

LETTER TO FAMILY

Cut here and paste onto school letterhead before making copies.

Science News

Dear Family,

We are starting a new science unit called **Energy and Matter**. We will be developing the idea that matter is the stuff from which all common and familiar objects and materials are made. Energy is usually defined as the ability to do work. In this unit we will come to know energy as the causal agent behind every action or activity. We will explore sources of energy, such as the Sun, batteries, fuels, and food and identify forms of energy, such as electricity, heat, light, sound, and moving masses.

The two attributes that we will use to define matter are mass and volume. In order to communicate mass and volume effectively, we will learn to quantify mass and volume in grams and liters, the standard units in the metric system. In order to quantify heat energy effectively, we will learn to measure temperature in degrees Celsius, the standard unit in the metric system. This unit introduces the metric system (the International System of Units—SI) as the language used by scientists to communicate the results of their observations and experiments. It has been found that students learn metric units (liter, gram, meter, degree Celsius) quicker and more thoroughly when they are introduced as a separate system, not converted from the customary units (foot, pound, quart, degree Fahrenheit). Our goal is that the metric concepts will have their own frame of reference in your child's mind, and that, in time, he or she will think metric.

Our study of matter will deal with phase change, including melting (the change from solid to liquid) and evaporation (the change from liquid to gas). Your child is probably familiar with phase changes in water (ice to water to water vapor), but may appreciate for the first time that these processes apply to thousands of materials, ranging from oxygen to rock. We will also investigate what happens when materials are mixed.

Watch for the Home/School Connection sheets that I will be sending home from time to time to extend our classroom experiences to your home. You can get more information about this module by going to FOSSweb (www.F OSSweb.com). If you have questions or comments or expertise you would like to share with the class, please drop me a note.

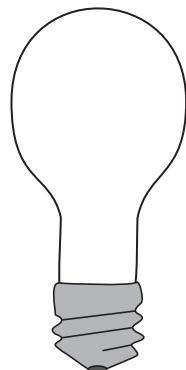
Sincerely,

Metric Measurement Units	
The meter is about the height from the floor to a typical doorknob.	The liter is about the volume of water in a bottle of drinking water.
The gram is about the mass of a standard paper clip.	Degrees Celsius Room temperature is about 24°C; body temperature is about 37°C.

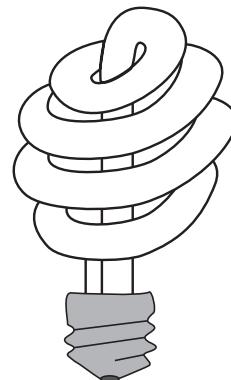
HOME/SCHOOL CONNECTION

Investigation 1: Force, Motion, and Energy

Lightbulbs are rated by the amount of energy they use. The unit of electric power is the watt.



Older style



Newer style

Record the watt rating for each bulb you can easily check. You may be surprised by the low wattage of the newer kind of bulbs that look like rope. Add up the total watts used by the lights you are able to check.

Safety Note. Only check bulbs that are turned off and not hot.

Lightbulb location	Style	Watts
Total watts		

HOME/SCHOOL CONNECTION

Investigation 2: Measuring Matter

Estimate Mass and Volume of Home Products

Find five packages of solid food, such as rice or cereal. Also find five liquid containers, such as fruit juice or dishwashing detergent. Estimate the mass of the solid products in grams and the volume of the liquid products in milliliters. Then check the labels to see how accurate your estimates are.

Solid products	Mass estimate	Mass on label
Liquid products	Volume estimate	Volume on label

HOME/SCHOOL CONNECTION

Investigation 3: Changing Matter

Use the newspaper, a TV weather report, or the Internet to find and record the high and low temperatures in your city (or one close by) for 5 days. Then draw two graph lines, one for high and one for low, to show the change in temperature over those 5 days.

HOME/SCHOOL CONNECTION

Investigation 4: Mixtures

Safety note: Advise students to be careful when heating and touching hot water.

How does temperature affect how much sugar will dissolve in water?

Materials

- | | |
|-------------------------------|--------------------------------------|
| • Sugar | 3 Clear containers |
| • Room-temperature water | 1 Measuring spoon (5 mL or teaspoon) |
| • Ice water | 1 Measuring cup |
| • Hot tap water (not boiling) | 1 Mixing spoon |

Procedure

1. Measure 100 mL (1/2 cup) room-temperature water into one clear container.
2. Measure one level 5 mL spoon (1 teaspoon) of sugar, and put it into the water.
3. Use the mixing spoon to mix the sugar until it has all dissolved. (How do you know it has all dissolved?)
4. Continue to add and mix spoonfuls of sugar until no more sugar dissolves. (How do you know when no more sugar will dissolve?)
5. Record your data in the table below.
6. Predict how many spoonfuls of sugar will dissolve in ice water and in hot water. (Do you think there will be a difference? Why?)
7. Repeat steps 1–5, using ice water, and then using hot water.
8. In the last column of the table, record the difference, if any, in number of spoonfuls of sugar when mixed with water at different temperatures.
9. Answer the questions below the table.

Water temperature	Prediction (spoonfuls of sugar)	Actual (spoonfuls of sugar)	Difference (compared to room-temperature water)
Room temperature			
Ice water			
Hot water			

How did the amount of sugar you could dissolve change when you used different temperatures of water?

What is the relationship between water temperature and amount of sugar that will dissolve?