WEEKDAY WONDERS

Content developed by the Tennessee Aquarium Education Department

TENNESSEE AQUARIUM

Wonders of Nature: Day 1

We live in a world filled with wonder! This week, young scientists invoke their innate sense of curiosity and wonder, as they explore our natural world by taking time to look up to the sky and down to the earth. They investigate natural phenomenon on a large scale, such as the phases of the moon, as well as on a more minute, less obvious scale, such as the resourceful way that plants can inhabit seemingly uninhabitable spaces and much more!

These curated activities are listed in a suggested sequence but may be done in the order that works best for you and your young scientists. Learn more about this series in the Introduction to Weekday Wonders.

Question of the Day

Have you ever wondered about the power of the sun?

Daily Nature Journal

Spending some time outside completing their daily nature journal is a great way for young scientists to become aware of the beauty of nature. Need help to help them? Use the Guide to Nature Journaling to support them in nature journaling each day.

Solar Snacks

Share the following information with your young scientist. The sun is a powerful source of energy for our planet. We can take advantage of the sun's energy to make our own tasty snacks!

Have your young scientist gather the following supplies:

- Aluminum foil
- Glue
- Tape

- Clear plastic wrap (or a piece of glass)
- Black construction paper or poster board
- Cardboard shoe box with lid (pizza box will also work)
- Scissors
- Thermometer (optional)
- Snack items, such as ingredients for S'mores.

In this activity, your young scientist will use the cardboard box to build a solar oven to make a snack. Have your scientist remove the lid of the box. S/he should glue aluminum foil to the inside of the box, with the shiny side out. Then, cut out black paper and glue it over the aluminum foil so the inside of the box is completely covered.

Your scientist should then take the lid of the box and cut a large flap, about 1 to 1 ½ inches from the edge of the box. Leave the flap attached along one of the long sides. The other three cuts should allow the scientist to open the flap in the same way one would open a pizza box. S/he should do this, even if you are using a pizza box. Have your scientist crease the long edge that is still attached to the lid.

Ask your scientist to glue aluminum foil to the inside of the flap and lid of the box. Be sure your scientist covers the flap separately from the rest of the lid so that it can still be opened.

Have your scientist add 1-2 pieces of clear plastic wrap to the inside of the lid, slightly larger than the flap. Tape the plastic wrap to the lid to make a seal. Be sure that the flap will still open.

To make a snack, your scientist can try a camp favorite – S'mores. On a sunny day, have your scientist place his/her solar cooker in a sunny spot. Open the solar oven by removing the shoe box lid or lifting the pizza box lid. Place a glass plate or clear plastic plate in the oven. Place an uncooked S'more (graham cracker, chocolate, marshmallow, second graham cracker) on the plate.

Your scientist should place the shoe box lid on the box and open the flap to try to direct as much sun as possible into the box. Your scientist may need to prop the flap open with a stick or skewer. The amount of time it takes to cook the S'more will vary on the amount of sun. Placing the thermometer in the solar oven allows your scientist to see the cooking temperature.

If your scientist enjoys cooking with the solar oven, s/he may wish to try other foods, such as nachos with cheese, hot dogs, cookies, or eggs.

Extension:

Build the solar cooker step by step so your scientist can gain an understanding of what absorbs and what reflects the sun's energy. Have your scientist use the thermometer to take the temperature of the oven each step in the building process.

Start by placing the thermometer in the empty shoe box and record the temperature. Add the aluminum foil and take and record the temperature again. Add the black paper and take and record the temperature again. Finally place the thermometer in the completed oven and for a final time take and record the temperature.

How does the temperature vary along the way? The shiny aluminum foil reflects the heat. The black colored paper absorbs the heat. Both these properties are important for cooking food.

Variation:

Your scientist can simplify the cooker by not adding the black paper and not gluing the aluminum lining in the bottom of the box (it should be placed to completely cover the sides and bottom of the box). Without the black paper, the cooker may not get as hot. Too add heat to the cooker, your scientist can roll up newspaper to line the sides of the box creating an insulation layer.

Sunlight Travel Challenge

Share with your scientist the importance of the sun and its energy. All life on Earth is dependent on the sun. Without the sun, our planet would be a frozen ball, as the sun provides energy in the form of heat and light. The sun also helps our bodies produce Vitamin D and serotonin, the chemical in the brain associated with happiness. Good health depends on some time in the sunlight. However, that sunlight takes a little while to make its way from the sun to us.

It takes about eight and a half minutes for the sunlight to travel from the sun to Earth. Set a timer for 8 minutes 20 seconds. Explain to your scientist that when you start the timer, s/he will be sunlight leaving the sun and must keep moving until the timer goes off s/he reaches the Earth. Your scientist can move in any way and can change to different movement any time. The object is to simply keep moving for the entire time.

Shadow Fun

As the sunlight travels to Earth, sometimes things get in the way and block a portion of the light creating a dark spot called a shadow. These shadows change as the Earth rotates on its axis. In this activity, your young scientist will discover the many ways these shadows change throughout the day.

Start this activity early in the morning. Have your young scientist choose a sunny spot in the driveway, on the sidewalk, or on a similar hard surface. Draw an X to show your scientist where to stand. Trace his or her shadow with sidewalk chalk and make a note of the time on the ground next to the tracing. If your young scientist will be working alone, have a large stuffed animal or toy "stand" on the X and have your scientist trace it.

Return to the exact same spot throughout the day and repeat tracing the shadow and noting the time. At the end of the day, have your young scientist spend a little time looking at the tracings of the shadows. Ask what stayed the same across the day and what changed.

Variation:

If it is a rainy day or your scientist does not have an outside space in which s/he can draw on a hard surface, this activity can be modified to be done inside. Your scientist should choose a small object and place it in the middle of a sheet of paper. Have your scientist use a flashlight to simulate the sun, creating

a shadow on the paper. Using a crayon, colored pencil, marker or other writing utensil, your scientist should trace the shadow. Then have your scientist move the flashlight and see how s/he can change the shadow. For each change, your scientist should trace the shadow and make notes about what cause the changes. For example, what did your scientist do to make the shadow longer or shorter?

Shadow Changes

After completing Shadow Fun, have your scientist spend some time reflecting on the shadows s/he drew throughout the day. Prompt your scientist with some or all of the following questions about the shadows.

- Are they all right on top of each other?
- Are they the same shape and the same size?
- At what time are the shadows longest? Shortest? Fattest? Thinnest?
- What else does s/he notice about how the shadow changes as the Earth rotates throughout the day?