



**DISTANCE LEARNING PACKET**

**4<sup>TH</sup> GRADE**

**SCIENCE**

Science Week 2 Day 1

SE2

Read the article from read works "What Causes the Seasons?"

Answer the questions

Science Week 2 Day 2

SE2a. Using the article What Causes the Seasons from yesterday create a model using items at your house (do not purchase anything... be creative) that explains why the length of day and night changes throughout the year. Write a paragraph explaining the model you created.

Example Model

Many people use a dark room, a flashlight, and a ball. Shine the flash light on the ball that represents Earth. The sun is represented by the flash light. Think about what you know about the tilt of the earth and seasons while you use the ball and the flashlight to model the seasons.

Science Week 2 Day 3

SE2b: Read the Ever Changing Sky from Read works and answer comprehension questions

Science Week 2 Day 4

SE2b: Create a model explaining the phases of the moon.

Use the picture included to create your own model of the moon phases.

Many people use Oreos to show the model of the moon, but be creative and use what you have at home.

Science Week 2 Day 5

SE2c: It is currently changing seasons. Use the articles that you have read this week to write an explanatory paper about the changing seasons. Use the plan from Write Bright to write about about the changing seasons and what you have read in the text as well as what what you are observing yourself.

# What Causes the Seasons?

The text and images are from NASA Space Place.

## It's all about Earth's tilt!

Many people believe that Earth is closer to the sun in the summer and that is why it is hotter. And, likewise, they think Earth is farthest from the sun in the winter.

Although this idea makes sense, it is incorrect.

It is true that Earth's orbit is not a perfect circle. It is a bit lop-sided. During part of the year, Earth is closer to the sun than at other times. However, in the Northern Hemisphere, we are having winter when Earth is closest to the sun and summer when it is farthest away! Compared with how far away the sun is, this change in Earth's distance throughout the year does not make much difference to our weather.

There is a different reason for Earth's seasons.

Earth's axis is an imaginary pole going right through the center of Earth from "top" to "bottom." Earth spins around this pole, making one complete turn each day. That is why we have day and night, and why every part of Earth's surface gets some of each.

Earth has seasons because its axis doesn't stand up straight.

## But what caused Earth to tilt?

Long, long ago, when Earth was young, it is thought that something big hit Earth and knocked it off-kilter. So instead of rotating with its axis straight up and down, it leans over a bit.

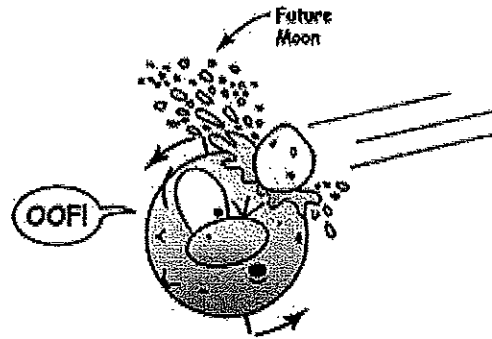
By the way, that big thing that hit Earth is called Theia. It also blasted a big hole in the surface. That big hit sent a huge amount of dust and rubble into orbit. Most scientists think that that rubble, in time, became our Moon.

Science

Week 2 Day 1

Science

Week 2 Day 2



As Earth orbits the sun, its tilted axis always points in the same direction. So, throughout the year, different parts of Earth get the sun's direct rays.

Earth has seasons because its axis is tilted. Earth rotates on its axis as it orbits the Sun, but the axis always points in the same direction.

Southern Hemisphere      Northern Hemisphere

**December:**  
 Summer south of the equator, winter north of the equator. The Sun shines directly on the Southern Hemisphere and indirectly on the Northern Hemisphere

**March:**  
 Fall south of the equator, spring north of the equator. The Sun shines equally on the Southern and Northern Hemispheres

**June:**  
 Winter south of the equator, summer north of the equator. The Sun shines directly on the Northern Hemisphere and indirectly on the Southern Hemisphere

**September:**  
 Spring south of the equator, fall north of the equator. The Sun shines equally on the Southern and Northern Hemispheres

Sometimes it is the North Pole tilting toward the sun (around June) and sometimes it is the South Pole tilting toward the sun (around December).

It is summer in June in the Northern Hemisphere because the sun's rays hit that part of Earth more directly than at any other time of the year. It is winter in December in the Northern Hemisphere, because that is when it is the South Pole's turn to be tilted toward the sun.

If you go to South  
America for the  
winter holidays,  
bring your swimsuit,  
not your skis!



Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. What is the Earth's axis?

- A. an imaginary pole that passes through the center of the Earth
- B. the path that the Earth travels around the sun
- C. the object that hit young Earth long ago, causing it to lean over
- D. the distance between the Earth and the sun

2. This text describes what causes us to have seasons at different times of the year on different parts of the Earth. What is one thing that causes seasons?

- A. the shape of the Earth
- B. the oval-shaped orbit of the Earth
- C. the tilt of the Earth
- D. the distance between the Earth and sun

3. The text says, although many people believe that we have summer when the Earth is closest to the hot sun, that we actually have summer when the Earth is farthest away from the sun. What conclusion can be drawn from this evidence?

- A. Earth's orbit changes shape almost every year.
- B. Scientists do not know for sure why we have seasons.
- C. Earth's seasons are caused by the moon rather than the sun.
- D. Earth's distance from the sun does not affect the seasons.

4. Based on the text, what causes a hemisphere on Earth to have summer?

- A. direct sunshine from the sun hitting that hemisphere
- B. indirect sunshine from the sun hitting that hemisphere
- C. that hemisphere's closeness to the sun, relative to its closeness at other parts of the year
- D. that hemisphere's natural climate and the warmth of the Earth's atmosphere in that area

5. What is the main idea of this text?

- A. Earth's oval-shaped orbit causes the seasons.
- B. Earth's tilted axis causes the seasons.
- C. The shape of the Earth causes the seasons.
- D. Earth's distance from the sun causes the seasons.

6. Please read the following sentences from the passage.

"But what caused the Earth to **tilt**? Long, long ago, when Earth was young, it is thought that something big hit Earth and knocked it off-kilter. So instead of rotating with its axis straight up and down, it leans over a bit."

What does the word **tilt** mean as used in these sentences?

- A. skip
- B. spin
- C. move
- D. lean

7. Please choose the answer that best completes the sentence below.

When the Northern Hemisphere is tilted towards the sun, the Southern Hemisphere does not receive direct sunshine, \_\_\_\_ it is winter in the south.

- A. because
- B. if
- C. so
- D. first

8. Why is the Earth's axis tilted?

9. Why does the Northern Hemisphere have summer in June? Use evidence from the text in your answer.

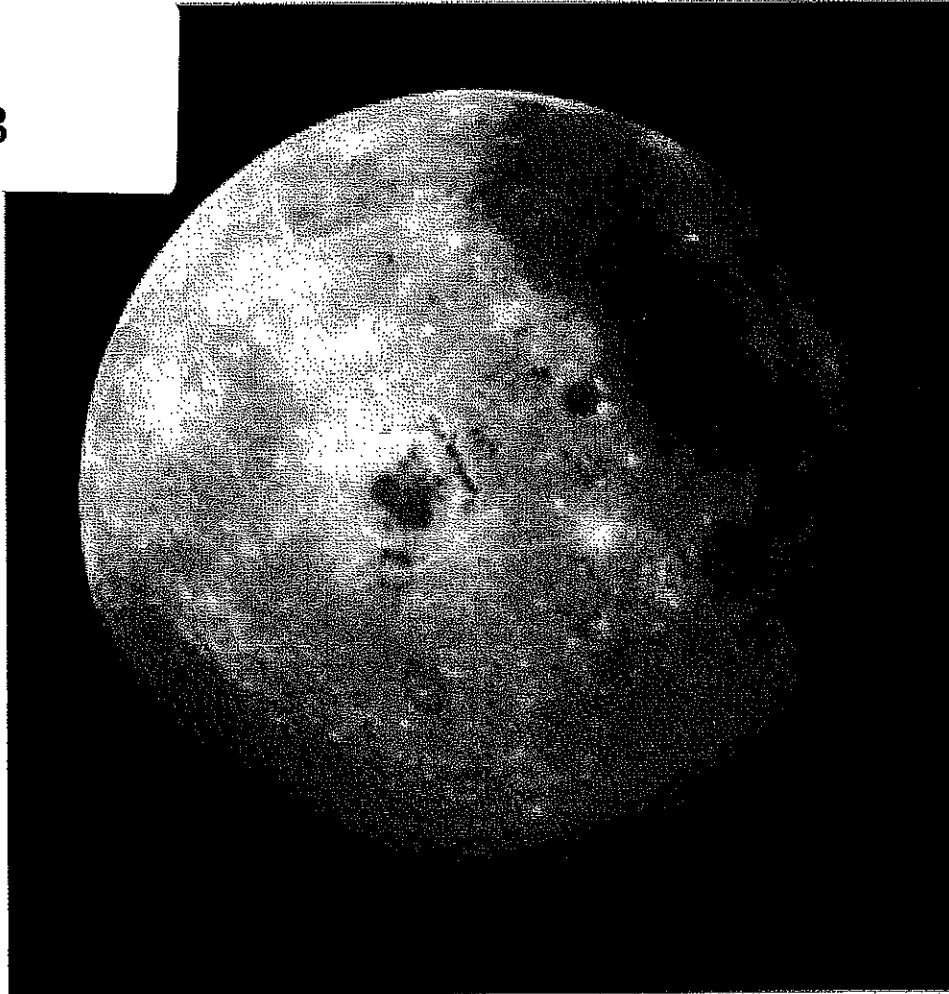
10. Imagine that the Earth's axis went straight up and down, instead of tilting. Explain whether or not the Earth would still have different seasons. Support your answer with evidence from the text.

# The Ever-Changing Sky

by Megan McGibney

Science

Week 2 Day 3



Look up at the sky on a clear day. You will see the sun. It is bright and shiny, warming much of what its light touches. Look up at the sky again at night. You may see the stars. They are also bright and shiny, glimmering in the dark sky. You may also see the moon. It looks bright and shiny, reflecting light from the sun. People have always looked up at the sky with wonder. Some have even studied the sun, moon, and stars. These people, called astronomers, have learned that those objects in the sky do not stay in the same place all the time.

The earth revolves around the sun and also rotates on its axis, which is an imaginary line that runs from the North Pole to the South Pole, through the earth's center. It takes just under 24 hours for the earth to complete one rotation on its axis - a day, that's right! And guess how long it takes the earth to revolve around the sun? A little over 365 days. That's a year, with an



extra quarter of a day.

Let's take a closer look at the moon. The earth does not revolve around the moon. Instead, the moon revolves around the earth. It takes the moon about four weeks to complete a revolution around the earth. The portion of the moon we, here on Earth, see changes over this period of about four weeks as the moon's position around the earth changes. The moonlight we see at night is the moon's reflection of sunlight onto Earth. The different ways the moon appears to us are known as the moon's phases. The moon's phases depend on the moon's position in relation to the earth and the sun.

The four-week period starts and ends with the new moon. The new moon cannot be seen because the side of the moon lit by the sun is facing away from the earth. This is because the moon is nearly between the sun and the earth at this time. After that comes the first quarter moon, which is when we see half of the side of the moon lit by the sun. Then comes the full moon, when we can see the entire side of the moon lit up by the sun. This is because the earth is nearly lined up between the sun and the moon, and the sunlit part of the moon is facing the earth. One of the last phases is called the last quarter moon. This is when we see the other half of the lit side of the moon.

Sometimes the way the sun, moon, and earth are positioned causes an event known as an eclipse. There are two types of eclipses. A lunar eclipse happens when the earth passes between the moon and the sun and when the earth blocks the moon from the sun. The earth's shadow may block the entire moon or just part of the moon from view. A solar eclipse happens when the moon passes directly between the earth and the sun. A solar eclipse can block part of the sun or the entire sun from the earth's view.

Because of the regular orbit of the moon around the earth and the regular orbit of the earth around the sun, astronomers can predict when an eclipse will happen even many years into the future.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. What does the earth revolve around?

- A. the moon
- B. the sun
- C. the stars
- D. meteors

2. What does the author describe in the passage?

- A. how long it takes the sun to revolve around the earth
- B. when the next solar eclipse will occur
- C. how long it takes the earth to revolve around the sun
- D. the movement of other planets in our solar system

3. The phases of the moon are caused by the moon's orbit around the earth. Which details from the text support this conclusion?

- A. It takes 24 hours for the earth to complete one rotation on its axis.
- B. A lunar eclipse occurs when the earth passes between the moon and the sun and the earth blocks the moon from the sun.
- C. The direction the sunlit side of the moon facing the earth changes as the moon revolves around the earth.
- D. The moon changes from a new moon to a half moon to a full moon.

4. What blocks the sun during a solar eclipse?

- A. the moon
- B. the earth
- C. the earth's shadow
- D. a nearby meteor

5. What is this passage mostly about?

- A. solar and lunar eclipses
- B. the solar calendar
- C. phases of the moon
- D. the movement of the earth and the moon

6. Read the following sentences: "It takes just under 24 hours for the earth to complete one rotation on its axis - a day, **that's right!** And guess how long it takes the earth to revolve around the sun?"

Why does the author say "**that's right!**"?

- A. because the author thinks the reader has made the connection between the rotation of the earth around its axis and the length of a day
- B. because the author was talking to someone while writing the passage
- C. because the author wants to reassure the reader
- D. because the author is waiting for an answer from the reader

7. Choose the answer that best completes the sentence below.

The moon goes through different phases in a month, \_\_\_\_\_ full moon, half moon, and new moon.

- A. but
- B. including
- C. first
- D. as a result

8. When does a full moon occur?

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9. Why can astronomers predict eclipses?

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10. Give two examples of how the sky is ever-changing.

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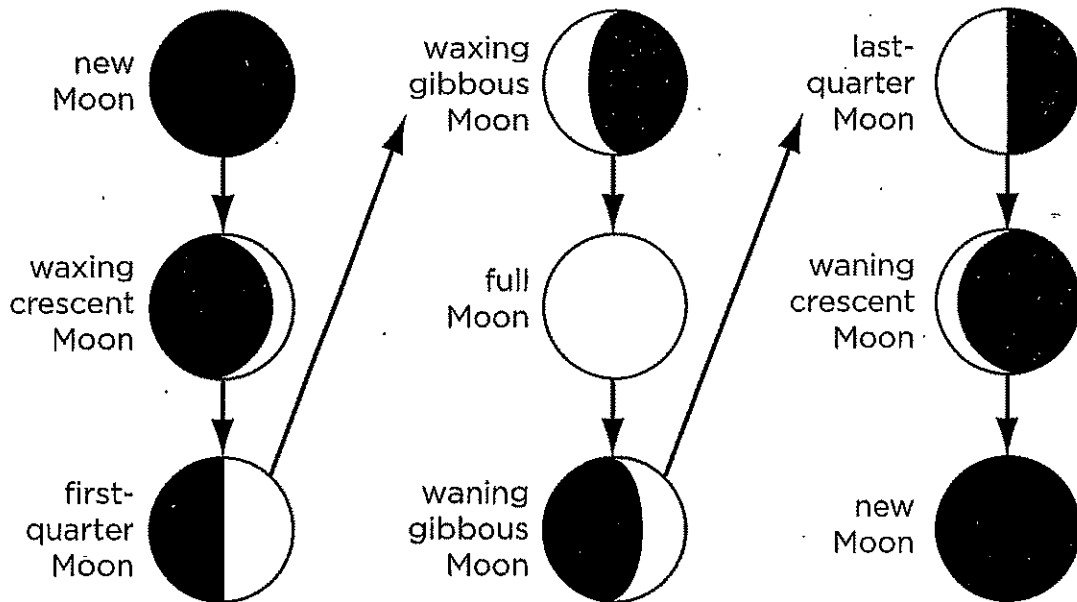
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Name \_\_\_\_\_ Date \_\_\_\_\_

# So Many Moons!

When you look at the sky at night, you can usually see the Moon. However, the Moon looks different from one night to the next. This is because of its cycle of phases. As the Moon revolves around Earth, it reflects different amounts of sunlight. The amount of sunlight reflected off of the Moon creates its phases, making it look different each night. In this activity, you will chart the phases of the Moon through one lunar cycle.



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