



Friends

Astronomy

Name _____

Grade _____ Teacher _____

School _____



UNIVERSITY OF
GEORGIA





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Can you define Astronomy?

Basically, it is the study of the universe. Space is hard to study because everything is so spread out, but scientists have learned a lot about our little corner of the universe - the Milky Way!

Join me, **Arch the Dawg**, to find out what's up in space!



Georgia 4-H is a partner in public education and strives to incorporate Georgia Standards in the education materials produced for in-school use. The following Georgia Standards are correlated to the content delivery included in this publication:

Georgia Standard S4E1b: Students will Evaluate strengths and limitations of models of our solar system in describing relative size, order, appearance and composition of planets and the sun.

Georgia Standard S4E2b: Students will develop a model based on observations to describe the repeating pattern of the phases of the moon (new, crescent, quarter, gibbous, and full).

Georgia Standard S4E2c: Students will construct an explanation of how the Earth's orbit, with its consistent tilt, affects seasonal changes.

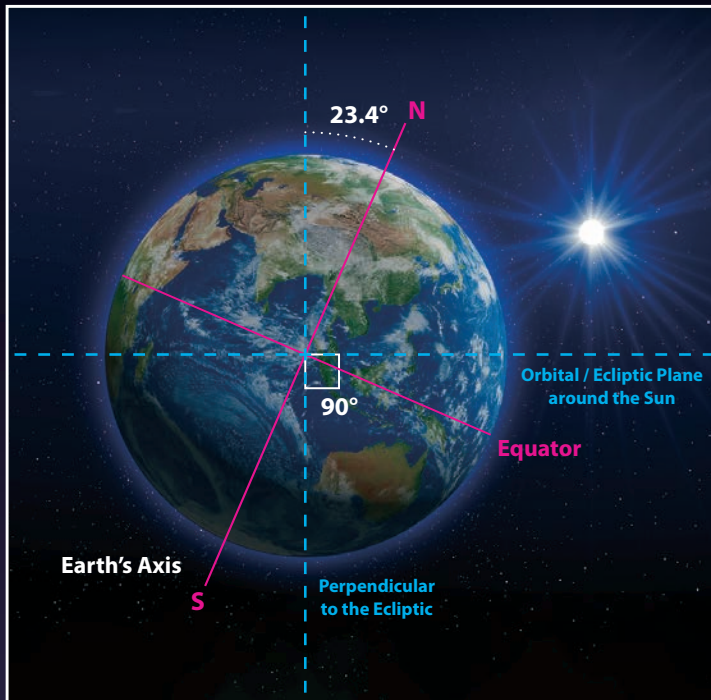
Georgia Performance Standards from www.georgiastandards.org

Think Green! Not just 4-H Green...but let's help do our part to recycle and reuse. Save this book, reread it or pass it along to a friend. If it's too worn, please recycle it.





THE EARTH, MOON, AND SUN

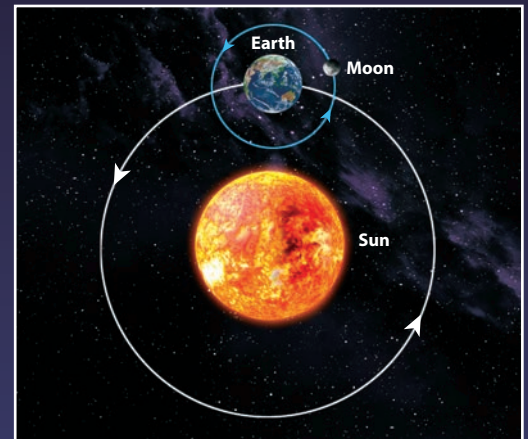


The **Sun** is a star and is the center of our solar system. Its gravity keeps the planets in orbit. The Sun provides the light and energy we need to survive!

The **Earth** rotates on its axis once every 24 hours, giving us day and night. The Earth revolves or orbits around the sun once a year. At any given time, half of the Earth will be illuminated by the Sun. This part of the Earth is experiencing daytime while the part not being illuminated is experiencing nighttime.

The Earth is also tilted on its axis by 23.4 degrees. This means that as we orbit or revolve around the Sun, parts of the Earth point towards the Sun while other parts point away from the Sun. This results in our seasons!

A **moon** is a natural satellite of a planet. Earth has only one moon, named Luna. Our moon is generally the brightest thing in the sky at night! But did you know that moonlight actually comes from the sun? That's true... the Moon doesn't make its own light but instead is illuminated by the Sun. As the Moon orbits the Earth, we can see only the part of the Moon that is lit up by the Sun. It takes about a month for the Moon to make its way around the Sun. Based on the Moon's relative location to the Sun and Earth, we see something different when we look at the Moon each night.



Check Your Space Smarts!

Fill in the following statement and the diagram below using the word bank. You will have to use one word twice.

The _____ orbits the _____ once every year.
The _____ orbits the _____ once every month.

Word Bank:

Sun
Earth
Moon



OBSERVING OUR MOON

Let's observe how the Moon changes over the next month.































Moon Phase Observations Instructions:

- For the next 28 nights, you'll observe the Moon and draw what you see. (It's okay if it's cloudy or rainy. You can leave those nights blank.)
- Look up at the night sky and view the Moon. Then, grab your observation log from the next page.
- You'll leave the parts of the Moon white when you can see it. You'll color in black for the parts of the Moon that you can't see.
- At the end of your observations, you will see the pattern of changes the Moon goes through at the end of the 28 days. These are called **moon phases**.

A **waxing moon** is a moon that gets more sunlight on it as the days go by. It is after we experience a new moon up to a full moon. A **waning moon** is after the full moon and will remain waning until we again experience a new moon.

To learn more about moon phases, please visit
moon.nasa.gov/moon-in-motion/moon-phases

Moon Phase Observation Log

						
Night 1	Night 2	Night 3	Night 4	Night 5	Night 6	Night 7
						
Night 8	Night 9	Night 10	Night 11	Night 12	Night 13	Night 14
						
Night 15	Night 16	Night 17	Night 18	Night 19	Night 20	Night 21
						
Night 22	Night 23	Night 24	Night 25	Night 26	Night 27	Night 28

Bonus: Do you know your moon phases? Color in each phase on your chart using the key below. The example on the right shows a waxing gibbous, so it has been colored light green.

NEW
MOON

WAXING
CRESCENT

FIRST
QUARTER

WAXING
GIBBOUS

FULL
MOON

WANING
GIBBOUS

THIRD
QUARTER

WANING
CRESCENT

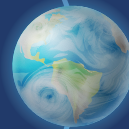
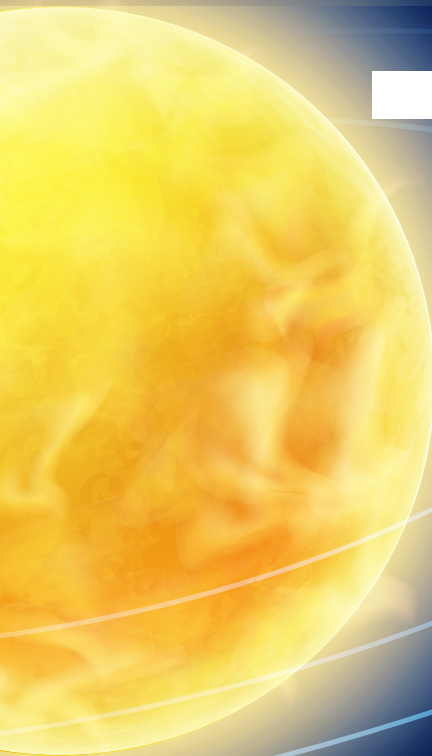
Example:





OUR SOLAR SYSTEM

The **solar system** is the gravitationally bound system of the Sun and the objects that orbit it. Our solar system's diameter is 287.46 billion kilometers. Our solar system is divided into the inner planets and the outer planets. The inner planets are small, rocky, and have no or few moons. The outer planets are large, gaseous, and have many moons. The inner and outer planets are separated by the asteroid belt, a region between Mars and Jupiter that contains millions of asteroids or small space rocks.



Did you know?

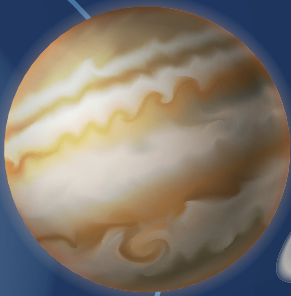
It is really, really, really hard to represent the solar system accurately in models because the planets are so far away from each other. This model shows us what the planets look like and their order, but is not accurate for size of the planets or distance between them.

Check Your Space Smarts!

Use your space smarts and the words in the word bank to fill in this map of the solar system!

Word Bank:

Earth	Saturn
Jupiter	Sun
Mars	Uranus
Mercury	Venus
Neptune	



But what about Pluto?

Pluto used to be considered a planet, but as scientists continued to explore our galaxy, they found tons of other celestial bodies about the same size as (or larger than) Pluto! Rather than naming ALL of these new discoveries as planets, they demoted Pluto to a **dwarf planet** in 2006. Dwarf planets are planets that are within orbit around the sun, are generally round due to their gravity, but have not cleared the debris in their orbit around the Sun. Most of the dwarf planets in our solar system are in the Keiper Belt, beyond Neptune. In addition to Pluto, Haumea, Makemake, and Eris are in the Kuiper Belt. There is another dwarf planet in the inner solar system called Ceres, located between Mars and Jupiter.



Total Solar Eclipse!

By Arch the Dog August 22, 2017

On Monday, August 21, 2017, the Northwestern part of Georgia experienced a total solar eclipse. I learned about eclipses in school during my 4-H class.

An **eclipse** occurs when the shadow of one celestial body falls on another. A **lunar eclipse** is when the Earth comes between the Sun and the Moon, so the Earth's shadow is on the Moon. A **solar eclipse** is when the Moon comes between the Earth and the Sun, so the Moon's shadow is on the Earth.

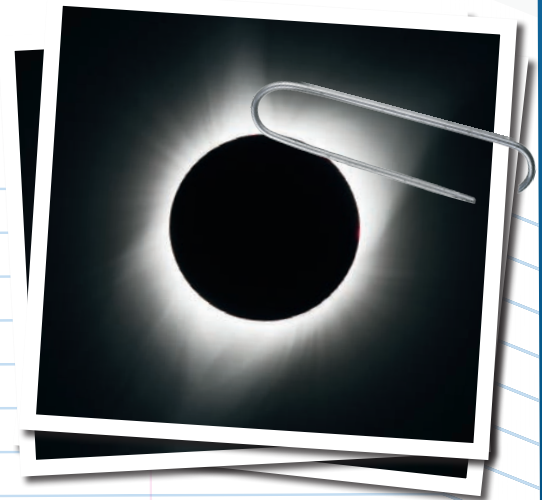
Spectators traveled far and wide to my community to experience **totality**, which is the few moments of total darkness experienced when a new moon passes completely in front of the Sun during the day. We all had to wear special UV blocking eclipse glasses to protect our eyes from the Sun's harmful rays. They were really cool!



A total solar eclipse happens on average once every 18 months, but only a sliver of the planet can see the eclipse each time. The last total solar eclipse visible from Georgia was in 1970, and the next one is in 2045! While total solar eclipses are uncommon, lunar eclipses usually happen twice each year.

The Old Farmer's Almanac can tell you when the next eclipse is happening in your area: almanac.com/astronomy/eclipse-dates.

I sure don't want to miss out on the next eclipse!



REFERENCES AND RESOURCES



Georgia Performance Standards, www.georgiastandards.org

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Departmental Publication 4-H FM-02

Printed Fall 2022

Published by University of Georgia Cooperative Extension. For more information or guidance, contact your local Extension office. The University of Georgia College of Agricultural and Environmental Sciences (working cooperatively with Fort Valley State University, the U.S. Department of Agriculture, and the counties of Georgia) offers its educational programs, assistance, and materials to all people without regard to race, color, religion, sex, national origin, disability, gender identity, sexual orientation or protected veteran status and is an Equal Opportunity, Affirmative Action organization.