STEM Sims™

Lunar Phase

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Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.

Start learning right now about the wonders of lunar phases. Take the following brief quiz to see how much you already know about the phases of the moon. See the bottom of page 4 to check your answers.

1. Orbiting spacecraft have found traces of _____ on the lunar surface that may have originated from deep underground.
   a. Potassium
   b. Zinc
   c. Water
   d. Kryptonite

2. On the side of the moon that the sun is shining on, the temperature can reach
   a. 140 °F.
   b. 260 °F.
   c. 320 °F.
   d. 400 °F.

3. What percentage of gravity does the Moon have compared to Earth?
   a. One sixteenth
   b. One eighth
   c. Half
   d. One sixth

4. Ancient astronomers believed the dark areas were bodies of water on the moon.
   a. true
   b. false

5. Who was the first astronomer to use a telescope to make scientific observations of the moon?
   a. Johannes Kepler
   b. Galileo Galilei
   c. John Wheeler
   d. Edwin Hubble

Far-out!

Just as Earth is constantly orbiting the Sun, the Moon is always orbiting the Earth. It takes 27.3 days for the Moon to travel all the way around the Earth and complete one orbit. In this activity students will build a Sun-Earth-Moon mobile and using it to describe the relative movement of the three objects. Students will identify some of the differing characteristics of the Sun, Earth and Moon.

Materials

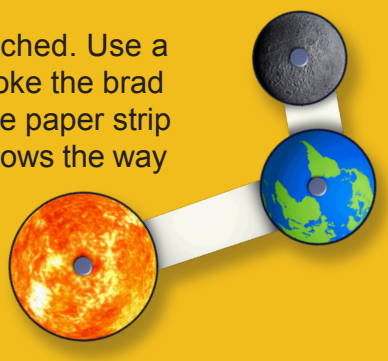
White cardstock or paper	Scissors
Markers/colored pencils	Tape or glue
2 brad fastners or twist-tie	3 circular household objects of different sizes to use as stencils

If no brads are available, you may improvise with a twist-tie garbage bag fastener.

Directions

1. Make sure to get proper permission before you do this experiment. Please ask an adult to help when cutting with scissors.
2. Draw three circles of various sizes. If desired, use round household objects as stencils. The largest circle will be your Sun, the medium circle is the Earth, and the smallest circle is the Moon.
3. Color & cut out your Earth, Moon, and Sun, and cut two additional strips of plain paper or cardstock.
4. Using tape or glue, adhere your Earth to the end of one strip of paper. Adhere your Moon to the end of the other strip.
5. Put the Moon aside, and turn your attention to the Earth with a rectangular strip attached.
6. Poke a brad through the center of your Sun, then through the “free” end of the paper strip (opposite the Earth). Turn the whole thing over, and bend the arms of the brad outward to hold the two pieces of paper together. You have made a model of the Earth orbiting around the Sun.
7. Now turn your attention to the Moon with a rectangular strip attached. Use a second brad or wire fastener to connect the Moon to the Earth: poke the brad through the center of your Earth, then through the “free” end of the paper strip (opposite the Moon) to connect the two pieces. Your model now shows the way the Moon orbits the Earth!

   Have fun using your model to watch the interaction among these three important bodies in our solar system!



Questions

1. How do the Earth and the Moon orbit the Sun?

2. How does the Moon orbit the Earth?

Lunar Phase

The Eclipse in History

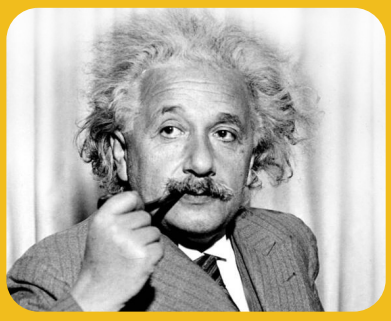
The earliest writings we have showing that people paid attention to eclipses in any official way are around 5,000 years old.

In Ancient China, solar and lunar eclipses were regarded as heavenly signs that foretold the future of the Emperor. The ancient Chinese believed that solar eclipses occur when a celestial dragon devours the sun. They also believed that this dragon attacks the Moon during lunar eclipses. In the Chinese language, the term for eclipse was “shi” which also means “to eat”.

According to the Greek historian Herodotus, a solar eclipse in 585 BCE stopped the war between the Lydians and the Medes, who saw the dark skies as a sign to make peace with each other.

The Greek astronomer Hipparchus used a solar eclipse to determine that the Moon was about 429,000 km (268,000 mi) away from the Earth. This is only about 11% more than what today’s scientists accept as the average distance between the Moon and the Earth.

Scientists have used eclipses to make discoveries in more recent times, too. On May 29, 1919, Sir Arthur Eddington tested Albert Einstein’s theory of general relativity during a total solar eclipse. Einstein had theorized that massive objects caused distortions in space and time. Eddington confirmed that starlight bent around the sun by measuring the position of certain stars relative to the eclipse.



Solar eclipses were by all accounts events of wondrous and magical proportions. Today, of course, we understand eclipses very well. We know how and why they happen, and when and where they happen. We have seen eclipses from space. We have even used eclipses to probe the laws of physics and to discover new worlds outside the Solar System. Still, eclipses of the sun hold their ancient magic and are fascinating to watch.

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Answers: **Page 2 Answers: 1) c, 2) b, 3) d, 4) a, 5) b. Page 3 Far-out!: 1)** As the Earth and moon rotates, it also moves, or revolves, around the Sun counterclockwise **2)** The moon orbits counterclockwise around the Earth.