastic jar in an open location on the school playground or outside the classroom window that will not be disturbed or blown over by the wind. For example, the jar may be placed in a garden and supported by rocks or bricks.
4. Distribute the [How Wet Did It Get](#) activity sheet. As a rain or snow storm passes, encourage students to draw pictures of the clouds overhead on this activity sheet. After the rain/snowstorm, children can observe the amount of rain/snow collected through the clear jar and observe which mark the water level is nearest. The teacher should help the children estimate the amount of rainfall to the nearest centimeter (cm). For example, if the water level is over half way between 1 cm and 2 cm, "round up" to 2 cm. If the water level is less than half way, "round down" to 1 cm.
5. To help children learn to estimate and read the rain/snow fall measurements, the teacher should use the paper centimeter ruler template (see [Rain Gauge](#) activity sheet). While observing the amount of water in the gauge, children can make a bar graph by coloring the amount of rain on the paper centimeter ruler. The teacher can then assist students in estimating the amount of water that fell. In the case of snow measurement, try to measure the snow depth before, during, and after melt. These multiple measurements will help

students to make the connection between snow and the water it contains.

6. On the day that it storms, children may check the National Oceanic and Atmospheric Administration's GOES website (<http://www.goes.noaa.gov>) to observe satellite images of the clouds and storm systems near your school's location. Choose the area that best corresponds to your location. For the continental United States (CONUS) images, short movies can be viewed by clicking on the icons below the images to show the clouds "in motion." This will allow children to observe on the computer how the weather system moves across time and location. For these movies, it is best to choose the "infrared" option so that the image does not go dark at night. The teacher (or children) can also go to other weather forecasting sites (such as the National Weather Service site at: www.nws.noaa.gov) to read the forecast and find out how long the rain or snow will last.
7. Using the [How Wet Did It Get](#) activity sheet, children can now draw a picture of the cloud images they observe, showing the storm system and clouds as viewed from space.

Questions for Class Discussion

1. How much rain/snow did we collect in the gauge? Is this an "exact" amount or is it an "estimate?"

Answers will vary. However, the measurement will be an estimate because the amount in the jar will likely fall between whole centimeter marks.

2. (If snowfall was measured). Why did the snow turn to water after you brought it inside? Was there a difference between the depth of snow and the depth of water after the snow melted? Will more water fall when it rains 2 cm, or when it snows 2 cm?

Students should recognize that snow is a crystallized form of water, and that snow depth does not equal water depth. More water will fall when it rains 2 cm than when it snows 2 cm, for example.

3. Do you think that the placement of the gauge changed the amount of rain/snow fall that you measured?

This question will challenge students to think about how measurements are linked to the placement of an instrument such as a gauge. For example, if the gauge was placed under a tree or next to a building, it may have been "shadowed" from receiving rain or snow. In some cases, snow accumulates (drifts) in areas due to blowing wind.

4. What do you observe on the satellite map of the weather? How did the satellite image of the clouds differ from your drawing of the clouds from below? How does this satellite map show the weather from space? Can you guess which other areas were affected by the same

storm as the one that hit your area?

Children should be able to recognize clouds and weather systems from satellite images on the satellite image web page. Students should also recognize that although the storm in the local area may have produced very dark and large clouds, these clouds are actually part of a larger cloud mass that may or may not extend far into other areas. Students should make the connection that clouds have large movement patterns and that these patterns are related to the weather.

IV. Assessment

Children should be able to record and graph the amount of rainfall with a paper centimeter ruler. Children should also be able to recognize a satellite image of clouds and weather systems. To assess student knowledge, fill a gauge with tap water to various levels and have students take turns estimating (i.e. rounding) the amount of water contained within.

Lesson Extensions for Authentic Assessment

- How can a measurement be taken with higher precision than using a centimeter scale? Introduce this question to your students, asking them to devise a system for better measurement. Then, develop a millimeter scale (or use a plastic metric ruler) for measuring precipitation. How do estimates using a cm scale compare with measurements using a mm scale?
- Write a class story on the board using the vocabulary words from this lesson. Then, act out the story using students as raindrops, snowflakes, clouds, etc. You may wish to have several students join hands as a "gauge" to catch the "falling" rain or snow, and then read off how much was caught.