

# Chapter 1

# Study Guide



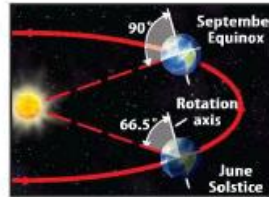
**Think About It!** Gravity causes objects in space to impact each other. Earth's motion around the Sun causes seasons. The Moon's motion around Earth causes phases of the Moon. Earth and the Moon's motions together cause eclipses and ocean tides.

## Key Concepts Summary

## Vocabulary

### LESSON 1 Earth's Motion

- The gravitational pull of the Sun on Earth causes Earth to revolve around the Sun in a nearly circular **orbit**.
- Areas on Earth's curved surface become more tilted with respect to the direction of sunlight the farther you travel from the equator. This causes sunlight to spread out closer to the poles, making Earth colder at the poles and warmer at the equator.
- As Earth revolves around the Sun, the tilt of Earth's **rotation axis** produces changes in how sunlight spreads out over Earth's surface. These changes in the concentration of sunlight cause the seasons.



**orbit** p. 12  
**revolution** p. 12  
**rotation** p. 13  
**rotation axis** p. 13  
**solstice** p. 17  
**equinox** p. 17

### LESSON 2 Earth's Moon



- The gravitational pull of Earth on the Moon makes the Moon revolve around Earth. The Moon rotates once as it makes one complete orbit around Earth.
- The lit part of the Moon that you can see from Earth—the Moon's **phase**—changes during the lunar cycle as the Moon revolves around Earth.

**maria** p. 22  
**phase** p. 24  
**waxing phase** p. 24  
**waning phase** p. 24

### LESSON 3 Eclipses and Tides

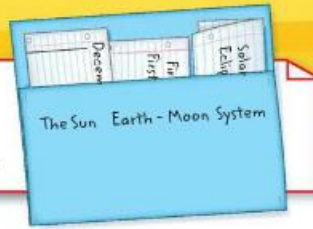
- When the Moon's shadow appears on Earth's surface, a **solar eclipse** occurs.
- When the Moon moves into Earth's shadow, a **lunar eclipse** occurs.
- The gravitational pull of the Moon and the Sun on Earth produces **tides**, the rise and fall of sea level that occurs twice each day.



**umbra** p. 29  
**penumbra** p. 29  
**solar eclipse** p. 30  
**lunar eclipse** p. 32  
**tide** p. 33

**FOLDABLES** Chapter Project

Assemble your Lesson Foldables as shown to make a Chapter Project. Use the project to review what you have learned in this chapter.



**Use Vocabulary**

Distinguish between the terms in each of the following pairs.

1 revolution, orbit

\_\_\_\_\_

\_\_\_\_\_

2 rotation, rotation axis

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\_\_\_\_\_

3 solstice, equinox

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\_\_\_\_\_

4 waxing phases, waning phases

\_\_\_\_\_

\_\_\_\_\_

5 umbra, penumbra

\_\_\_\_\_

\_\_\_\_\_

6 solar eclipse, lunar eclipse

\_\_\_\_\_

\_\_\_\_\_

7 tide, phase

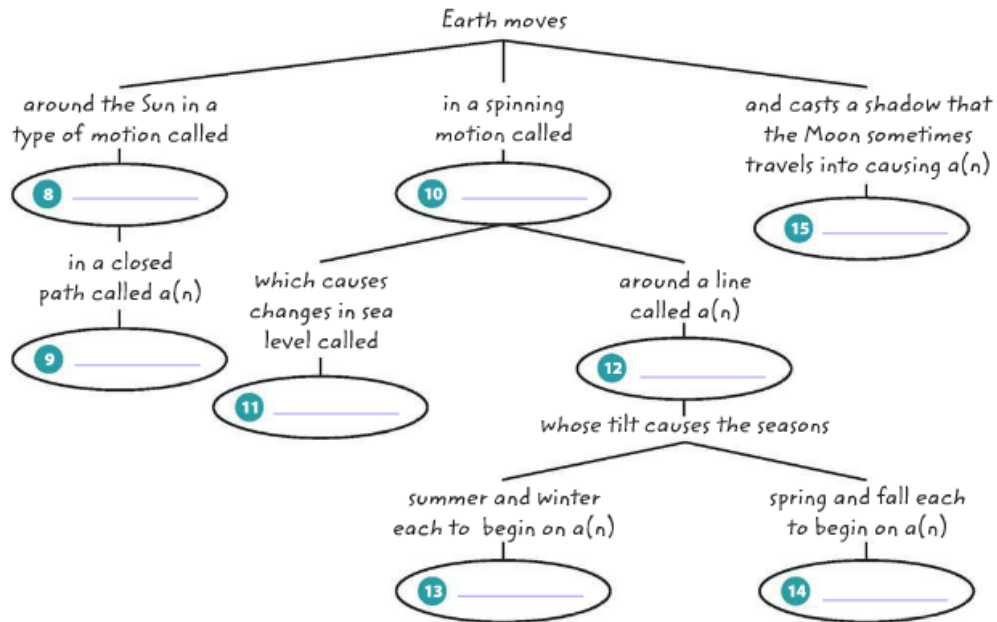
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**Link Vocabulary and Key Concepts**

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Use vocabulary terms from the previous page to complete the concept map.



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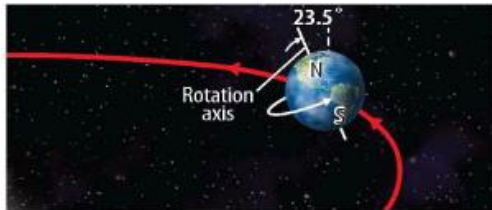
# Chapter 1

# Review

Fill in the correct answer choice.

## Understand Key Concepts

- Which property of the Sun most affects the strength of gravitational attraction between the Sun and Earth? **SC.8.E.5.4**
  - mass
  - radius
  - shape
  - temperature
- Which would be different if Earth rotated from east to west but at the same rate? **SC.8.E.5.9**
  - the amount of energy striking Earth
  - the days on which solstices occur
  - the direction of the Sun's apparent motion across the sky
  - the number of hours in a day
- In the image below, which season is the northern hemisphere experiencing? **SC.8.E.5.9**



- fall
  - spring
  - summer
  - winter
- Which best explains why Earth is colder at the poles than at the equator? **SC.8.E.5.9**
    - Earth is farther from the Sun at the poles than at the equator.
    - Earth's orbit is not a perfect circle.
    - Earth's rotation axis is tilted.
    - Earth's surface is more tilted at the poles than at the equator.
  - How are the revolutions of the Moon and Earth alike? **SC.8.E.5.4**
    - Both are produced by gravity.
    - Both are revolutions around the Sun.
    - Both orbits are the same size.
    - Both take the same amount of time.

## Critical Thinking

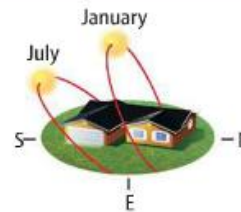
- Relate the ways Earth moves and how each affects Earth. **SC.8.E.5.9**

| Earth's Motions | Effects of Earth's Motions |
|-----------------|----------------------------|
| _____           | _____                      |
| _____           | _____                      |
| _____           | _____                      |
| _____           | _____                      |
| _____           | _____                      |

- Summarize Why is the same side of the Moon always visible from Earth? **SC.8.E.5.9**

\_\_\_\_\_

\_\_\_\_\_



- Interpret Graphics The figure above shows the Sun's position in the sky at noon in January and July. Is the house located in the northern hemisphere or the southern hemisphere? Explain. **SC.8.E.5.9**

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\_\_\_\_\_
- Illustrate On a separate piece of paper, make a diagram of the Moon's phases. Include labels and explanations with your drawing. **SC.8.E.5.9**
- Differentiate between a total solar eclipse and a partial solar eclipse. **SC.8.E.5.9**

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- 11 **Generalize** the reason that solar and lunar eclipses do not occur every month. **SC.8.E.5.9**

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- 12 **Differentiate** Explain the two types of tides and the cause of each type of tide. **SC.8.E.5.9**

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## Writing in Science



- 13 **Survey** a group of at least ten people to determine how many know the cause of Earth's seasons. On a separate piece of paper, write a summary of your results including a main idea, supporting details, and a concluding sentence. **SC.8.E.5.9**

## Big Idea Review

- 14 At the South Pole, the Sun does not appear in the sky for six months out of the year. When does this happen? What is happening at the North Pole during these months? Explain why Earth's poles receive so little solar energy. **SC.8.E.5.9**

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- 15 What phenomena do the motions of Earth and the Moon produce? **SC.8.E.5.9**

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## Math Skills

MA.6.A.3.6

### Convert Units

- 16 When the Moon is 384,000 km from Earth, how far is the Moon from Earth in miles?

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- 17  If you travel 345 mi from Jacksonville to Miami, how many kilometers do you travel?

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- 18 The nearest star other than the Sun is about 40 trillion km away. About how many miles away is the nearest star other than the Sun?

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Fill in the correct answer choice.

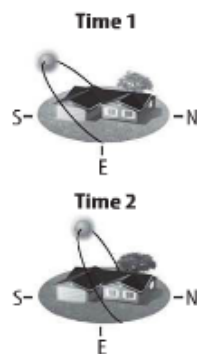
### Multiple Choice

1 What keeps Earth in orbit around the Sun?

SC.8.E.5.4

- (A) tilt of its axis
- (B) gravitational attraction to the Sun
- (C) gravitational attraction to the Moon
- (D) gravitational attraction to the Sun and the Moon

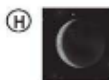
Use the diagram below to answer question 2.



2 What happens between times 1 and 2 in the diagram above? SC.8.E.5.9

- (F) Days grow shorter and shorter.
  - (G) The season changes from fall to winter.
  - (H) The region begins to point away from the Sun.
  - (I) The region gradually receives more solar energy.
- 3 How many times larger is the Sun's diameter than Earth's diameter? SC.8.E.5.9
- (A) about 10 times larger
  - (B) about 100 times larger
  - (C) about 1,000 times larger
  - (D) about 10,000 times larger

4 Which diagram illustrates the Moon's third quarter phase? SC.8.E.5.9



5 Which accurately describes Earth's position and orientation during summer in the northern hemisphere? SC.8.E.5.9

- (A) Earth is at its closest point to the Sun.
  - (B) Earth's hemispheres receive equal amounts of solar energy.
  - (C) The north end of Earth's rotational axis leans toward the Sun.
  - (D) The Sun emits a greater amount of light and heat energy.
- 6 Why does the Sun's energy warm Earth more at the equator than at the poles? SC.8.E.5.9
- (F) The equator has tropical rain forests.
  - (G) Sunlight is less spread out near the equator.
  - (H) Sunlight is more spread out near the equator.
  - (I) The equator lacks ice, which reflects the Sun's energy.

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- 7 During one lunar cycle, the Moon **SC.8.E.5.9**
- (A) completes its east-to-west path across the sky exactly once.
  - (B) completes its entire sequence of phases.
  - (C) progresses only from the new-moon phase to the full-moon phase.
  - (D) revolves around Earth twice.

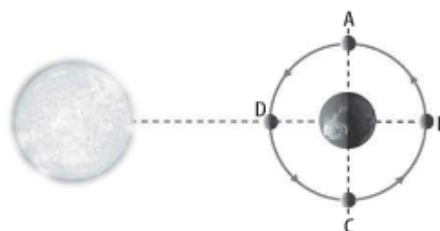
Use the diagram below to answer question 8.



- 8 What does the flag in the diagram above represent? **SC.8.E.5.9**
- (F) high tide
  - (G) low tide
  - (H) neap tide
  - (I) spring tide
- 9 During which lunar phase might a solar eclipse occur? **SC.8.E.5.9**
- (A) first quarter moon
  - (B) full moon
  - (C) new moon
  - (D) third quarter moon

- 10 Which does the entire Moon pass through during a partial lunar eclipse? **SC.8.E.5.9**
- (F) Earth's penumbra
  - (G) Earth's umbra
  - (H) the Moon's penumbra
  - (I) the Moon's umbra

Use the diagram below to answer questions 11 and 12.



- 11 Where are the neap tides indicated in the above diagram? **SC.8.E.5.9**
- (A) A and B
  - (B) B and C
  - (C) A and C
  - (D) C and D
- 12 Where are the spring tides indicated in the above diagram? **SC.8.E.5.9**
- (F) B and C
  - (G) C and D
  - (H) B and D
  - (I) A and C

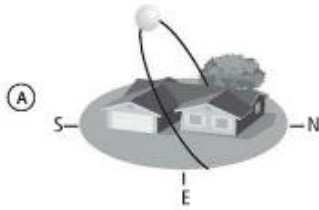
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### NEED EXTRA HELP?

| If You Missed Question... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------------------------|---|---|---|---|---|---|---|---|---|----|----|----|
| Go to Lesson...           | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 3 | 3  | 3  | 3  |

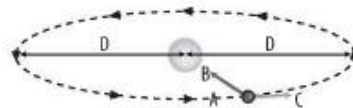
**Multiple Choice** Bubble the correct answer.

1. Which image shows the December solstice?  
SC.8.E.5.9



2. Which process produces large amounts of energy within the Sun? SC.8.E.5.5

- (F) nuclear fission
- (G) nuclear fusion
- (H) Earth's motion around the Sun
- (I) the Sun's gravitational pull



3. Which arrow in the image above indicates the path Earth would take if the Sun disappeared? SC.8.E.5.4

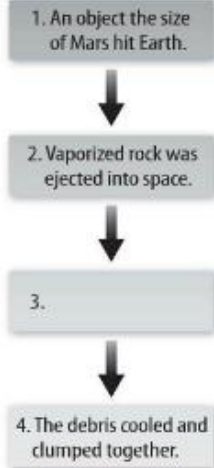
- (A) A
- (B) B
- (C) C
- (D) D

4. What causes the seasons? SC.8.E.5.9

- (F) the changes in the tilt of Earth's rotation axis
- (G) the force of the Sun's gravitational pull on Earth

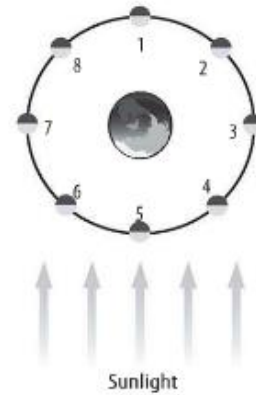
- (H) the great distance Earth is from the Sun
- (I) the tilt of Earth's axis as it moves around the Sun

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**Multiple Choice** *Bubble the correct answer.*


1. The above four steps show how the Moon was formed. Which statement below is step 3? **SC.8.E.5.4**
- (A) Debris fell back to Earth, which caused craters.
- (B) Maria were formed by the impacts of large objects.
- (C) The Sun burned up most of the rocky debris.
- (D) Vaporized rock formed a ring around Earth.
2. The Moon is visible because it **SC.8.E.5.9**
- (F) reflects light from Mars.
- (G) reflects light from Earth.
- (H) reflects light from the stars.
- (I) reflects light from the Sun.

Use the image below to answer questions 3 and 4.

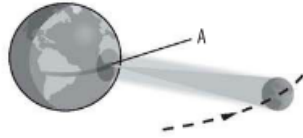


3. Which numbers indicate the phases during which the Moon is waning? **SC.8.E.5.9**
- (A) 1, 5
- (B) 2, 3, 4
- (C) 5, 6, 7
- (D) 2, 3, 4, 5, 6, 7
4. Which number indicates how the Moon is seen from Earth during the second week of the lunar cycle? **SC.8.E.5.9**
- (F) 1
- (G) 3
- (H) 5
- (I) 7

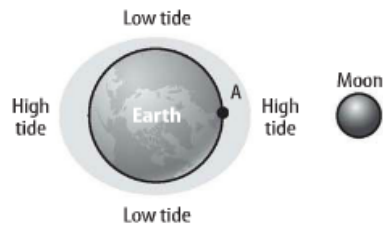




**Multiple Choice** Bubble the correct answer.



- According to the image above, what type of eclipse is occurring at the point labeled A on the globe? **SC.8.E.5.9**
  - partial lunar eclipse
  - partial solar eclipse
  - total lunar eclipse
  - total solar eclipse
- Why don't solar eclipses happen every month? **SC.8.E.5.9**
  - Earth's orbit around the Sun is at an angle, which keeps Earth out of the Moon's shadow.
  - Earth's tilt on its rotation axis keeps it from falling into the Moon's shadow during most months.
- The Moon's orbit is irregular, and most of the time the Moon is too far away to cast a shadow on Earth.
- The Moon's orbit is tilted compared to Earth's orbit, so Earth is not in the Moon's shadow most months.



- According to the image above, how will the tide at Point A change over the next 12 hours? **SC.8.E.5.9**
  - The tide will change from low tide to high tide.
  - The tide will change from high tide to low tide.
  - The tide will change from high tide to low tide and back to high tide.
  - The tide will change from low tide to high tide and back to low tide.
- A partial solar eclipse is seen at locations in **SC.8.E.5.9**
  - Earth's penumbra.
  - Earth's umbra.
  - the Moon's penumbra.
  - the Moon's umbra.

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