STATEWIDE STAR PARTY

MAKE A STAR CLOCK

Activity Instructions

http://www.ncsciencefestival.org/starparty/

OBJECTIVE

Make a Star Clock that allows you to tell time with the night sky

SUGGESTED AGE RANGE

Ages 9 and up (younger with adult help)

ACTIVITY DURATION

15 minutes (10 to make + 5 to use)

MATERIALS

These materials are included in the 2016 Star Party host kit.

- Star Clock outer and inner circles copied onto cardstock (note: regular paper works, too)
- scissors (additional pairs may be helpful)
- paper fasteners
- Optional: red flashlight or trimmed red balloon to cover white flashlight

MORE RESOURCES

Download the template for the Star Clock from http://www.skyandtelescope.com/astronomy-resources/make-a-star-clock/

CREDITS

The Star Clock was developed by the Pacific Science Center. The Procedure section is modified from instructions printed in *Sky and Telescope*.

PREPARATION

Arrange materials on a table, leaving space for participants to make their Star Clocks. You may wish to display a completed Star Clock.

Plan to make the Star Clock indoors. Then use it outdoors on a clear night.

PROCEDURE

In mid-April at 11 p.m. Daylight time (10 p.m. on your Star Clock), the Big Dipper is quite high in the sky, above the North Star. Cassiopeia lies closer to the horizon.

1. Tell your participants that just as the Sun can be used to tell time in the day, the stars can be used to tell time at night. Invite them to make their own Star Clock.
2. Give each participant a pair of scissors, a sheet with the Star Clock dials, and a paper fastener.
3. Instruct participants to cut out the (black) inner and (white) outer dials of the Star Clock, being sure to cut out the notch on the inner black dial.
4. Tell them to attach the black inner dial on top of the white outer dial with a paper fastener. The dials must be attached via the small circles in the middle. Scissors (or a push pin) can help jab a hole big enough to allow participants to push the fastener through the small circles. Young participants may need adult assistance to safely create the holes, place the fastener, and separate the fastener's two prongs.
5. Head outside on a clear night to use the Star Clock. Optional: Look at the Star Clock with a red flashlight (or white flashlight covered with a trimmed red balloon) without ruining night vision.
6. Explain to participants how to set and read the Star Clock:
   a. Face north.
   b. Hold the Star Clock in front of you.
   c. Turn the outer dial so that the current month is on top.

PROCEDURE (CONTINUED)

d. Keeping the current month at the top, turn the black inner dial until the star patterns match their positions in the sky. For example, if Cassiopeia is on the horizon, then Cassiopeia should be at the bottom of the Star Clock.

e. Read the time in the notched window, adding 1 hour if Daylight time applies.

f. Note that the Star Clock may not perfectly match your watch. Your Star Clock doesn't know, for example, where you are within your time zone.

7. Encourage further exploration by asking questions and posing challenges. How will the Big Dipper move over the next few hours? Which way is the sky turning? What months of the year is Cassiopeia high in the sky in early evening? Where will the Big Dipper be at midnight on your birthday?

To use the star clock, face north. Keep the current month at the top while turning the black dial until the star patterns match their positions in the sky.

MORE INFORMATION

The Star Clock works because the sky appears to turn around us like a clock, as a result of Earth's rotation every 24 hours.

Because Earth rotates from west to east, the sky appears to move in the opposite direction, from east to west. That's why the Sun appears to rise in the east and set in the west. The Sun's changing position can be used to tell time in the day, such as with a sundial. At night, Earth's rotation makes the nighttime stars also appear to rise in the east and set in the west.

Strictly speaking, what's really going on is that the sky appears to turn around the north celestial pole, a point marked by Polaris, the North Star. Polaris acts like a pivot point in the sky because it happens to be located over the North Pole—over Earth's axis of rotation.

Therefore, star patterns in the northern part of the sky, such as the Big Dipper and Cassiopeia, never truly rise and set (at North Carolina's latitude). They are circumpolar, endlessly circling around that point marked by Polaris, rising higher then lower then higher again relative to the horizon, but never completely setting below it.

Because the circumpolar star patterns turn around every 24 hours, you can use the position of the Big Dipper or Cassiopeia relative to the horizon to tell you what time it is on a given date.

NORTH CAROLINA space grant

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