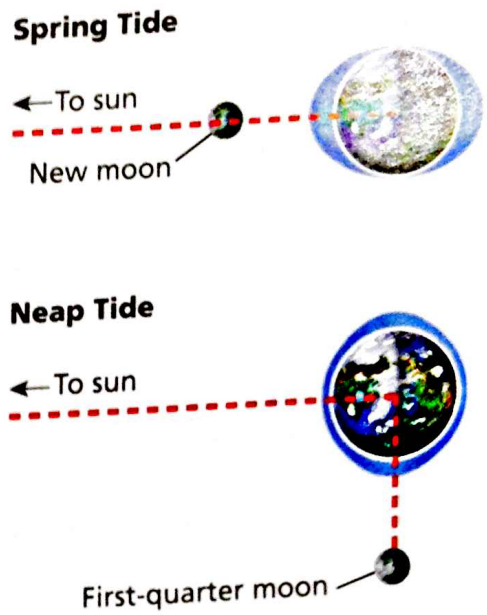
Spring Tides The sun's gravity also pulls on Earth's waters. As shown in the top diagram of Figure 17, the sun, moon, and Earth are nearly in a line during a new moon. The gravity of the sun and the moon pull in the same direction. Their combined forces produce a tide with the greatest difference between consecutive low and high tides, called a **spring tide**.

At full moon, the moon and the sun are on opposite sides of Earth. Since there are high tides on both sides of Earth, a spring tide is also produced. It doesn't matter in which order the sun, Earth, and moon line up. Spring tides occur twice a month, at new moon and at full moon.

Neap Tides During the moon's first-quarter and third-quarter phases, the line between Earth and the sun is at right angles to the line between Earth and the moon. The sun's pull is at right angles to the moon's pull. This arrangement produces a **neap tide**, a tide with the least difference between consecutive low and high tides. Neap tides occur twice a month.

Reading Checkpoint What is a neap tide?

FIGURE 17
Spring and Neap Tides
When Earth, the sun, and the moon are in a straight line (top), a spring tide occurs. When the moon is at a right angle to the sun (bottom), a neap tide occurs.



Section 3 Assessment

Target Reading Skill **Previewing Visuals** Refer to your questions and answers about Figure 11 to help you answer Question 1 below.

Reviewing Key Concepts

1. a. **Explaining** What causes the moon to shine?
   b. **Relating Cause and Effect** Why does the moon appear to change shape during the course of a month?
   c. **Interpreting Diagrams** Use Figure 11 to explain why you can't see the moon at the time of a new moon.
2. a. **Explaining** What is an eclipse?
   b. **Comparing and Contrasting** How is a solar eclipse different from a lunar eclipse?
   c. **Relating Cause and Effect** Why isn't there a solar eclipse and a lunar eclipse each month?
3. a. **Summarizing** What causes the tides?
   b. **Explaining** Explain why most coastal regions have two high tides and two low tides each day.
   c. **Comparing and Contrasting** Compare the size of high and low tides in a spring tide and a neap tide. What causes the difference?

Lab zone At-Home Activity

Tracking the Tides Use a daily newspaper or the Internet to track the height of high and low tides at a location of your choice for at least two weeks. Make a graph of your data, with the date as the *x*-axis and tide height as the *y*-axis. Also find the dates of the new moon and full moon and add them to your graph. Show your completed graph to a relative and explain what the graph shows.