FACTivity

Time needed:
One class period and, optionally, an additional 30 minutes in a second class period

In this FACTivity, you will explore a range of instruments used by scientists. You will then use your imagination to create instruments that measure a range of classroom **variables**.

Materials
- Access to the Media Center or the Internet
- Graphic organizers on pages 68-69
- "Streaming Live" article

In this article, the scientists used the following instruments to collect, measure, and record data:

Instrument	Measures
Thermometer	Air temperature
Barometer	Relative humidity
Anemometer	Wind speed
Porometer	Pore opening size (stomata opening size)
Densiometer	Tree canopy cover
Water well meter	Depth from soil surface to ground water
Quantum meter	Light intensity

If you read "Thinking About Science," you will have a good idea of what the word "meter" at the end of each of these instrument names means. It gives you a clue that the first part of the instrument name tells what variable the instrument measures.

The questions you will answer in this FACTivity are:

1. What are at least five more instruments with the word "meter" in their name, and what variables do they measure?
2. What instrument names can be created for imaginary use in the classroom and what **unit of measurement** would these instruments use?
3. What are the characteristics of a useful unit of measurement?
4. How does having a measurement range help someone to understand the measurement?

The method you will use to answer this question is:

1. Your class should first brainstorm any additional instruments you know ending with the letters "m-e-t-e-r." These instruments should be written in the graphic organizer given in the next section. You should then do research on the Internet or in your Media Center about scientific instruments. Record any instrument ending with the five letters "meter" and what variable it measures in the graphic organizer. To complete the graphic organizer, you should also fill in the column named "unit of measurement." The unit of measurement is the numeric unit used to measure the variable. A thermometer, for example, measures the air temperature in degrees Fahrenheit or Celsius. Your class should identify as many instruments as possible.

2. After you have identified instruments, it is time to get creative! Using the second graphic organizer, imagine instruments that measure variables that could be found in the classroom. Below are examples. Remember that these are not real instruments!

Instrument Name	Measures	Unit of Measurement	Measurement Range
Footometer (fö **tə** mə tər)	Foot length	Inches or centimeters	6 inches-15 inches (15.24- 38.1 centimeters)
Silencometer (sī lən **sö** mə tər)	The amount of time students have been silent	Seconds or minutes	0-600 seconds or 0-10 minutes
Jumpometer (jum **pö** mə tər)	How far or high a student can jump	Feet or meters	6 inches-4 feet (0.15-1.22 meters)

3. After the created instruments have been identified and the graphic organizer is completed, your teacher will lead a class discussion about scientific instruments. In particular, you will discuss the need for a clear unit of measurement and a measurement range. Discuss and answer the following questions:

   a. What are the characteristics of a useful unit of measurement?

   b. How does having a measurement range help you understand the measurement?

While doing Internet or Media Center research, other instrument names may have been found. An example is "rain gauge." You should realize that scientific instruments do not all end with the five letters that spell "meter."

FACTivity
continued

Your teacher will lead a class discussion in which you explore how the use of scientific instruments helped the scientists in this study do their research.

Scientific Instruments

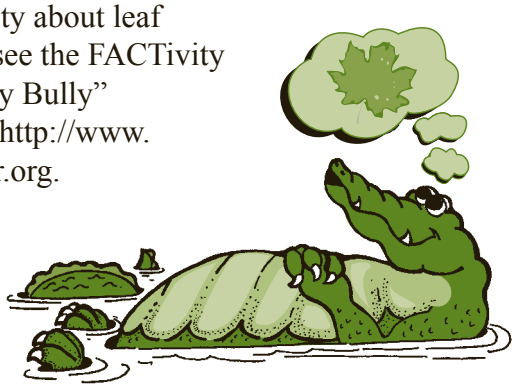
Instrument Name	Measures	Unit of Measurement

Instruments That Might Be Used in the Classroom

Instrument Name	Measures	Unit of Measurement	Measurement Range

Optional (using an additional 30 minutes at the end of a week): Student teams identify additional real scientific instruments and/or create new imagined instruments over a week's period. The team with the longest (and best documented) list of instruments wins. All listed instruments, whether real or imagined, must include the four columns shown in the second graphic organizer. Students will present their instruments and the class will pick the team winner.

For a FACTivity about leaf transpiration, see the FACTivity for the "Woolly Bully" monograph at http://www.naturalinquirer.org.



Web Resources

Weather instruments
http://www.weatherwizkids.com/weather-instruments.htm

Biosphere 2
http://www.b2science.org/

What is a densiometer?
http://www.youtube.com/watch?v=nTc_sqUPVZo

We need trees!
http://kids.discovery.com/tell-me/earth/why-do-we-need-trees

Do trees grow on farms?
http://www.realtrees4kids.org/index.htm