

GRADE ONE
EARTH SCIENCE: EXPLORING THE SUN AND MOON



Standard 1.E.3: The student will demonstrate an understanding of the patterns of the Sun and the Moon and the Sun's effect on Earth.

1.E.3A. Conceptual Understanding: Objects in the sky move in predictable patterns. Some objects are better seen in the day sky and some are better seen in the night sky. The Sun is a star that provides heat and light energy for Earth.

Great Resource:
<http://solar-center.stanford.edu>

1.E.3A.1 Use, analyze, and interpret data from observations to describe and predict seasonal patterns of sunrise and sunset.

Essential Understanding:

- It is essential for students to know that the Earth turns (rotates) and the Sun appear to rise and set.
- The Sun appears to move across the sky during the day. It is lower in the sky in the morning (sunrise) and in the evening (sunset).
- Day sky: The day sky is when there is enough light from the Sun to see. Examples of features found in the day sky might include the Sun, the moon, clouds, birds, or airplanes.
- The Sun is the only star seen in the day sky.

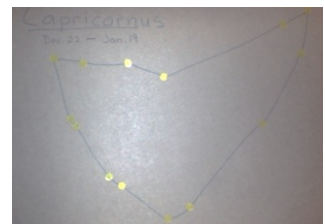
Activities:

- Spin a basketball on end to simulate earth’s rotation.
- Take students outside to stare up at the sky. If they stand still they should see clouds moving slowly. This is due both to wind and Earth’s rotation.
- During this unit student should spend some time outside observing the day sky. Students should draw the day sky using crayons or colored pencils.
- For homework, students should observe and draw the night sky. Teacher may take pictures of the night sky to show on the board for students to draw.
- When we set the clocks back 1 hour, students should be asked on Monday how the sky appears different, and why they think this is.

For data, students should complete the following by placing a check (✓) in the correct column where the item can be seen.

Items in the Sky	Day Sky	Night Sky
light blue color		
bats		
dark blue or black color		
clouds		
stars		
lightning		
sun		
moon		
birds		

- Have students look at and try to say the word, “constellations.” Research each student’s astrological sign and have them make the pattern of stars they should see during their birth season. For more information see: <http://www.astro.wisc.edu/~dolan/constellations/extra/constellations.html#Orion>
- Watch a video of the sunrise over the beach. <https://www.youtube.com/watch?v=vmSdcWqo2nY>
- Watch a video of a sunset over the beach. <https://www.youtube.com/watch?v=qPXedeDDwVg>
- This book is about the Great Bear (Ursa Major) constellation. http://www.amazon.com/Biggest-Bear-Adam-Relf/dp/0439840155/ref=sr_1_2?ie=UTF8&qid=1412271603&sr=8-2&keywords=biggest+bear



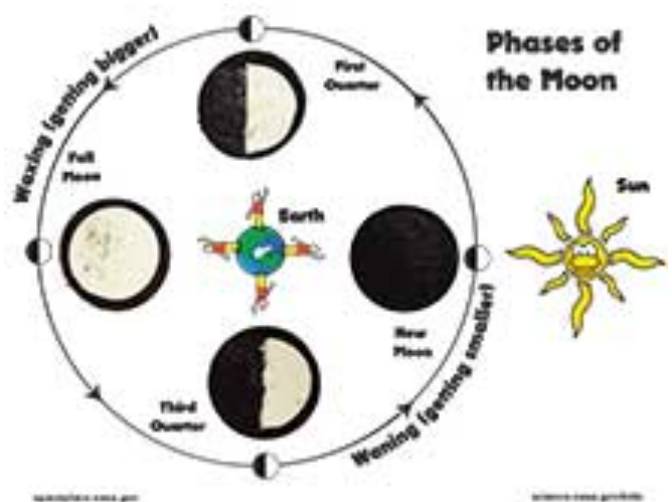
1.E.3A.2 Use data from personal observations to describe, predict, and develop models to exemplify how the appearance of the moon changes over time in a predictable pattern.

Essential Understanding:

- The Moon's appearance changes over time.
- The Moon is a ball of rock that moves around Earth.
- The Moon goes around earth about once every month.
- The Moon does not make its own light.
- The Moon can be seen because the sun's light shines on it.
- As the Moon moves around Earth, it appears to change shape. For example, we can see the entire Moon, part of the Moon, or none of the Moon.
- The appearance of the Moon changes shape in a regular pattern each month

Activities:

- Model the moon phases with a basketball and a flashlight in a dark room.
 - Cut a large circle, about 2½ foot diameter, to tape to the classroom wall. Turn off the lights. Have a student hold the flashlight so that the light shines on the ball making a shadow on the paper, which represents the Earth. As the flashlight is moved, what happens to the shadow? If you were standing at the paper looking at the basketball, which represents the moon, would the moon's appearance change as the light moved?
- Watch this program about the moon. <http://www.wonderville.ca/asset/phases-of-the-moon>
- Here is another animation. http://www.nasa.gov/mission_pages/LRO/news/2013-moon-phases.html#.VC39kly8_1o
- Students should draw the moon. Give each student a blank calendar page on which to draw a sketch of the moon each night. Naming the phases is not required, but terms like full moon, crescent moon, and half moon may be introduced.
- Students may model the phases of the moon with playdough.
- Students may model the phases of the moon with sandwich cookies. <http://spaceplace.nasa.gov/oreo-moon/en/>
- Ask students to compare the amount of sun given off by the moon to that which is given off by the sun. Tell them to think of Halloween night when they are walking around at night trick-or-treating. Does the moon give enough light to produce a shadow? Does the moon give off heat?



1.E.3A.3 Obtain and communicate information to describe how technology has enabled the study of the Sun, the Moon, planets, and stars.

Essential Understanding:

- Powerful telescopes can be used to learn about the sun, moon, planets, and stars.
- Manmade satellites are machines that are launched by rockets into space and are used by scientists to study the sun, moon, planets, and stars.
- Some manmade satellites take pictures of the sun, moon, planets and stars.

Activities:

- Review the need for light in order to see objects.
- Ask students what types of objects are difficult to see. Their list may include objects that are too small, too dark, too far away, etc.
- Ask students what we use when we have trouble seeing objects. Their list may include binoculars, glasses, magnifying lenses, telescopes, microscopes. If you have some of these, give students some objects to look at with magnifying lenses.
- Discuss how binoculars work, then how telescopes work.
- There are several ideas for making a telescope with a Pringles can, or paper towel tube, or gift wrap tube at the links below.
<http://www.exploratorium.edu/exploring/space/activity.html>
http://www.exploratorium.edu/science_explorer/pringles_pinhole.html
- Show your students some of the live feed from the International Space Station.
<http://spacestationlive.nasa.gov/timeline/>



1.E.3A.4 Conduct structured investigations to answer questions about the effect of sunlight on Earth's surface.

Essential Understanding:

- The Sun is a star in the daytime sky that provides energy in the form of heat and light.
- The heat from the Sun provides warmth for Earth's surfaces.
- Without the Sun, Earth would be too cold to live on.
- Plants need the light from the Sun so that they can make their own food.
- To measure the effects of sun's heat on earth's materials. For example: soil (warm soil enables growth for plants) and water.

A helpful resource:

- <http://www.epa.gov/sunwise/kids/>

Activities:

- Plant grass seed in small containers.
- Set potting soil in the sun, measure its temperature in the morning and later during the warmer part of the day.
- Does soil temperature affect plant growth?
As an experiment, grow two groups of plants (same type and amount of seeds, same type and amount of soil, same type of pots, in a location where each group will receive the same amount of light). The pots for Group A will be set in an ice bath so that the soil is kept cool. Ice will need to be added daily. Group B will not be in an ice bath, so the soil will be room temperature. Care for each group in the same way. Collect data as the plants grow.
- UV beads can be purchased. These beads change color due to UV radiation.
- Students may research the need for sunscreen.
- What is the affect of the sun on construction paper?

Students should make a hypothesis as to what will happen.

Method A: On a Monday, have students cut various shapes of thin cardboard to attach to or lay on top of a sheet of construction paper. The construction paper should be set outside in the sun, in a location where it will stay dry. On Friday, carefully remove the cutouts and observe what happened to the construction paper.

Method B: On a Monday, have students cut shapes from Aluminum foil (opaque), wax paper (translucent), and a transparent sheet (transparent) to attach or lay on top of construction paper. On Friday, carefully remove the cutouts and observe what happened to the construction paper.

See links for more ideas.

<http://www.education.com/activity/article/create-summer-sun-faded-prints/>

<http://bloomingbrilliant123.blogspot.com/2012/07/sun-prints-craft-for-kids.html>



1.E.3A.5 Define problems related to the warming effect of sunlight and design possible solutions to reduce its impact on a particular area.

Essential Understanding:

The sun provides warmth and light to Earth's surfaces. If an area is shielded from the sun, the temperature effect will be less.

Activities:

- Ask students, how many of you have heard that black clothes make you hot, but light colored clothes allow you to be cooler? Ask students how they could design a test to determine if this is true?

-Students may want to wrap cups of water in black construction paper and white construction paper. As the cups sit in the sun, they could monitor the temperature.

-Students could design a tent to keep their gummy bear cool so that he can have a longer hibernation. (Some gummy bears will melt in the sun.)



-Students could have a competition to design a structure to make the best cooler for their very own ice cube. The person whose ice cube lasts the longest is the winner.

- Materials for use include: aluminum foil, wax paper, plastic wrap, brown paper, construction paper, toothpicks, drinking straws, felt, Styrofoam, black plastic like from a trash bag, fabric, cardboard, muffin cups, coffee filters, etc.
- Thermometers may be needed for your experiment. If you need some, please request them from Jeannie Hill at jhill@rhmail.org.