



Try This at Home Science: Simple Sundial

Activity Overview:

Build a device that uses the sun to tell time.

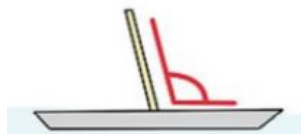
*Begin set up in the morning (before noon)

Materials:

- 1 paper plate (paper circle 10-inch diameter)
- Crayons/markers
- 1 long sharpened pencil
- 1 straw
- Ruler (straight edge)
- Compass

Try this!

1. Write the number "12" anywhere along the outer portion of the plate, facing toward the middle.
2. Find the middle of the plate and stick the sharpened pencil through. Remove the pencil so that you have a hole in the middle.
3. Use your ruler and a pencil to make a straight line from the 12 to the hole
4. Using a compass (you can get a compass app on your smart device) find North (if you are in the northern hemisphere).
5. Put your straw in the hole in the middle and bring your plate outside in a sunny place, right before noon.
6. Slant the straw so that it is pointing in the direction North from your compass (see image below).



7. Once it is noon, turn your plate so that the shadow hits the line you drew from the 12.
8. Secure your plate with rocks, or thumbtacks into the ground.
9. Come back at 1:00 pm and use your ruler to draw the line where the shadow hits. Label this line 1.
10. Repeat step 9 for each hour on the hour until the Sun sets.
11. Come back tomorrow (or the next sunny day) and check the time on your sundial!

What's happening?

The straw represents the gnomon (pronounced no-mon) which works like the hands on a clock. As the diurnal motion of the sun changes throughout the day, it will shine on your sundial from different angles. Therefore, the gnomon's shadow will change in both position and length, depending on that angle. That shadow will move to different spots every 60 minutes, keeping the time for us! Where this shadow lands tells us what time it is based on the clock we drew.

How does this relate to science?

One day on Earth is 24 hours. This is the amount of time it takes for the Earth to rotate around its axis one time. We measure one day in 12-hour cycles (A.M. and P.M.), and we can represent this on a clock. As the Earth is spinning there are specific times when the Sun is hitting one spot and not another. In other words, when the sun is rising on your part of the Earth and it is lower in the sky. The length of the shadows is longer because of the angle of the light. When your part of the Earth is face on with the Sun and is casting the shortest shadow, we call that "high noon". When your part of the Earth is starting to spin away from the sun, we call it sunset. We can break down the position of the Sun as it shines on the Earth as we rotate, and that is how we tell time on a sundial!



Now try...

- Make a sundial out of different materials. Can you make a natural one that stays outside?
- We used the sun to make our sundial, how can you make your sundial more accurate?
- Thinking critically: why would this activity work better in the summer in Michigan? Why are the lines different from the lines on your clock at home?

Additional Information

Adapted from <https://www.wikihow.com/Make-a-Sundial>

For more "Try This at Home Science" activities, visit www.mi-sci.org.