

Our Amazing Moon

Students explore the changing relationships between the Sun, Earth and the Moon through a kinesthetic model and a hands-on craft project.

Grade Level: Kindergarten

Phenomena:

What is the relationship of the Earth, Sun, and Moon?

Objectives:

- Students will identify why Earth experiences day and night.
- Students will identify at least three phases of the moon.
- Students will verbally and artistically explain why we observe moon phases.
- Students will act out Earth's rotation.

Materials:

- Lamp
- Moon Phase Pictures
- Outer Space Pictures
- Moon Phase Coloring Page
- Yellow &/or Orange Crayons
- Nevada Headband

Appendixes:

- Moon phases Student Sheet pg. 5
- Day and Night Song pg. 6
- Phases of the Moon pg. 7
- Outer Space Pictures pg. 8

Time Considerations:

Preparations: 5 minutes

Lesson Time: 50-60 minutes

Introduction: 10 minutes

Activity 1: 5 minutes

Activity 2: 15-20 minutes

Activity 3: 10 minutes

Activity 4: 10 minutes

Conclusion: 5 minutes

Related Lesson Plans:

Sun Rays, Kinesthetic Astronomy, Comparing Worlds



Next Generation Science Standards

K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface.

Science and Engineering Practices (SEP):

Planning and Carrying out Investigations

Disciplinary Core Ideas:

Conservation of Energy and Energy Transfer

Crosscutting Concepts:

Cause and Effect

Excellence in Environmental Education Guidelines

Strand 1—Questioning, Analysis and Interpretation Skills:

- E) Organizing information**—Learners are able to describe data and organize information to search for relationships and patterns concerning the environment and environmental topics.
- F) Working with models and simulations**—Learners understand that relationships, patterns, and processes can be represented by models.
- G) Drawing conclusions and developing explanations**—Learners can develop simple explanations that address their questions about the environment.

Background

Standing on the surface of Earth, it appears to us Earth is stationary and the Sun and Moon revolve around it. However, early astronomers determined just the opposite. Earth actually revolves around the Sun and the Moon revolves around the Earth. This concept is challenging for younger elementary students to grasp, since field trips cannot blast off into space. Instead, students can reflect upon their personal observations of the Sun and Moon, to understand the day

and night better.

To an untrained eye, the Sun and Moon appears to move across the sky, thus supporting the original theory that the Earth is at the center of the solar system. That is, the solar system is geocentric. However, the daily rotation of Earth is the reason that all locations experience a consistent day and night every 24 hours.

The combination of Earth's rotation and the Moon's revolution explains why the Moon appears to rise and set in the night sky. A common

misconception among people is why we see different phases of the Moon throughout a month. Many believe the reasoning depends on the amount of shadow the Earth casts upon it from the Sun. This is false. As the moon orbits around Earth the Moon reflects sunlight from the sun. The Moon's phase is determined by the angle and amount of sunlight reflected. Therefore, the Sun "lights up" the phases of the moon.

The presence of the Moon is often associated with night, but an observant student will know the Moon is also visible during the day during certain times of the month. Since the Moon doesn't give off light of its own, how can we see the Moon during the day? The answer deals with the Earth and Sun. Sunlight, during the day is reflected off Earth and shone onto the Moon, which is then reflected back to Earth, allowing us to see the Moon during the day.

Day and night provide some

fascinating insight to the basics of astronomy. Students will leave this lesson with knowledge they can apply immediately with their own observations of the natural world!

Preparation

Arrive to the classroom at least five minutes early to set up the following materials:

- Lamp: to one side of the sitting area, which represents the Sun
- Moon Picture: taped to the opposite side of the lamp.

Gather enough yellow or orange crayons for each student to use, for the Moon Coloring activity. Print off and have ready the moon phase pictures and outer space pictures for discussion topics.

Doing the Activity

Activity 1 - Outer Space Intro

Begin by telling the class we will be talking about outer space today! To pre-assess your

audience, brainstorm with students about they know about space and what is in it. Take note any misconceptions students have about space, specially the Sun, Earth and moon. Feel free to share different photos of celestial bodies to help students share their thoughts fully.

Narrow their focus to sun and moon. Explain to the class that today we will be 1) investigating what really happens to make day and night, and 2) what makes the moon special.

Activity 2 - Rotating Earth

To start, move students so everyone is sitting in a circle. This circle represents Earth! Use the Earth Ball to show students where Nevada is located. Then place the Nevada Headband on a student's head that is opposite the Sun in the classroom.

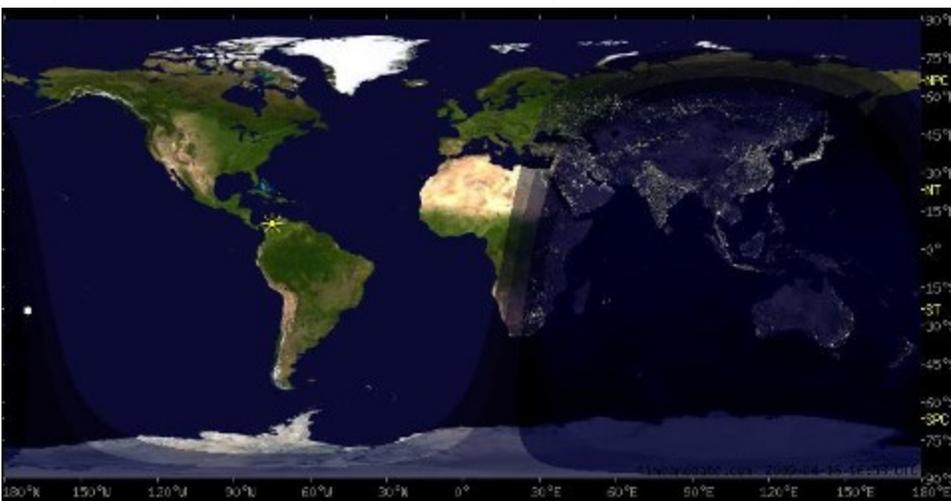
Instructors: if students become restless in this activity, after each rotation have students simply sit down in their circle, instead of standing.

Part A: Rotation

Before any movement takes place, ask students if they feel Earth (use the Earth Ball to demonstrate) sits still in outer-space? NO! It spins or rotates. Demonstrate Earth's rotation by having all students stand, hold hands, and walk one complete circle. As you walk, sing the *Day & Night Song* (page 6).

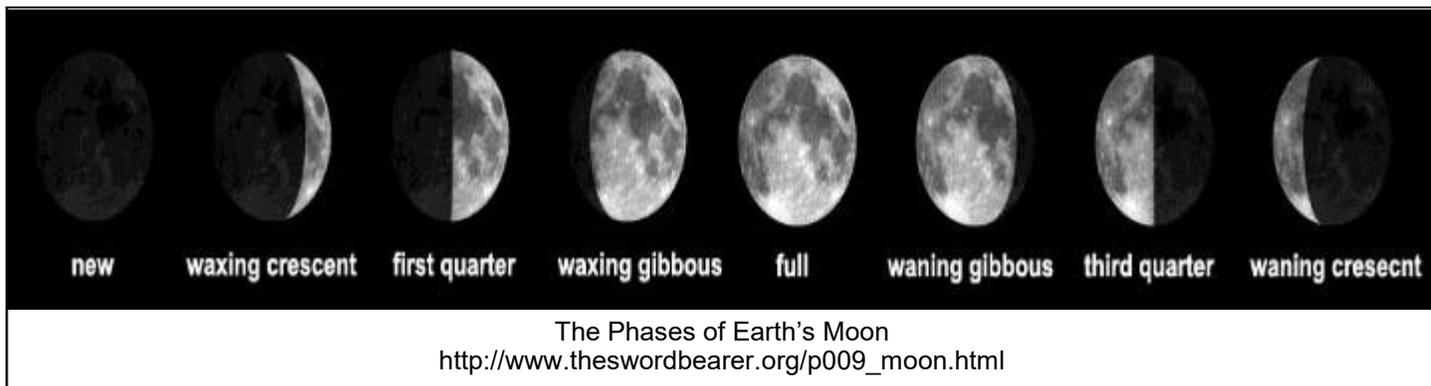
Part B: Day Time

Next, ask students to focus their thoughts of the day. What do we see during the day that makes



.Night and Day World Map
[https://www.google.com/search?](https://www.google.com/search?num=10&hl=en&authuser=0&site=imghp&tbm=isch&source=hp&biw=1204&bih=652&q=Day+and+Night+world+map&oq=Day+and+Night+world+map&gs_l=img.3..0j0i24l8.719.7173.0.7379.25.14.1.10.11.0.212.1435.10j3j1.14.0...0.0..)

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daytime, daytime? The Sun! With this said, turn off the classroom lights and turn on the lamp that represents the Sun. Explain to the class what the lamp represents and ask, if it's daytime in Nevada? Nope! Have students rotate their Earth, until Nevada is next to the Sun. Sing the *Day & Night Song* as you rotate.

Part C: Night Time

Review how daytime came to Nevada. Then, ask students to think about the night. What do we see during the night that makes nighttime, nighttime? The Moon! Place a picture of the Moon opposite the Sun and Nevada in the classroom. Ask students if it is now nighttime in Nevada? No! Rotate students so Nevada is standing next to the Moon. Sing the *Day & Night Song* as you rotate.

As review, have students rotate to create day and night in Nevada. Then summarize with the class that day and night happens because of Earth's rotation.

Activity 3 - Phases of the Moon

Have students sit down in their circle and direct their attention to the moon. Use a picture of a full moon to begin this activity. Pre-assess students on their

understanding of the moon by asking, does the moon change shape and what is it made of?

Begin with the shape of the moon. Introduce moon phases by using pictures of a full, half, and new moon along with the following arm motions to represent each one:

- **Full Moon:** arms stretched up and hands connected to create a circle (moon) above the head
- **Half Moon:** same position as state above, but this time drop one arm
- **New Moon:** both arms lowered and held behind the back.

Next ask students why they believe the moon changes shape? At this time identify any misconceptions. Many students will feel the moon melts, molds, or even breaks pieces of itself off. Remind students the moon is made of rock and it cannot actually change shape. Instead, the Sun gives the moon it's shape. Throughout a month, the Sun lights up different amounts of the moon, thereby we see different phases of the moon.

Use the moon phase pictures to assist student understanding of this concept. Follow this by singing *The Moon Song* (page 6).

Activity 4: Name that Phase!

Explain to students they have the opportunity to draw the phases of the moon. Demonstrate how students will color their Moon Coloring page before dismissing them to their tables.

Emphasize the yellow crayon represents the sunlight from the sun. As students color, they are "shining" a certain amount of sunlight on the moon to create a specific moon phase.

Conclusion

Dismiss students back to their table while singing the *Moon Song!*

As students finish their coloring page, have each person pair share their artwork with their neighbor.

Review key points of the lesson with students such as:

- Why do we have day and night?
- What is the Sun made of?
- What is the moon made of?
- What are the phases of the moon?
- Why do we see the moon differently during a month?

Finally, have students sing the *Moon Song* one last time. Then challenge students to look closely at the moon from home and try to determine the phase of the moon.

Assessment

Informally evaluate students by their ability to engage in group discussion about day and night and the moon.

Formally evaluate students by their ability to identify if it is day or night for them during Activity 1, to tell why there is day and night on Earth, to describe the changing moon shapes in the sky and their ability to correctly follow directions and paste the moon cut-outs in the right order.

Extensions

Story Time

As an introduction to how the Moon changes and the phases of the Moon, read the book, *Papa, Please Get the Moon for Me*, by Eric Carle.

Explore Day and Night

Show students the Day and Night World Map at:
<http://www.timeanddate.com/worldclock/sunearth.html>. Explore different days and times and see how the map changes.

Moon Phase Calendar

Sources

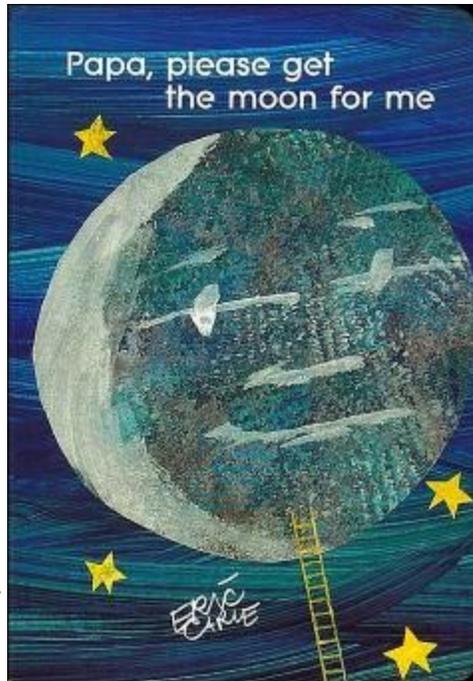
(Carle, Eric. *Papa, Please Get the Moon for Me*. Saxonville, MA: Picture Book Studio, 1986.

(2009). In *Night and Day World Map*. Retrieved Oct. 4, 2010, from <http://www.timeanddate.com/worldclock/sunearth.html>

Moon Phase Calendar: http://www.moonconnection.com/moon_phases_calendar.phtml

Glasthal, J. B., & S. Wolinsky. (1996). *Scholastic Children's Dictionary*. New York, New York: Scholastic Inc..

Work with students over the period of a month to draw the moon each day. Have them create a moon phase calendar of the month. Ask parents to assist you in this activity by having their child look at the



moon when it is visible. Lastly, have students share their observations about the moon

Vocabulary

Sun: the star that the earth and other planets revolve around and that gives us light and warmth.

Moon: the satellite that moves around the earth once each month and reflects light from the sun.

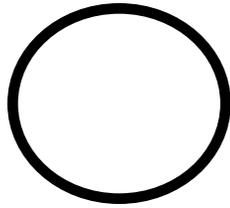
Earth: the planet on which we live. Earth is the third planet from the sun, between Venus and Mars. In cases where it is described as part of the solar system, Earth is often capitalized.

Rotate: to turn around and around like a wheel. *The earth rotates on its axis once a day.*

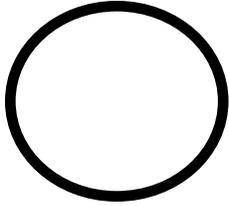
Phase: a stage of the moon's change in shape as it appears from earth.

Model: small or miniature, as in a *model railroad*.

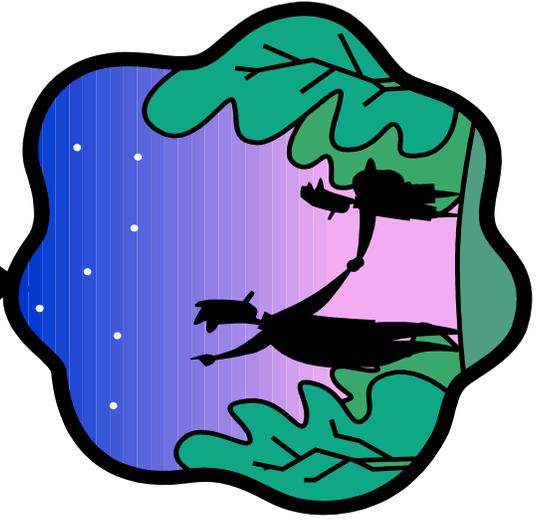
Half
Moon



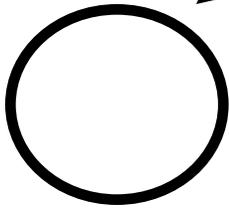
Full
Moon



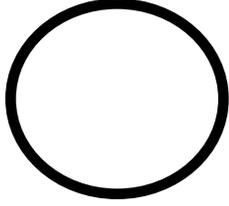
Can you
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of the
moon?



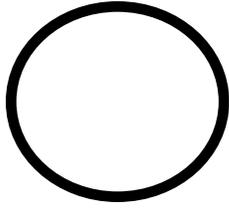
New
Moon



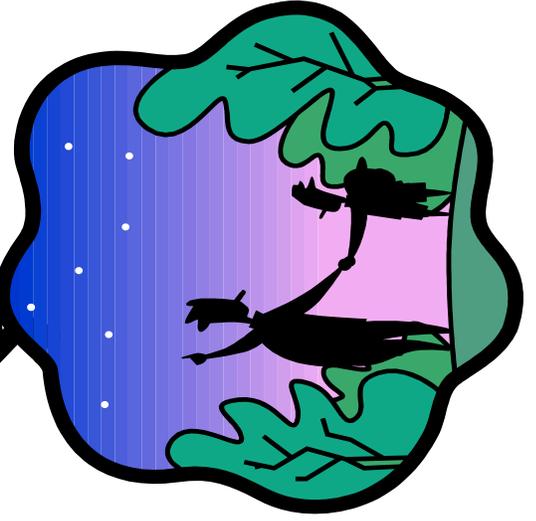
Half
Moon



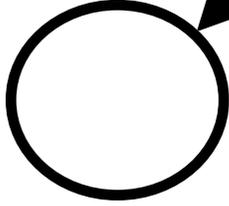
Full
Moon



Can you
draw the
phases
of the
moon?



New
Moon



Day & Night Song

Goes to the tune: "Here We Go Round the Mulberry Bush"

The Earth spins round and round,
round and round,
round and round.
The Earth spins round and round to make day and night!



The Moon Song

Goes to the Tune: "I've got the Whole World in My Hands."

The Sun lights up the Moon,
The Sun lights up the Moon,
The Sun lights up the Moon.
It can be full, half or new!



new moon



new crescent



first quarter



waxing gibbous



full moon



waning gibbous



last quarter



old crescent

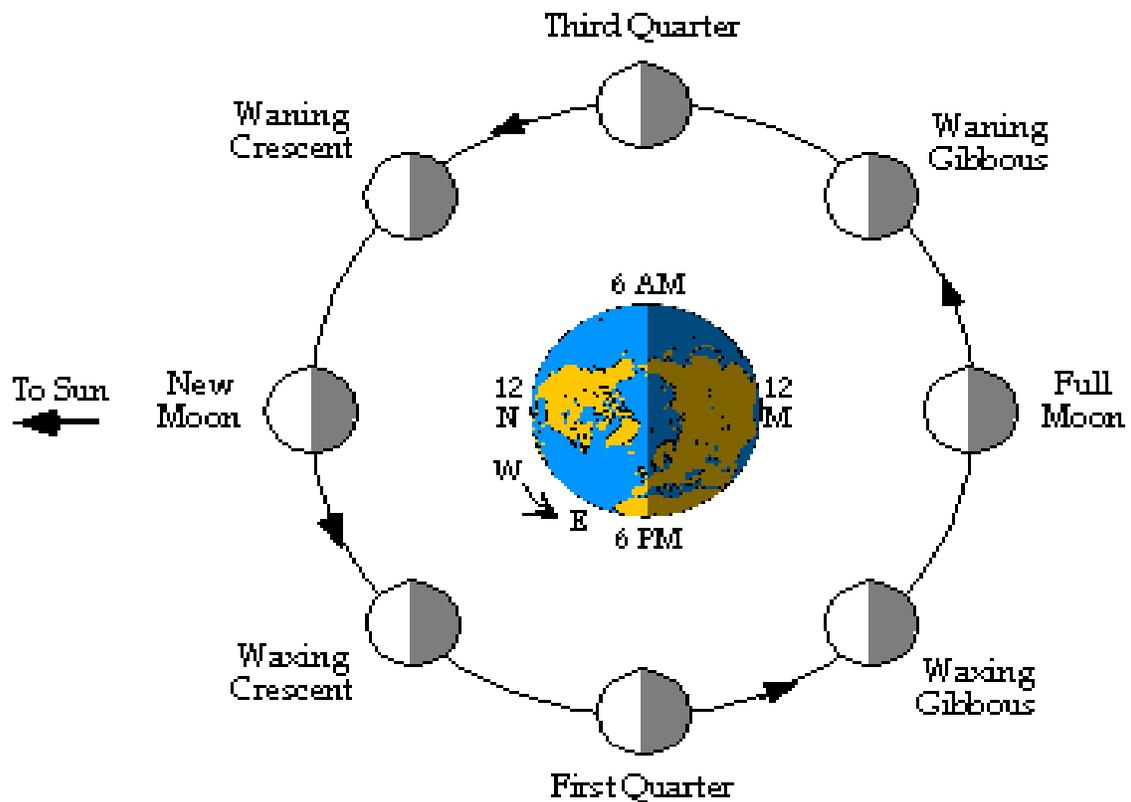
Phases of the Moon

<http://visual.merriam-webster.com/astronomy/celestial-bodies/moon/phases-moon.php>



<http://www.planetsforkids.org/moon-moon.html>

Phases of the Moon



http://www.opencourse.info/astronomy/introduction/04.motion_moon/moon_phases.gif

Outer Space Pictures



http://wallpaperstock.net/outer-space-pleiades_wallpapers_34387_1680x1050_1.html



http://onlyhdwallpapers.com/wallpaper/outer-space_stars_galaxies_planets_galaxy_cluster_nebulae_de



http://www.acclaimimages.com/_gallery/_free_images/0124-1006-0114-1134_nasa_space_shuttle_lifting_off_to_outer_space_m.jpg