

# CONCISE CURRICULUM

Science and ELA

*Including*  
**Additional STEM Activities**

4<sup>th</sup> grade

Student Interactive Workbook  
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# Unit 1

## Earth Science: The Solar System

Science Standards addressed:  
S4E1, S4E2



### Vocabulary

galaxy	gravity	universe
solar system	hydrogen	constellation
myth	sphere	enormous
fixed	wandering	axis
orbit	reflect	revolve
telescope	astronomer	dwarf
surround	faint	swirling
rotating	evening	day
phases	disappear	portion
complete	shrinking	revolution
crescent	swollen	wane
journey	cycle	tilted
seasons	successful	experiencing
equal	occurs	returns

# Georgia Science Standards

**S4E1. Obtain, evaluate, and communicate information to compare and contrast the physical attributes of stars and planets .**

- a. Ask questions to compare and contrast technological advances that have changed the amount and type of information on distant objects in the sky..
- b. Construct an argument on why some stars (including the Earth's sun) appear to be larger or brighter than other stars.
- c. Construct an explanation of the difference between stars and planets in the sky..
- d. Evaluate strengths and limitations of models of our solar system in describing relative size, order, appearance, and composition of planets and the sun.

**Essential Question: What can we see in the night sky?**

**S4E2. Obtain, evaluate, and communicate information to model the effects of the position and motion of the Earth and the moon in relation to the sun as observed from Earth.**

- a. Develop a model to support an explanation of why the length of day and night change throughout the year.
- b. Develop a model based on observations to describe the repeating pattern of the phases of the moon (new, crescent, quarter, gibbous, and full)..
- c. Construct an explanation of how the Earth's orbit, with its consistent tilt, affects seasonal changes .

**Essential Question: How do the earth and moon move?**

**Essential Question: What is in the solar system?**



**CONTEXT CLUES:** (ELAGSE4L4a)

On Earth we **gaze** at the stars in the sky above us.

Gaze means: A) hold B) collect C) look

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A **galaxy** is a giant collection of stars. A galaxy is held together by a very strong force that we call **gravity**. Scientists believe that there are billions of galaxies in the **universe**. Each galaxy contains large balls of burning gas called stars. Some galaxies contain smaller bodies known as planets. When a galaxy contains planets that move around a star, it is known as a **solar system**.

One thing you may have noticed about stars is that they are not all the same color. There are red stars, blue stars, white stars, and yellow stars. A star's temperature is what makes a star a certain color. Very hot stars are usually blue in color. Red stars are much cooler than other stars because they are so old. They have burned up much of the **hydrogen** gas that gives them energy. Our sun is in the middle: not too hot and not too cold. The star that we call the sun is a medium-hot, yellow-white star.

Sometimes you can see patterns when you look up at the stars. These patterns are called **constellations**. A very popular constellation is the Big Dipper. Of course there isn't a real dipper in the sky. It, like all constellations, is a way of grouping the stars. Ancient people imagined that groups of stars were connected by lines that formed animals or people. These shapes came from their stories called **myths**.

**EXTRACTING INFORMATION FROM THE TEXT:**

1. What holds galaxies together? \_\_\_\_\_

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2. What gives stars their color? \_\_\_\_\_

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3. Name a popular constellation that you can see in the night sky. \_\_\_\_\_

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**MAKING REAL-WORLD SCIENCE CONNECTIONS:**

Think about a constellation you can see in the night sky. Think about the name of the constellation. Why do you think it was given its name? Explain your answer.

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**COMPARE AND CONTRAST TECHNOLOGICAL ADVANCES:**

Ask questions to compare and contrast technological advances that have changed the amount and type of information on distant objects in the sky. (S4E1a)

Type of Technology: \_\_\_\_\_

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Type of Technology: \_\_\_\_\_

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## READING, LANGUAGE, AND INFORMATION PROCESSING

### PARTS OF SPEECH: (ELAGSE4L1)

Underline the nouns in each sentence. (Nouns are people, places, things or ideas)

Circle the prepositions. (at, by, for, to, in, before, after, over, of, under, until, with, since, etc.)

Draw a box around the conjunctions. (Conjunctions are joining words such as and, but, and or)

Draw a line between the complete subject and the complete predicate.

1. Each huge galaxy contains burning balls of gas called stars.

\*What does the galaxy do? \_\_\_\_\_ (verb)

\*What words modify galaxy? \_\_\_\_\_ and \_\_\_\_\_ (adjectives)

### SENTENCE SKILLS PRACTICE: (ELAGSE4L2c)

Simple or Compound: A simple sentence contains one independent clause that can stand alone. A compound sentence contains two independent clauses. Put **S** if the sentence is simple, put **C** if the sentence is compound.

Insert commas where needed before a coordinating conjunction in a compound sentence.

1. There are billions of stars in our galaxy and they are not all the same color. \_\_\_\_\_

2. A constellation is a collection of stars. \_\_\_\_\_

3. Blue stars are hot, red stars are cool and yellow stars are in the middle. \_\_\_\_\_

4. Our sun is a huge star but it is not the biggest. \_\_\_\_\_

### MULTIPLE MEANING WORDS: (ELAGSE4L4a)

Choose the correct definition for the sentences below.

star: (A) giant balls of hot gas in the universe

star: (B) highly popular athlete or performer

1. The musician's talent made her a **star** in her hometown. \_\_\_\_\_

2. The **star** of the play recited his lines perfectly. \_\_\_\_\_

3. The sun is a **star** that is the center of our solar system. \_\_\_\_\_

4. The brightest **star** in the night sky is called *Sirius*. \_\_\_\_\_

**CONTEXT CLUES:** (ELAGSE4L4a)

Ancient Greeks called the planets Mercury, Venus, Mars, Jupiter, and Saturn "**wandering** stars".

**Wandering** means: A) moving    B) colorful    C) exploding

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Our sun is a burning **sphere** of gases. The star we call the sun is **enormous**. It is over 600,000 miles across. It's the largest object in our entire solar system. Our solar system is made up of the sun, the nine planets, moons, asteroids, and comets. Planets are large round objects that move around a star. Even though the planets are very large, the sun is bigger than all of the planets put together.

Stars are **fixed** objects. Stars do not move. Stars appear to move because Earth is spinning on its **axis**. As Earth spins, the stars look as though they are traveling east to west across the night sky. It is this spinning that makes the sun appear to "rise" in the east and "set" in the west. Only Earth is moving. Ancient Greeks saw five objects in their night sky and noticed that they moved faster than the other stars. The Greeks named these five objects "**wandering** stars" because they seemed to move differently than the other stars. We now know that these five "stars" were actually Mercury, Venus, Mars, Jupiter, and Saturn and not stars at all. Remember: stars don't move and planets do.

Each planet in our solar system is in **orbit** around the sun. There are eight planets and eight different orbits. Some planets make their trip around the sun very quickly while other planets take longer. The planets close to the sun have a shorter orbit, so make the trip much faster. Those planets further away from the sun can take decades to make just one orbit.

**EXTRACTING INFORMATION FROM THE TEXT:**

1. What makes stars look as though they are moving? \_\_\_\_\_

\_\_\_\_\_

2. Explain why the planets have a different orbit time around the sun.

\_\_\_\_\_

\_\_\_\_\_

3. Describe the characteristics of the sun. \_\_\_\_\_

\_\_\_\_\_

4. Why does the sun appear to "rise" in the east and set in the west?

\_\_\_\_\_

**Research:**

Research the planets and their different orbits around the sun. Tell about which one has the shortest orbit around the sun and which one has the longest orbit around the sun. Explain why the orbits are different.

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**CONSTRUCTING AN EXPLANATION:**

**Construct an explanation of the difference between stars and planets in the sky. (S4E1c)**

**Characteristics of stars:**

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**Characteristics of planets:**

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## READING, LANGUAGE, AND INFORMATION PROCESSING

### PARTS OF SPEECH: (ELAGSE4L1)

Underline the nouns in each sentence. (Nouns are people, places, things or ideas)

Circle the prepositions. (at, by, for, to, in, before, after, over, of, under, until, with, since, etc.)

Draw a box around the conjunctions. (Conjunctions are joining words such as and, but, and or)

Draw a line between the complete subject and the complete predicate.

1. Mercury, Venus, Mars, Jupiter, and Saturn were not stars at all.

(6 nouns)

2. The star we call the sun is enormous. (2 nouns)

### PROGRESSIVE VERBS: (ELAGSE4L1b)

Change each of the underlined verbs to the past, present, and future progressive verb forms.

Use the correct helping verb (was/were, am/ is/ are, or will be) and the -ing form of the underlined verb.

1. Planets (revolve) around the sun.

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

2. Stars (appear) at night.

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

3. The Greeks (name) the planets.

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

4. People (look) at the sky.

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

**CONTEXT CLUES:** (ELAGSE4L4a)

Planets **orbit** the sun. They move around the sun continuously.

**Orbit** means: A) scanning          B) holding          C) circling

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When you look up into the night sky, you can see hundreds or even thousands of stars. Since planets are much closer than stars they look like they are the same size, but they aren't. Planets in our solar system are much smaller than stars and don't produce their own light, but they seem to glow. The planets, like our moon, **reflect** the light of the sun, so it looks like they are glowing. Since planets are orbiting the sun they are in a different place every night, but stars stay in the same place.

If you have ever looked up and seen the Big Dipper then you have seen a constellation. These groups of stars appear to be in different places in the night sky from month to month, but since stars don't move we know that something else is causing the constellations to look like they've moved. Since the planets all **revolve** around the sun, and Earth is a planet, then that would explain why stars appear to be moving. As Earth travels around the sun we see the sky and the stars from different places.

It is easy enough to see stars in the sky, but to study the stars and the planets people use **telescopes**. When **astronomers** study stars or planets they use very powerful telescopes to help them see details that you cannot see with your eyes alone. Astronomers can tell whether a planet is near or far, large or small, and even what it is made of. Scientists also use telescopes to study stars so that they can learn more about our universe.

**EXTRACTING INFORMATION FROM THE TEXT:**

1. Why do planets look like they are glowing? \_\_\_\_\_

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2. Why do the stars in the sky appear to be moving? \_\_\_\_\_

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3. Why do astronomers use telescopes? \_\_\_\_\_

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4. Why would scientists want to learn more about our universe? \_\_\_\_\_

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**INFERENCE:**

**Explain this statement:**

"Scientists also use telescopes to study stars so that they can learn more about our universe."

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## READING, LANGUAGE, AND INFORMATION PROCESSING

### PARTS OF SPEECH: (ELAGSE4L1)

**Underline the nouns in each sentence.**

(Nouns are people, places, things or ideas)

**Circle the prepositions.** (at, by, for, to, in, before, after, over, of, under, until, with, since, etc.)

**Draw a box around the conjunctions.** (Conjunctions are joining words such as and, but, and or)

**Draw a line between the complete subject and the complete predicate.**

1. Planets in our solar system are much smaller than stars. (3 nouns) (2p)
2. Scientists use telescopes to study stars. (3 nouns)
3. Astronomers study stars and planets. (3 nouns) (1c)

### SYNONYMS AND ANTONYMS: (ELAGSE4L5c/4L4c)

A synonym is a word that means the same.

An antonym is a word that has the opposite meaning.

Circle the word that means the **SAME** as **revolve**.

A) move    B) slide    C) rotate    D) flip

### CAUSE AND EFFECT: (ELAGSE4RI5)

The cause is why something happened and the effect is what happened as a result.

Planets in our solar system are much smaller than stars and don't produce their own light, but they seem to glow. The planets, like our moon, reflect the light of the sun, so it looks like they are glowing.

CAUSE: \_\_\_\_\_

(What causes the planets to glow?)

EFFECT: The planets in our solar system seem to glow.

**CONTEXT CLUES:** (ELAGSE4L4a)

Of the eight **major** planets in the solar system, Mercury is now the smallest and is about the same size as Earth's moon.

**Major** means: A) circular B) light C) main

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There are eight (8) major planets in our solar system. Pluto, now called a "Dwarf Planet", used to be the ninth, but some scientists argued that Pluto was too small to be considered a real planet. If you began at the sun and traveled into space you would pass Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune before finally reaching smaller Pluto. Of the eight major planets in the solar system, Mercury is now the smallest and is about the same size as earth's moon. The planet Jupiter is much larger than any other planet, but is still tiny compared to our sun. Jupiter is more than ten times as wide as Earth. That means that you could line up ten Earths side-by-side and they still wouldn't be as wide as Jupiter.

Saturn is the second largest planet in our solar system and is known as "The Queen of Planets." Saturn is a planet that seems different from the rest because it has rings around it. The third largest planet, Uranus, also has **faint** rings around it as well, but they are hard to see from earth. Stormy Neptune is a **swirling** ball of hot gases and is the fourth largest planet. All four of these huge planets are known as "Gas Giants" because they are made almost entirely of gases. Gas giants don't produce their own energy, so they cannot be considered stars.

The four smaller planets are all made of rocks and minerals. Mercury is the smallest of these while Earth is the largest. Venus was once known as "Earth's Twin" because it is about the same size as Earth, but scientists tell us that Venus is nothing like Earth. Venus is the hottest planet in the solar system because of the thick poisonous clouds that **surround** it and trap the heat. Finally, there is the planet that is the closest to Earth: Mars. Mars is known as the "Red Planet" because of its reddish colored soil.

**EXTRACTING INFORMATION FROM THE TEXT:**

1. What planet is the largest in our solar system? The smallest? \_\_\_\_\_

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2. Name the planets that are "Gas Giants." Why are they called this?

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3. List the planets in order from smallest to largest. \_\_\_\_\_

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4. Now list them in order from the sun. \_\_\_\_\_

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**EVALUATING STRENGTHS AND LIMITATIONS:**

Evaluate strengths and limitations of models of our solar systems in describing relative size, order, appearance, and composition of planets and the sun. (S4E1d)

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## READING, LANGUAGE, AND INFORMATION PROCESSING

### PARTS OF SPEECH: (ELAGSE4L1)

Underline the nouns in each sentence. (Nouns are people, places, things or ideas)

Circle the prepositions. (at, by, for, to, in, before, after, over, of, under, until, with, since, etc.)

Draw a box around the conjunctions. (Conjunctions are joining words such as and, but, and or)

Draw a line between the complete subject and the complete predicate.

1. Saturn is the second largest planet in our solar system. (3 nouns) (1p)

\* What is the linking verb? \_\_\_\_\_

2. Neptune is a swirling ball of hot gases. (3 nouns) (1p)

\*What is the linking verb? \_\_\_\_\_

### SENTENCE SKILLS PRACTICE: (ELAGSE4L1f)

Sentence Fragments do not express a complete thought. A complete sentence has a subject and a verb and expresses a complete thought.

Change all fragments below into complete sentences.

1. the second largest planet in our solar system

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2. a swirling ball of hot gases

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3. made a rocks and minerals

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## Experiment Alert!



Try putting a coin on the right side of a table. Now, walk to the other side of the table and notice that the coin appears to be on your left. The coin didn't move...you did. Stars don't move...the planets do.

## Planets Activities:

List all terrestrial planets:

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List all Gas Giants:

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List the planets in order from smallest to largest:

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**CONTEXT CLUES:** (ELAGSE4L4a)

Once the planet has brought us back into **view** of the sun, we are again in day light and the planet has made one complete rotation.

**View** means: A) sight B) around C) sky

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You've probably heard that each morning the sun rises and then sets in the evening. Since we know that the sun is a star and doesn't move, then we have to understand how the sun appears to travel across the sky. Earth, like all of the planets in the solar system, is **revolving** around the sun. While Earth travels around the sun, it is also **rotating**. This spinning of Earth is what causes us to have daytime and nighttime.

Because Earth is a **sphere**, only half of our planet can face the sun at any given time. The half of the planet that is facing the sun is said to be having daytime. At the same time, the dark side of the planet is enjoying nighttime. As the planet spins on its axis it slowly moves us from night to day and then from day to night. The length of the day is affected by the Earth's tilt as it revolves around the sun. In Georgia we see the sun appear to rise in the eastern sky, but what is really happening is that as Earth turns we are able to see more and more of the sun. As our part of the planet slowly turns to face the sun we can watch as the sun looks higher and higher in the daytime sky.

After a long day of enjoying the sun's rays, it is time for night. The planet continues to turn and moves us out of sight of the sun. At first, we notice that the sun looks lower in the sky. This is **evening** and it's beginning to get dark. As we turn away from the sun, the sky gets darker and nighttime falls over Georgia. One rotation of Earth takes 24 hours, and that is one **day** on Earth.

**EXTRACTING INFORMATION FROM THE TEXT:**

1. What causes us to have daytime and nighttime? \_\_\_\_\_

\_\_\_\_\_

2. How do we move from day to night and night to day? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**WRITING AN EXPLANATION:**

Do you think we need day and night? Explain your answer.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

What do you think it would be like to live in a part of the world where it was dark or "night" for almost 24 hours of a day?

\_\_\_\_\_

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\_\_\_\_\_





## READING, LANGUAGE, AND INFORMATION PROCESSING

### PARTS OF SPEECH: (ELAGSE4L1)

Underline the nouns in each sentence.

(Nouns are people, places, things or ideas)

Circle the prepositions. (at, by, for, to, in, before, after, over, of, under, until, with, since, etc.)

Draw a box around the conjunctions.

(Conjunctions are joining words such as and, but, and or)

Draw a line between the complete subject and the complete predicate.

1. Earth revolves around the sun. (2 nouns) (1p)

\*What does Earth do? \_\_\_\_\_ (verb)

2. People see the sun rise in the sky. (3 nouns) (1p)

\*What do the people do? \_\_\_\_\_ (verb)

### CAUSE AND EFFECT: (ELAGSE4RI5)

The cause is why something happened and the effect is what happened as a result.

The spinning of Earth is what causes us to have daytime and nighttime.

CAUSE: \_\_\_\_\_

EFFECT: \_\_\_\_\_

### SYNONYMS AND ANTONYMS: (ELAGSE4L5c/4L4c)

A synonym is a word that means the same.

An antonym is a word that has the opposite meaning.

Circle the word that **DOES NOT** mean the same as **rotate**.

A) turn

B) view

C) twirl

D) spin

**CONTEXT CLUES:** (ELAGSE4L4a)

About once per month the moon seems to **disappear**; we cannot see it at all. **Disappear** means: A) rotate B) revolve C) vanish

**NOTES:**

The planets rotate and because they rotate they have day and night. Our moon also rotates, so does the moon have a daytime and a nighttime? Well, the answer is yes AND no. Because of the speed that the moon revolves around Earth, half of the moon is always facing the sun and the other half is always facing away from the sun. The dark side of the moon is always dark, so why does it look like the moon is all lit up on one night and then only half lit just a few nights later? These shapes that the moon seems to have are called **phases**.

The phases of the moon are caused by where the moon is and how we see the moon from Earth. It takes the moon 29 days to make one trip around Earth. About once per month the moon seems to disappear; we cannot see it at all. This phase of the moon is called the new moon. The new moon happens because the moon is between Earth and the sun. All of the sun's light is shining on the side of the moon facing away from us, but as the moon revolves around Earth, and Earth rotates on its axis, we start to see a little bit of that daytime side of the moon.

A day or so after the new moon, we can see a small **portion** of the lit side of the moon. This phase of the moon is called the waxing crescent. This phase looks like a fingernail. Over the next week, we see a bit more of the lit side of the moon every night. It looks like the lit part of the moon is growing bigger, or waxing, but it is the same size. We are just able to see more of it as the moon moves around Earth. After about seven nights we can see half ( $\frac{1}{2}$ ) of the lit side of the moon, and this is referred to as the first quarter half-moon. Now the moon's trip around Earth is one-fourth of the way **complete**.

**EXTRACTING INFORMATION FROM THE TEXT:**

1. Does the moon have a daytime and nighttime? \_\_\_\_\_

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2. How long does it take the moon to make one trip around Earth? \_\_\_\_\_

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3. How long does it take to see half of the lit side of the moon? \_\_\_\_\_

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4. What happens in the "new" moon phase? \_\_\_\_\_

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5. What happens during the waxing crescent? \_\_\_\_\_

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**OBSERVATIONS:**

**Draw the type of moon you see over the next three nights.  
What phase is the moon in?**

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**Draw the type of moon for three nights of the next week.  
What phase is the moon in?**

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**Draw the type of moon for three nights of the next week.  
What phase is the moon in?**

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## READING, LANGUAGE, AND INFORMATION PROCESSING

**CAUSE AND EFFECT:** Find the cause and effect.

It looks like the lit part of the moon is growing bigger, because we are able to see more of it as the moon moves around Earth.

**CAUSE:** \_\_\_\_\_

**EFFECT:** \_\_\_\_\_

### **PARTS OF SPEECH: (ELAGSE4L1)**

**Underline the nouns in each sentence.**

(Nouns are people, places, things or ideas)

**Circle the prepositions.** (at, by, for, to, in, before, after, over, of, under, until, with, since, etc.)

**Draw a box around the conjunctions.**

(Conjunctions are joining words such as and, but, and or)

**Draw a line between the complete subject and the complete predicate.**

1. The moon revolves around Earth. (2 nouns) (1p)

\*What does the moon do? \_\_\_\_\_ (verb)

2. The shapes of the moon are called phases. (3 nouns) (1p)

\*What is the verb phrase? \_\_\_\_\_

### **PROGRESSIVE VERBS: (ELAGSE4L1b)**

Change each of the underlined verbs to the past, present, and future progressive verb forms.

Use the correct helping verb (was/were, am/ is/ are, or will be) and the -ing form of the underlined verb.

1. The moon (revolve) around Earth.

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

2. The moon (look) bigger throughout the month.

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

**CONTEXT CLUES: (ELAGSE4L4a)**

The gibbous cycle of the moon's phases occurs when the moon is more than half full, but less than **completely** full.

**Completely** means: A) entirely    B) partially    C) slowly

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The moon is just over seven days into its **journey** around Earth, and we can see more and more of the lit side of the moon. During the first quarter half-moon we saw the right side of the moon lit up. Now, as we slowly see more of the lit **portion** of the moon, it appears that the moon is becoming swollen. The moon is entering the waxing gibbous phase. The gibbous **cycle** of the moon's phases occurs when the moon is more than half full, but less than completely full. During the next seven nights we are able to see almost all of the lit side of the moon.

Finally, after about 14 days we are able to see the entire lit side of the moon. During a full moon the moon has moved so that it is exactly opposite of where it was during the new moon. Earth is now between the moon and the sun, but because the moon is not even with Earth the sun's light shines completely on the moon. The light from the sun is **reflected** off of the moon and makes our night a little brighter. Because the moon's journey around Earth takes about one month, we usually only see a full moon once per month, but there are times when there are two full moons in one month. We say that this second full moon is a blue moon. It is very rare to have two full moons in one month, so the name blue moon has come to mean anything that rarely happens.

After just one night the moon begins to show its dark side to us, and the full moon appears to begin shrinking. During the first half of its orbit the right side of the moon looked as though it was growing. Now the right side is growing dark and the lit side of the moon is on the left. This happens because the moon is on the opposite side of Earth and we get a different view of it. Since the moon is no longer full, but not quite only half full, we again call this phase the gibbous phase. Because the moon is now **waning**, the next 7 days will be the moon's waning gibbous phase.

**EXTRACTING INFORMATION FROM THE TEXT:**

1. What happens when the moon appears to be swollen? \_\_\_\_\_

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2. Explain what happens during a full moon. \_\_\_\_\_

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3. Why does the moon look like it is growing? \_\_\_\_\_

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**Think About It!**

One night Yuri was playing kickball with his friends. When he came inside the house, he discovered he lost his house key out of his pocket. He went back outside to find his key, but it was so dark he could not see. Later that month, he went outside and he was able to find his key by the light of the full moon.

**What happened between the time when Yuri could not see outside and the time he was able to see by the light of the full moon?**

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## DEVELOPING A MODEL:

Develop a model based on observations to describe the repeating patterns of the phases of the moon (new, crescent, quarter, gibbous, and full). (S4E2b)

List the steps you took to make your model.

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Draw a picture of the model you made.





