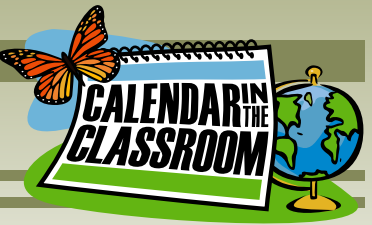




# Eye on the Sky



## Overview

Students become astronomers as they share first-hand observations of the day and night sky and use simple models to find out why we have day and night.

## Background

Astronomy is the science that deals with the study of all of the heavenly bodies and the Earth's relationship to the sun, stars, planets and other objects in space. Because the objects are so large and distances between these bodies are so great scientists must use special equipment like telescopes. Many times they also use models to help them visualize conditions and concepts. In this activity, you and the students will use some simple models to learn about day and night.

Our Earth is always moving. The phenomenon we call “day and night” is due to the fact that the Earth rotates or spins on its axis. One complete rotation takes 24 hours. During daylight hours, the place on Earth where we live is illuminated by the sun. At night the portion of the Earth where we live has rotated so that we face away from the sun. (The Earth also revolves or orbits around the sun. This trip takes 365 days, our year, and is responsible for our seasonal changes – but that is studied in another lesson.)

The *Minnesota Weatherguide Environment Calendar* provides useful information for this lesson. See the daily data for sunrise and sunset as well as moonrise and moonset. Depending on the day you go outside, the students may be surprised to see the moon during the day.

Caution: When you are outside on a sunny day, be sure to warn students not to stare directly at the sun because this may cause permanent eye damage.

## The Activity

### Day 1 Observing the Sky

#### Warm Up

1. Set the stage for a brief outdoor “eye on the sky” experience. The students will become “sky spies” as they examine the sky. What do they think they will see when they are outdoors for observations? (For the most varied observations select a day that is not total cloud cover. Caution students not to look directly at the sun because it can hurt their eyes.)
2. While outside, use the portable dry-erase board to make a list of things seen in the sky: sun, moon, clouds, airplanes, dust, smoke, birds, flying insects. Ask students to describe each object they notice. They may make their list by using drawings in their journals.

## Time:

Day 1: 40 min.

Day 2: 30 min

## Skills:

Observing  
Describing  
Comparing  
Inferring  
Critical thinking

## Vocabulary:

astronomy  
astronomer  
day  
night  
rotation  
observation

## Materials Needed:

- Flashlight
- Globe
- Student journals
- crayons/color pencils
- Portable dry-erase board/pen
- *Minnesota Weatherguide Environment™ Calendar*
- Pictures of the sun and moon

Is there anything you observed that was made by humans? Sort the objects into two lists: natural and human made objects. Are there other objects made by humans that you sometimes see in the sky? (helicopters, kites, hot air balloons, fire works, rockets.)

Ask: What provides the light so we can see? (If they do not immediately recognize that the sun is the source, move the group into the shade of the building and then into a darkened room.)

3. Once you are back in the classroom ask students what they would observe if it were nighttime? Make a list. Tonight they have fun homework: They will become astronomers. Ask students to make nighttime observations to discover if there are other things we need to add to our night sky list.

(In addition to the moon and stars, students may list airplanes, lightening bugs, lightening, streetlights, meteors-shooting stars, owls.)

## **Day 2 Investigating What Causes Night and Day**

1. Discuss the student "homework." Are there new observations and descriptions to add to the "nighttime" list?
2. Today you will use a model to help students understand what causes day and night. Scientists often use models to help them study and understand things that are difficult to observe because the objects may be very big or very small.
3. Gather your students around the globe and identify the location of Minnesota. In our model, this globe represents our Earth.
4. Now, we know from our observations that light comes from the sun. The flashlight in this model represents our sun.
5. It is hard for us to imagine, but our Earth is spinning around like a top. We call this motion rotation.
6. Shine the flashlight on globe at Minnesota and ask: Is it daytime or is it nighttime in Minnesota? Slowly rotate the globe left, keeping the flashlight in its original position, so that the flashlight is now shining on the opposite side of the globe. Is it daytime or nighttime in Minnesota now?
7. Continue rotating the globe and help them identify sunrise in the east and sunset in the west. Complete the cycle several times and have students verbally announce day/night, sunrise, noon, sunset, midnight.
8. Set the globe and flashlight aside. Now students will become part of a different kind of model as they stand in a circle. There should be a small amount of elbow room between students.
9. Select one student to stand in the center of the circle. This person will represent the sun. All students will face the sun and pretend that their heads represent the globe or Earth. The nose on each of their faces will represent Minnesota. (What countries would be on the back of their heads?) When they are facing the "sun" is it day or night in Minnesota?
10. Now have everyone to rotate slowly to the left so that it is nighttime in Minnesota. Continue rotating to the daylight position. After several rotations, ask students to concentrate on finding their positions for sunrise and sunset. (They should just barely see the "sun" in the corner of their eyes.)
11. It is difficult for us to realize that the sun does not "move across the sky." This is a common misconception. The sun only appears to move. As they rotate, have the children concentrate on how their view of the person representing the sun changes in their field of view. (Because the children will rotate several times, be sure to trade out and let additional students represent the sun.)
12. If you are teaching this lesson to 3rd graders, now ask them if the length of daylight is constant throughout the year? (It is not, there are seasonal changes in day length.) Consider using the lessons "Burning Daylight" and "Sunrise/Sunset", also in the Astronomy-themed lessons next to investigate the seasonal patterns in the lengths of day and night in Minnesota.

## **Wrap Up & Assessment**

Review the lists that the children have created. Discuss what they have learned about day and night and the sun and moon. As an Assessment have students create two drawings, one to represent daytime, one to represent nighttime. Do they include anything in the drawings that shows technology?

## Questions for Discussion

As a link to technology ask the students to list human inventions that help us see at night. (flashlight, headlights, streetlights, lamps, airplane lights, etc.) What inventions help us when the sun is too bright? (shades, awnings, sunglasses, baseball caps, umbrellas, tinted glass, sun screens, etc.)

## Extensions

Show pictures of the sun and the moon. Ask students how they are different. (The bright sun is a burning energy and it produces its own light and heat. That heat keeps the Earth warm. The sun is so bright that it is not safe to stare directly at it. The sun is far out in space and the Earth travels or orbits around the sun. This trip takes a year. Our moon on the other hand, is a rocky body that produces no heat or light, it merely reflects the sun's light like a mirror. The moon travels or orbits around the Earth. It takes the moon a month to travel around the Earth. It is safe to look directly at the moon.)

Students may wonder where the stars go during the day. The stars are always in the sky, but the sun is so bright that we cannot see the starlight. To show this phenomenon, it may work to darken the classroom and shine the flashlight on the ceiling very near one of the light fixtures. Tell students this lighted spot on the ceiling represents a star. Now, with the flashlight still focused on the ceiling have a student flip on the classroom light. The "star light" should be difficult to see.

## Resources

*Day and Night* (Let's Explore Series) by Henry Pluckrose

*The Sun Is Always Shining Somewhere* by Allan Fowler

*What Makes Day and Night?* by Franklyn Branley

*Minnesota Weatherguide Environment™ Calendar*

online: <https://jeffersfoundation.org/programs/calendar-in-the-classroom/>

## Minnesota Academic Standards

### 3-D Science Standards

#### Science Practices:

2. Developing and Using Models
3. Plan and Carry Out Investigations (investigating through observation)
6. Constructing Explanations
8. Obtaining, Evaluating and Communicating Information

#### Crosscutting Concepts:

1. Patterns
4. Systems and System Models

#### Disciplinary Core Ideas:

PS3: Energy

K: Collect observational data to determine the effect of sunlight on Earth's surface

ESS1: Earth's place in the universe

3rd Grade: Observe the sun, moon, and stars and use observations to describe patterns

### Art Standards

Grade	Strand	Anchor Standard	Benchmarks
K	Create	Create original artistic work	1. Create art that communicates an idea using artistic foundations.
3	Create	Create original artistic work	1. Create visual representations of places or systems that are part of everyday life using artistic foundations.