Our Blue Marble: Sundials
DIY Sundial

Objective: Junior Scientists will construct a paper sundial to learn about Earth’s position to the Sun.

Materials Needed:
- Pencil or Straw
- Paper plates
- Markers
- Scissors
- Paper circle template (Included)

Parent or Guardian Activity Summary:
Students will use a paper template to create their own sundial to tell time on sunny days.

Setup Instructions:
Print out one circle template for each sundial

Additional Notes:
- The more precise you can be when setting up the gnomon on the sun dial and placing your numbers on the face, the more accurate your sundial will be.
- Students can keep the circle templates if they prefer, they are there to help students find the center of their sundial.
- Students may need help poking holes in the plate to attach their gnomon. Use caution.
- The paper circle template is included to make the activity easier and make the sundial more precise, but it is not necessary for the activity. The included instructions sheet is written for creating the sundial without the template. If using the paper templates, replace the instructions with the below.
- Template instructions: Cut out one of the circle templates on the table. Fold the circle in half and then in half again. Unfold the paper and look for where the folds meet – this is the center. Line up the template with your plate and poke a hole through the plate where the folds meet. This hole is where the pencil will go. The template can help space out the numbers evenly, too. The 12, 3, 6, and 9 will each be at one of the folds in the circle.
Sundial History

Sundials have been around for thousands of years, first used by the Babylonians and Egyptians in 1500 BCE. Early civilizations called them "shadow clocks" and understood the passing of time by how the sun moved across the sky and changed the angle of the shadow cast by the *gnomon*. Until the creation of modern mechanical clocks in the 11th century, sundials were the main form of time measuring around the world. Although first created in the Middle East and Africa, versions and history surrounding the sundial can be found all over the world; showing a common understanding in all humans of shadow, the sun, and time passing.

Sundials were found in everything from sailing ships to royal palaces and were used by all peoples. They came in every shape and size and sometimes made up parts of buildings. The smallest sundial in the world is found in the Czech Republic and requires a magnifying glass to read. The largest sundial is found in India and is 90 ft high!

Oldest known sundial found in Egypt 1500 BCE.  
Chinese sundial from the 2nd century  
Celtic sundial in Ireland from the 7th century  

World's largest sundial, India.  
World's smallest sundial, Czech Republic
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Activity 1: DIY Sundial

Activate Your Knowledge:
Did you know our Earth is part of a larger solar system that is part of an even bigger galaxy? The Sun is the largest object in our solar system. Because of its mass, it exerts gravity on the other planets, like the Earth, in the solar system. As a result of this gravity, the Earth revolves around the Sun. Since the Sun doesn’t shine all the time, we know the Earth is rotating, too. As the Earth rotates, different parts of the Earth receive different amounts of sunlight because it reaches the Earth at different angles. You can use a sun dial and the angle of the light to tell time.

Materials You Will Need:
- Paper plate
- Pencil or Straw
- Markers
- Scissors

Procedures:
1. First, locate the center of your plate so you can position your pencil. The pencil will serve as your gnomon. The gnomon is the part of the sundial that casts a shadow on the sundial. The side of the plate where food is typically placed should be facing the ground. At the center of the plate, using a pencil, poke a hole into the center of the plate. This is where the pencil will go.

2. Using a marker, turn your sundial face into a clock-face. Write numbers 1-12 on the plate like you would see on a clock. Unless using the template provided.

3. Attach your gnomon by sticking the pencil in the hole in the middle of the sundial face.

4. To set it up, find a bright spot with direct sunlight. Turn the sundial until the shadow of the gnomon is on the appropriate time on your sundial face. Now, you can check back on the sundial later to see if the time is correct!

5. Also watch the shadow made by the pencil or straw it will become longer or shorter depending what time of day it is.