

LETTER TO FAMILY

Cut here and paste onto school letterhead before making copies.

Science News

Dear Family,

We are about to begin a study of planetary systems. We'll start with Earth's star, the Sun, and use a variety of tools to observe and record its position in the sky. To orient our observations, we'll use a compass. And to monitor the Sun, we will use our shadows. While we use the language that the Sun rises in the east and sets in the west, we know that it really isn't the Sun moving but the rotation of Earth on its axis that makes it appear that the stationary Sun is moving across the sky.

We will be modeling the predictable pattern of the Sun as it travels across the sky during the day and during different seasons.

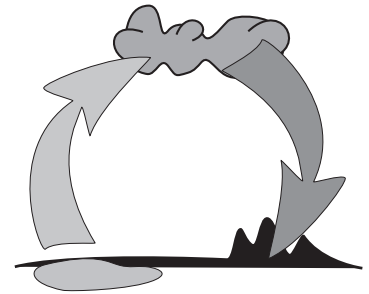
Then we will study the Moon, other planets, and stars. We will start as a class by observing the Moon during the day and follow that up with night-sky observations. As a bridge to what we have been studying in class, students will look for the Moon and other objects in the night sky when they are at home. To make night-sky observations, take your child outside at about the same time each evening (when it's dark) and observe the sky. Take a few minutes to enjoy the night sky together. Talk about what you see. For example, if it's cloudy, you won't see anything but clouds. If it's clear, you will see stars (you might want to point out a constellation or two), planets (points of light that appear larger and brighter than stars), and sometimes the Moon. Discuss the changes in the night sky from night to night, especially the changing appearance of the Moon, and where you see it in the sky. (You can use the Internet or local newspaper to find out when it rises.)

We will return to Earth to study our atmosphere and weather and learn about the weather variables that meteorologists use to measure the conditions of the atmosphere. We will be collecting local weather data from our class weather station and from nearby weather monitoring stations via the Internet. You can increase your child's interest in weather by asking him or her to talk about the science investigations. Keep track of the changes in weather together. Check out the weather maps in the daily newspaper or online, or watch the evening news for weather reports.

We will then turn our attention to heating Earth. We'll place containers of water and dry soil in the sunshine to find out if they heat up equally. We'll use the results of these experiments to consider how uneven heating of Earth's surface produces convection currents. These concepts come together in the water cycle, which continually renews the supply of fresh water. Finally, we'll develop the idea of climate and develop awareness of what is meant by climate change. And we will conduct experiments to design solar water heaters, sorting out the variables that influence the temperature and heating rate of a water-heating system.

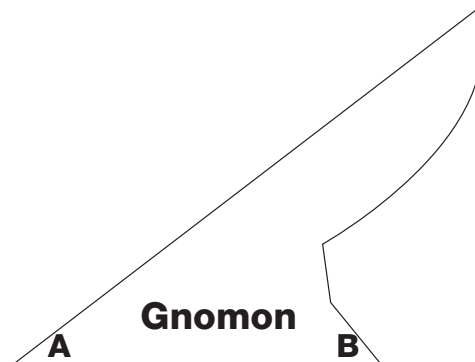
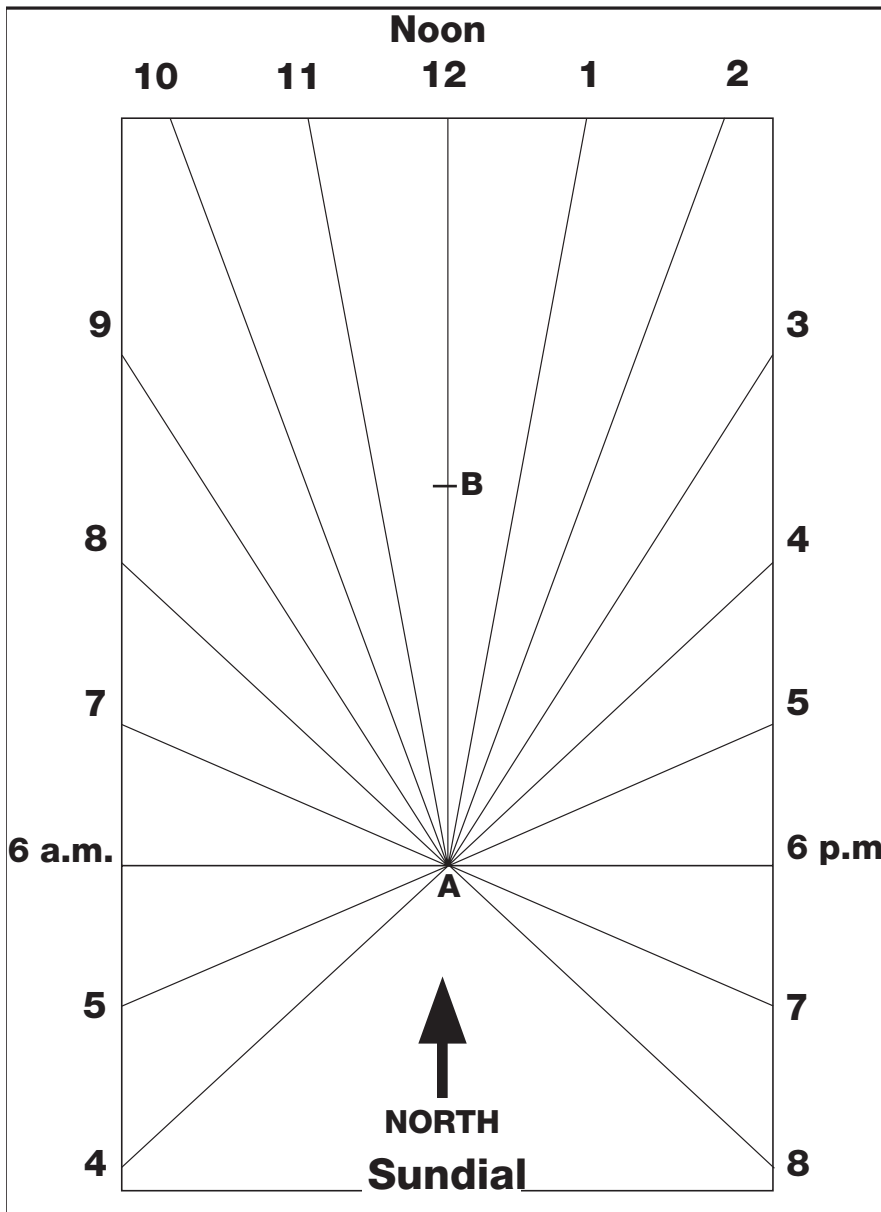
Thanks for your help! You can get more information on this module by going to www.FOSSweb.com.

Sincerely,



HOME/SCHOOL CONNECTION

Investigation 1: The Sun



Sundial Pattern

This sundial will work best at latitude 38° north, the latitude of San Francisco Bay. But the gnomon can be easily modified to fit your area. Find the latitude of your hometown. Then modify angle A on the gnomon to measure that angle.

Materials

- Cardboard
- 1 Scissors
- 1 Protractor
- Glue
- Tape

Directions

1. Glue the pattern to a piece of cardboard. Let it dry.
2. Cut out the sundial and the gnomon carefully.
3. Tape the gnomon to the sundial on the 12:00 line, matching angles A and B.
4. Place the sundial outside or in a sunny window. It must be level. Point the 12:00 line and the gnomon directly north. Adjust the sundial by comparing the time you see on the dial with the time on a clock and turning the sundial until the times match. The sundial will now tell time accurately.

NOTE: Sundials measure local apparent time, which depends on the position of the Sun in the sky. You will need to adjust the time you read on the sundial to get standard time. Check a reference to get the correction factors required to make this adjustment.

HOME/SCHOOL CONNECTION

Investigation 2: Planetary Systems

A student, who is 10, is curious about how old she would be on other planets in the solar system. She knows that on Earth a year equals 365 days. But other planets have longer or shorter years. How can she figure out how old she would be on these planets?

Planet	Orbit in Earth days
Mercury	88
Venus	225
Mars	687
Jupiter	4,333
Saturn	10,759
Uranus	30,685
Neptune	60,189

1. How many Earth days old is the student?
2. How many Mercury years old is the student?
3. How many Mars years old is the student?
4. On which planets is the student less than a year old?
5. On which planets is the student older than she is on Earth?
6. How old would you be today on each of the planets?
7. How old would each member of your family be today on each of the planets?

HOME/SCHOOL CONNECTION

Investigation 3: Earth's Atmosphere

1. Choose a weather source that will give you at least a 5-day forecast for your home area. Write your data source at the bottom of the page. Here are some suggested data sources.
 - TV news (List the channel at the bottom of the page.)
 - Daily newspaper (List the newspaper at the bottom of the page.)
 - Internet (Visit FOSSweb for a list of appropriate sites and list the one used.)
2. Record the 5-day forecast for your home area in the forecast table below.
3. Check with your source every day and record the actual weather.
4. Write about whether the forecast was true to the actual weather.

5-Day Weather Forecast						
Day	Temp. (°C)	Humidity (%)	Wind speed (km per hour)	Wind direction	Visibility (km)	Observable weather
1						
2						
3						
4						
5						

5-Day Actual Weather						
Day	Temp. (°C)	Humidity (%)	Wind speed (km per hour)	Wind direction	Visibility (km)	Observable weather
1						
2						
3						
4						
5						

HOME/SCHOOL CONNECTION

Investigation 4: Heating Earth

Whales are the biggest animals alive on Earth today. They need a lot to eat. Many whales are filter feeders and rely on tiny, floating crustaceans called krill as the main part of their diet. A blue whale can eat over 3,636 kilograms of krill a day. The krill depend on tinier marine plants for their food. And the plants depend on sunshine for their survival. So if you think carefully, whales depend on a whole lot of sunshine for their survival!

How Many Sun Days Do You Use?

Plants depend on solar energy for their survival. They use the Sun’s energy to make food and store the energy in their leaves, seeds, and fruit. When an animal, like you, eats the fruit from a plant or tree, you are eating this stored solar energy. Plants need different amounts of time in the sunshine to produce the fruits and vegetables we use for food. You might think of it this way: one day of sunshine used and stored by a plant equals one “sun day.” For example, it can take up to 73 days for corn to grow from a seed to the stage when you can eat it off the cob. You are using 73 days of stored solar energy in the corn when you eat it.

Find out how many sun days it takes to ripen your favorite fruits and vegetables.

- Write down your favorite fruits and vegetables in the chart below.
- To find the number of sun days for each food, read seed packets or a seed catalog. Some seed catalogs are available on the Internet, or you might try the library or a garden-supply store. For the cereal, find out what type of grain your cereal is made of (for example, oats or corn).

Type of food	Your favorite	Number of sun days
Example	Corn	73
Vegetable		
Fruit		
Cereal		

HOME/SCHOOL CONNECTION

Investigation 5: Water Planet

People can use different energy sources to heat water for their homes. Often they use gas or electric water heaters. Some people use solar-energy collectors on their roofs to heat water for their home use.

What energy source does your family use to heat water?

The chart below shows the estimated cost per month for heating water for a home, depending on the number of people who live in the home.

Cost of a water heater, 160 liter, with insulation blanket		
Number of people in household	Electric water heater	Gas water heater
1	\$17.71	\$ 7.06
2	\$28.93	\$10.21
3	\$40.15	\$13.36
4	\$51.37	\$16.51
5	\$62.59	\$19.66
6	\$73.81	\$22.81
7	\$85.03	\$25.86
8	\$96.03	\$29.11

Ask to look at a copy of the utility bill for your home. Find the amount of gas and/or electricity your family used for a month and how much it cost. How do these amounts compare with the figures in the chart? How can you tell how much of the total utility cost is for heating water? If your family uses a solar water heater, how does the total bill compare?

Here are some ways your family might reduce hot-water use and conserve water in your home.

- Install low-flow showerheads and put aerators on the faucets.
- Put an insulating blanket on the water heater.
- Lower the thermostat on the water heater to 49°C.
- Wash clothes in warm or cold water, not hot.
- Fix leaky faucets and showerheads.

Check with your local utility company for more energy-saving tips and information about energy sources. List three more ideas for saving energy by cutting down on hot-water use. Write your ideas on the back of this sheet.