

**Watch the video below.
With a partner, identify
the phenomena and
why it occurs.**

[https://www.youtube.com/watch?v=s
MKvqMUZwV4](https://www.youtube.com/watch?v=sMKvqMUZwV4)

Essential Question: What causes Tides?

Standard:

S6E3d. Explain the causes of waves, currents, and tides.

Use Your Notes Sheet to Record Important Information

Tides

Name _____ Date _____ Period _____

1. What are tides? _____

2. High tides are when water reaches its _____ and low tides are when
water reaches its _____.

3. What causes tides? _____

4. Why does the Moon have a greater gravitational pull than the Sun? _____

5. As Earth rotates, different places on the planet's surface _____

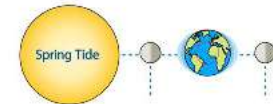
6. Label the High Tides and the Low
Tides on the diagram to the right.



7. Changes in the position of _____

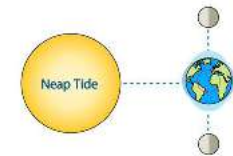
8. Describe Spring Tides: _____

9. Label the Spring Tide diagram including the
two moon phases and the high and low tides.



10. Describe Neap Tides: _____

11. Label the Neap Tide diagram including the
two moon phases and the high and low tides.



12. Tides occur at different times each day because _____

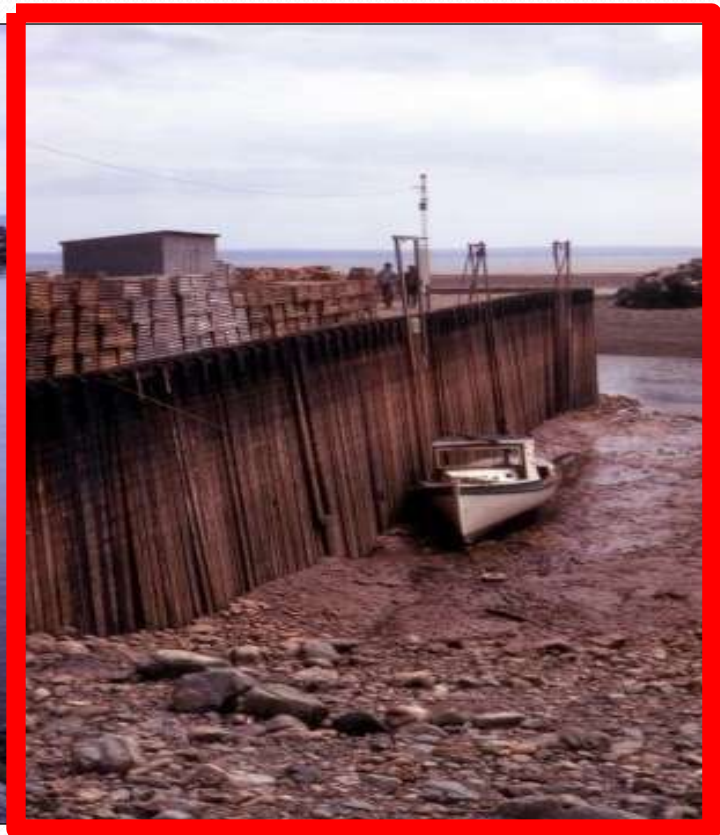
What Are Tides?

- Tides are the daily rise and fall of Earth's waters on its coastlines.
- As the tide comes in, the level of water on the beach rises, and as the tide goes out, the level of water on the beach goes down.

High tides are when the water reaches its highest point.



Low tides are when the water reaches its lowest point.



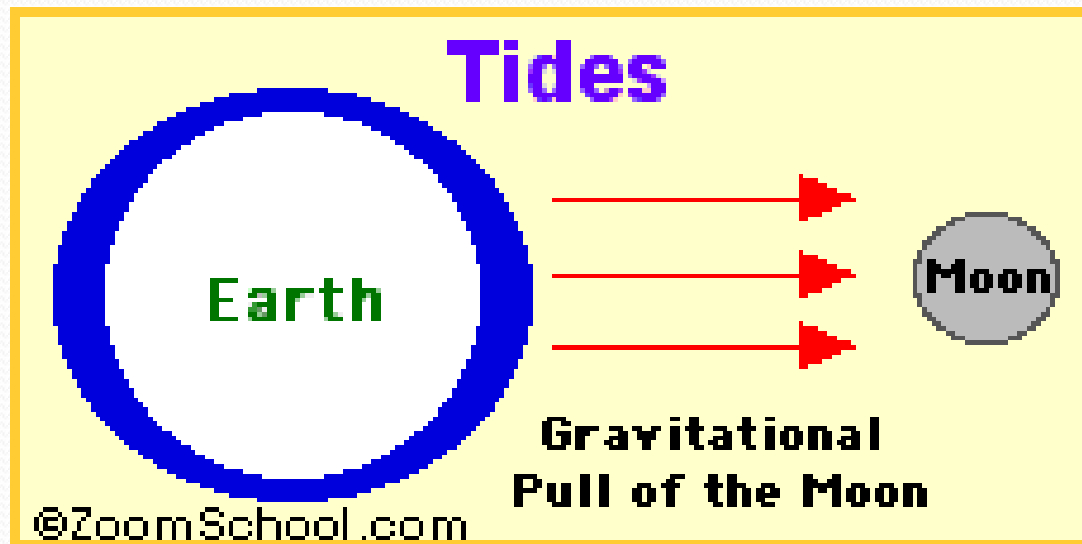




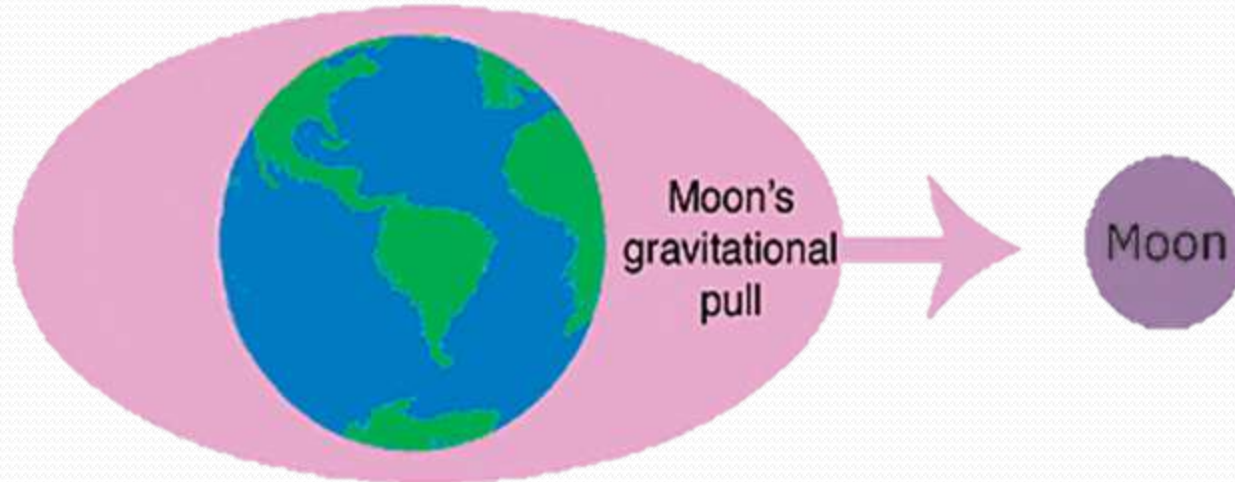
What Causes Tides?

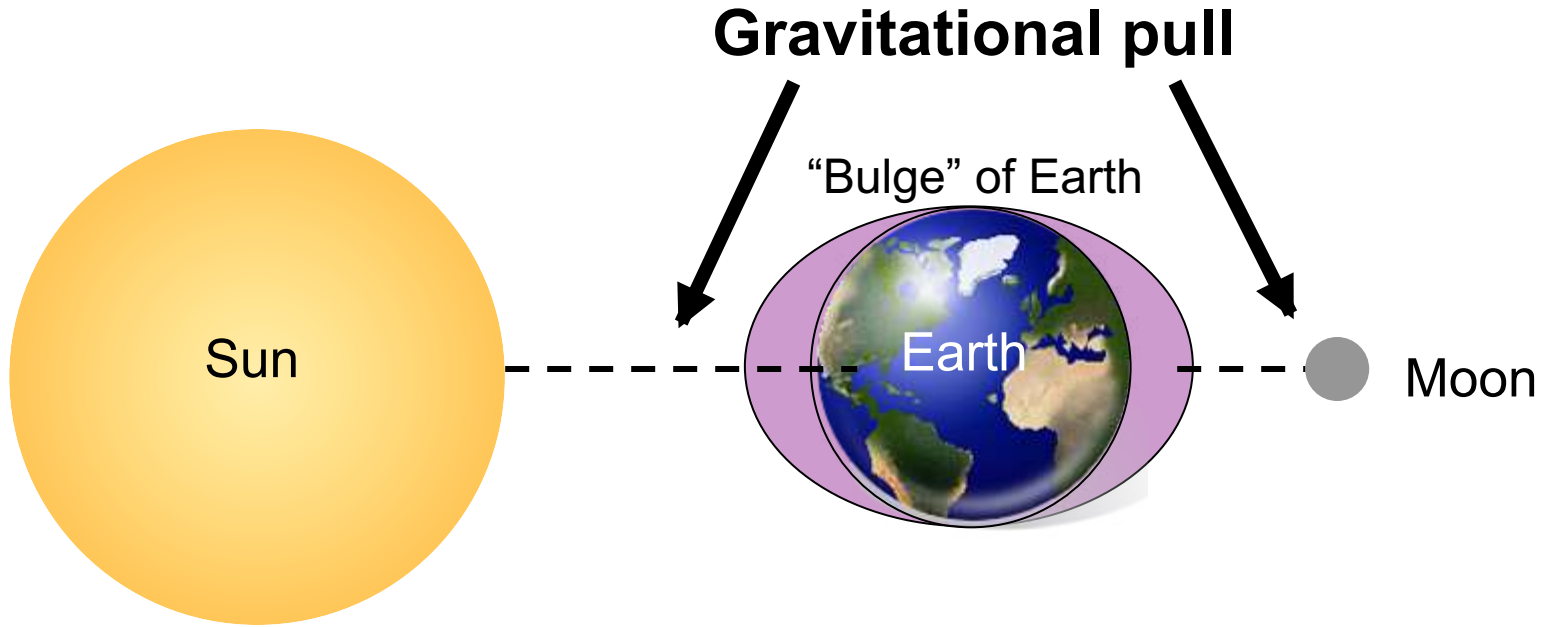
The gravitational pull from the Moon, and the rotation of the Earth on its axis, cause the ocean and sea water to bulge, producing the tides.

Since the Moon is close to the Earth, it has a strong gravitational pull on it (closer objects have a stronger gravitational pull).

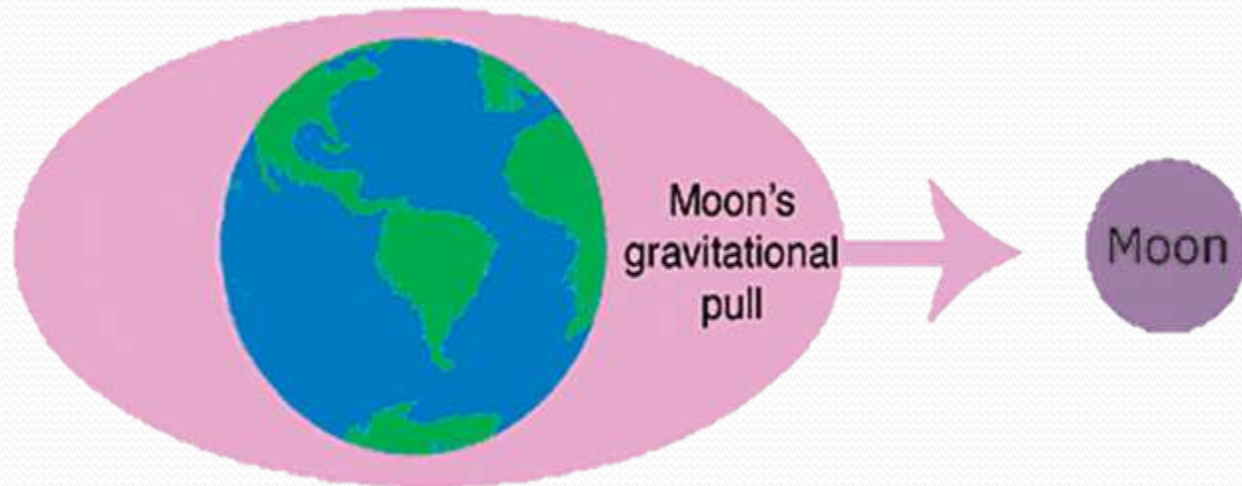


- The Moon pulls on the water on the side nearest to it more strongly than it pulls on the center of the Earth.
- This pull creates a bulge of water on the side of Earth facing the the Moon.

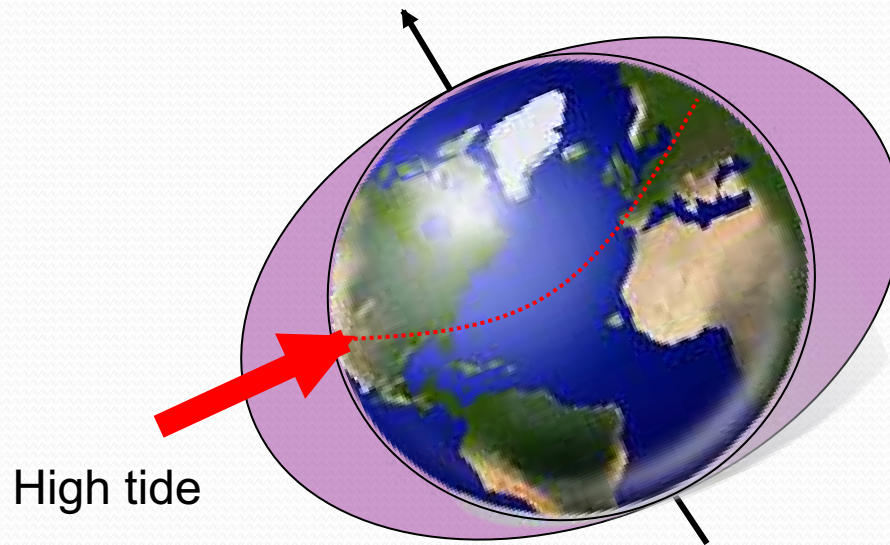




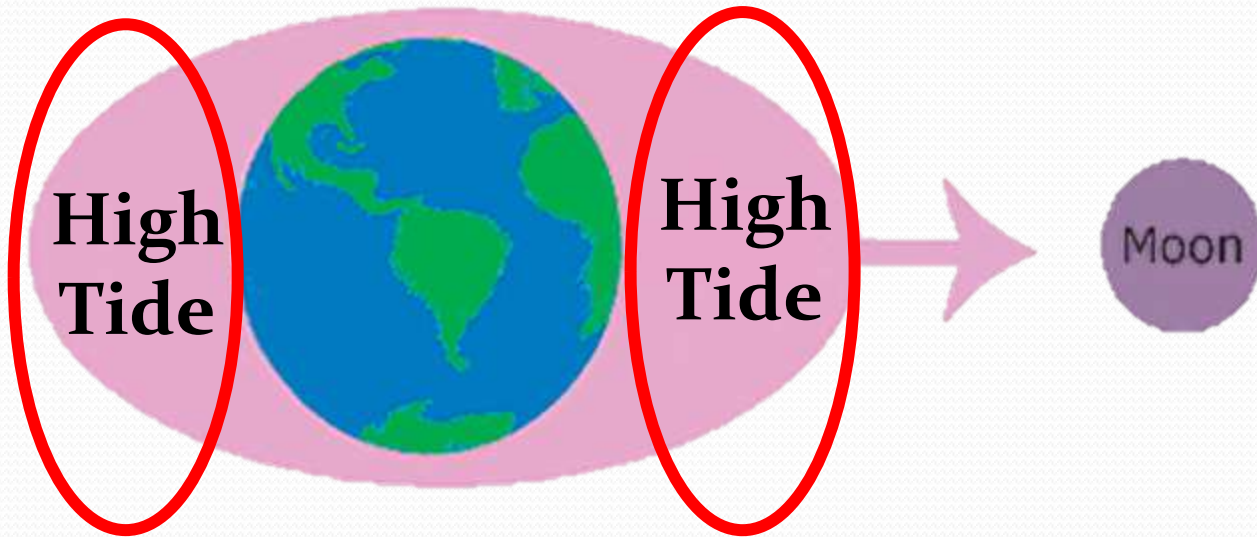
- The water on the side of Earth facing away from the Moon has a less strong pull.
- As Earth rotates, different places on the planet's surface pass through the areas of the tidal bulges and have the change in water levels.



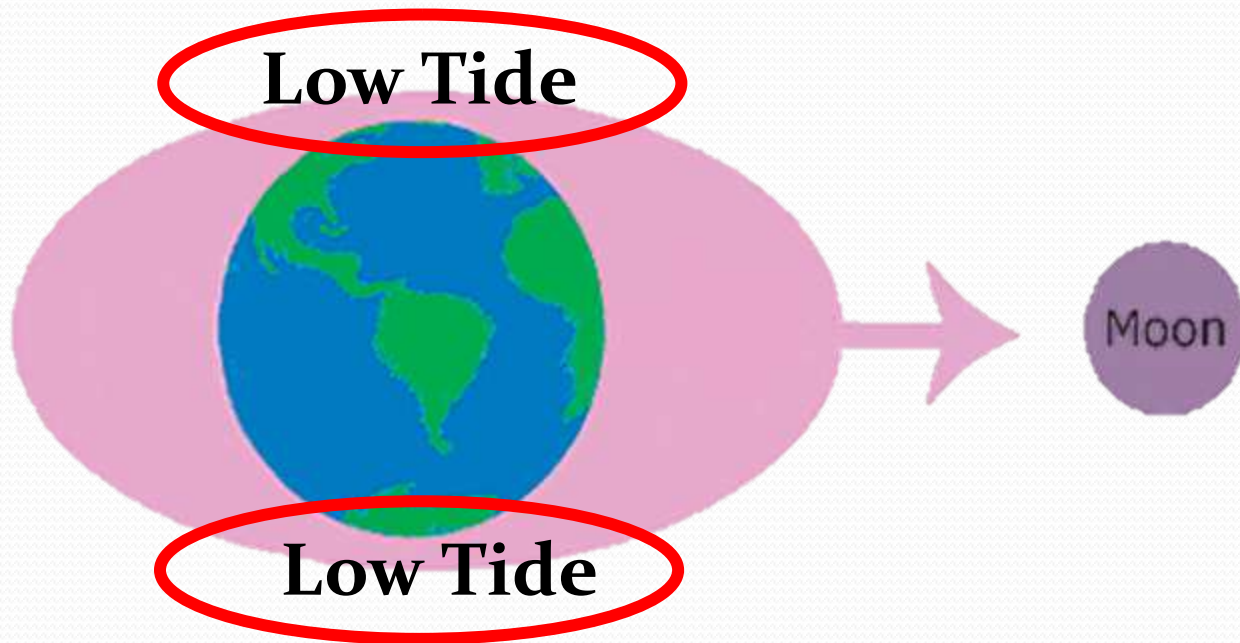
The Earth rotates one full turn in 24 hours, but the bulge of water stays on the side of the Earth facing the moon. The bulge stays in place as the Earth moves under it.



In places where there are tidal bulges, high tide is occurring along the coastlines.

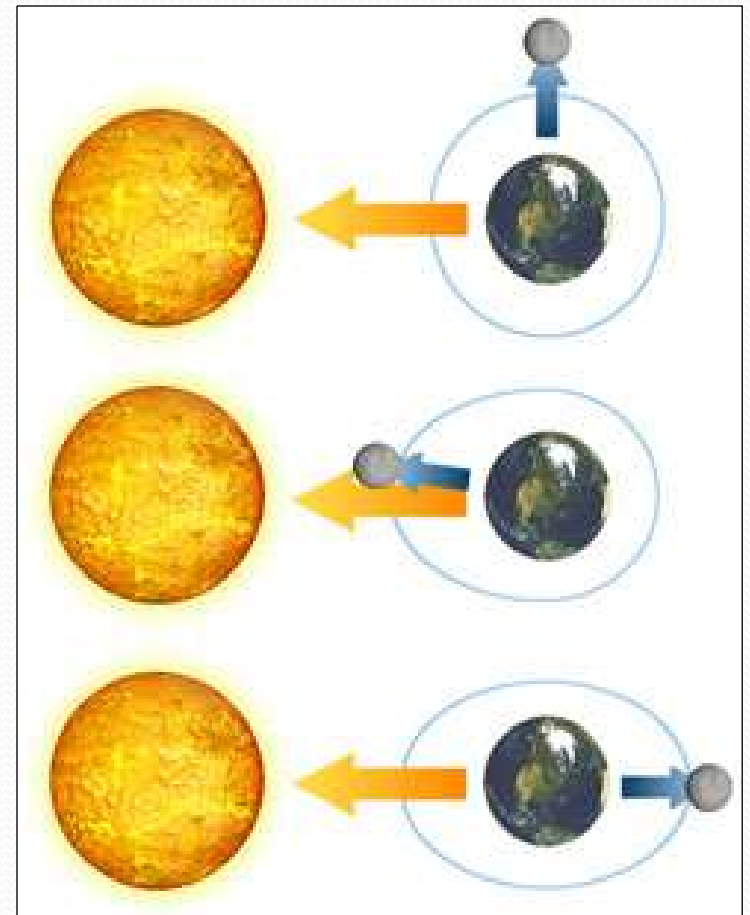


In places between the tidal bulges, low tide is occurring along the coastlines.



Sun's Gravity and Tides

- The Sun is so large that its gravity also affects tides.
- At times, the Sun and Moon pull together on Earth's waters in the same direction.
- At other times they pull in different directions.



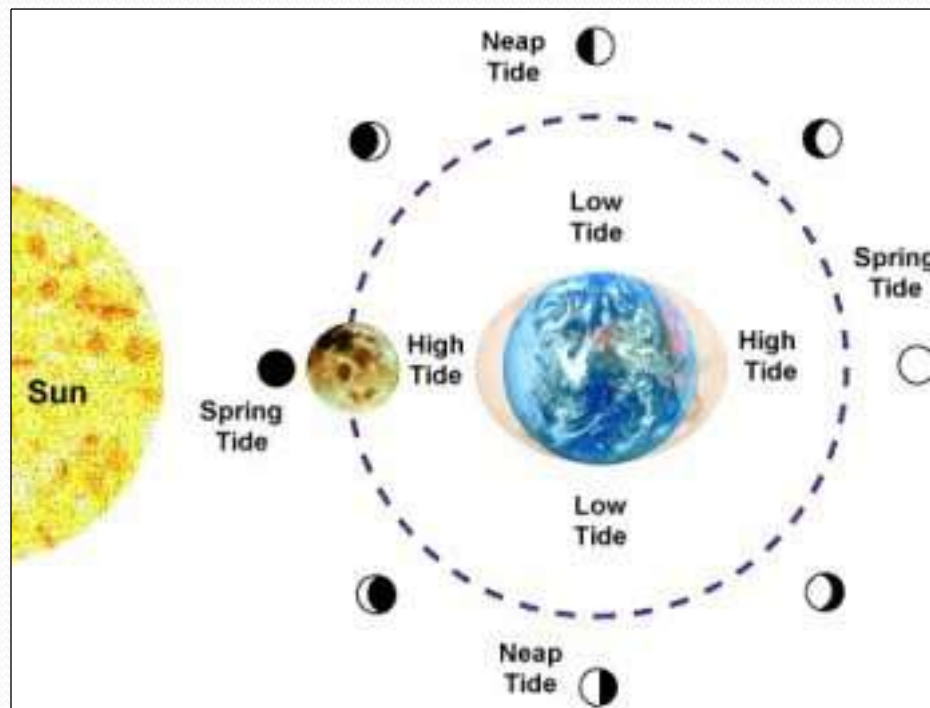


Think, Pair, Share:

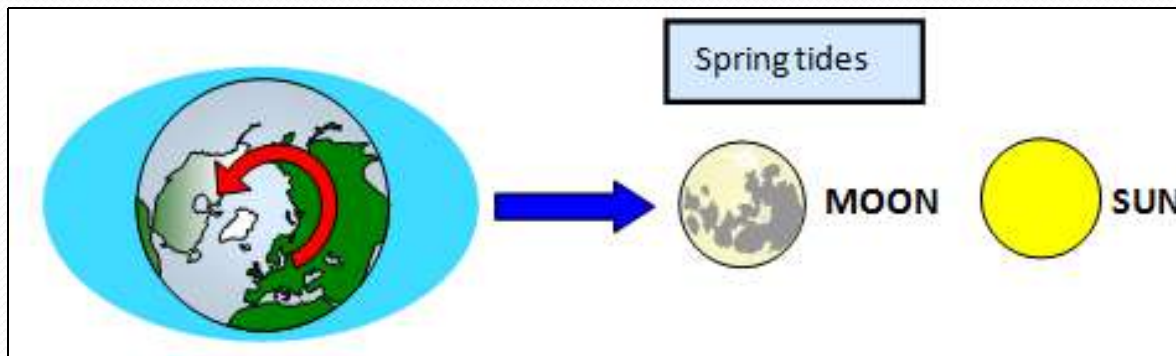
Why does the Moon's gravity affect tides more than the Sun's gravity?

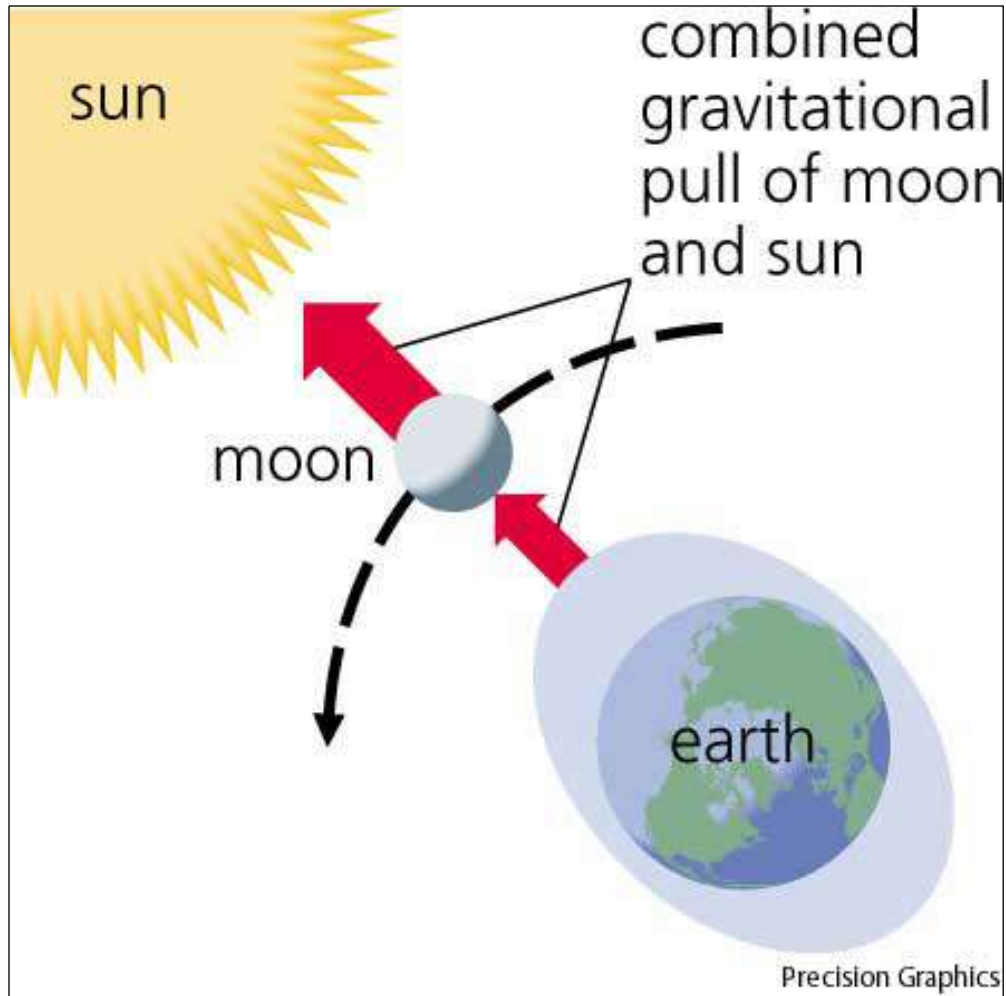
Even though the Sun is much larger than the Moon, the Moon is much closer to the Earth than the Sun.

Changes in the positions of Earth, the Moon, and Sun affect the height of tides during a month.

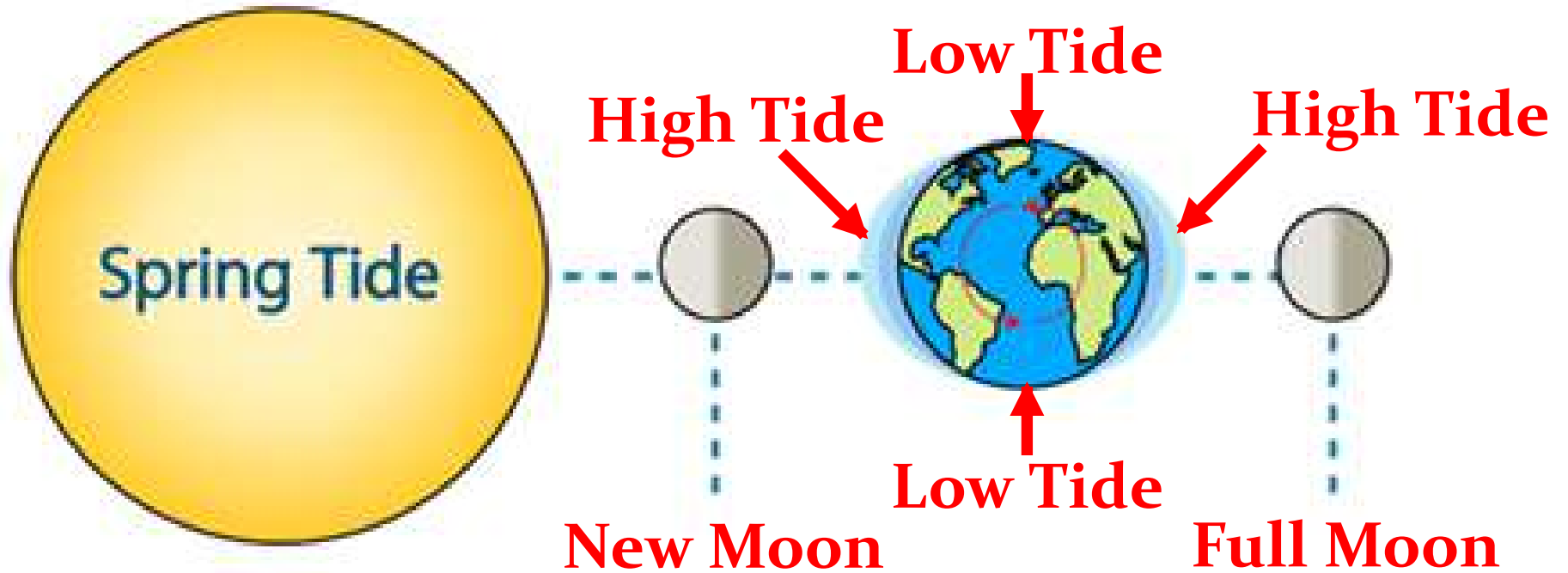


- Spring tides occur 2 times a month, during a full and new moon when the Earth, Sun, and Moon are lined up.
- Spring tides are higher and lower than normal tides.



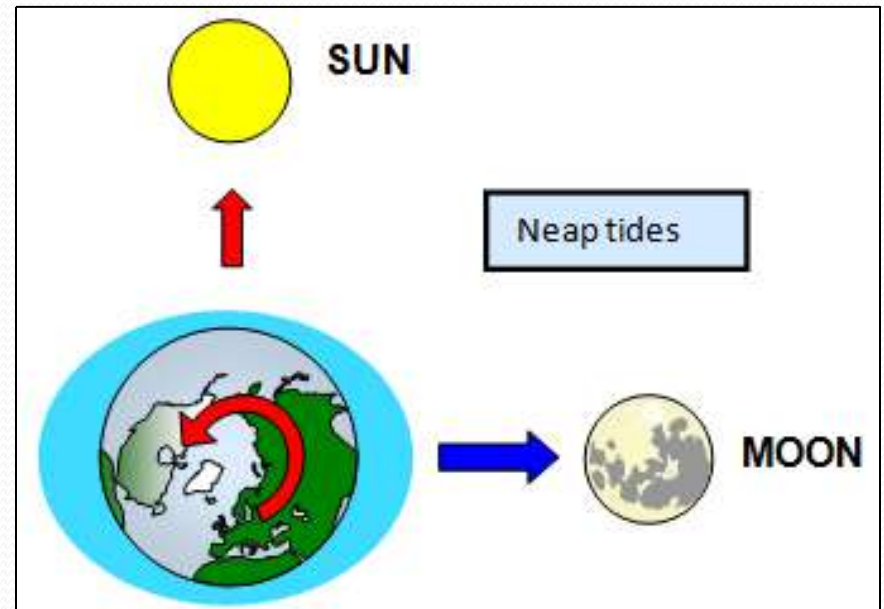


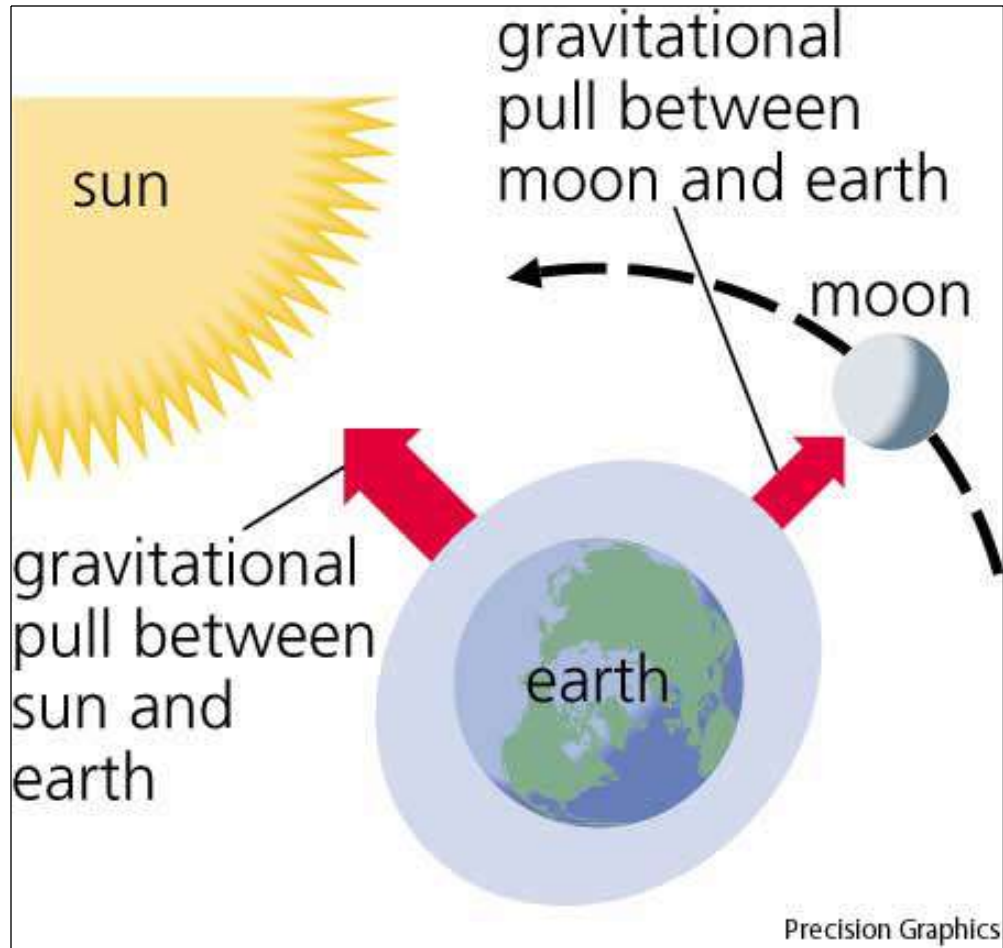
Spring Tide



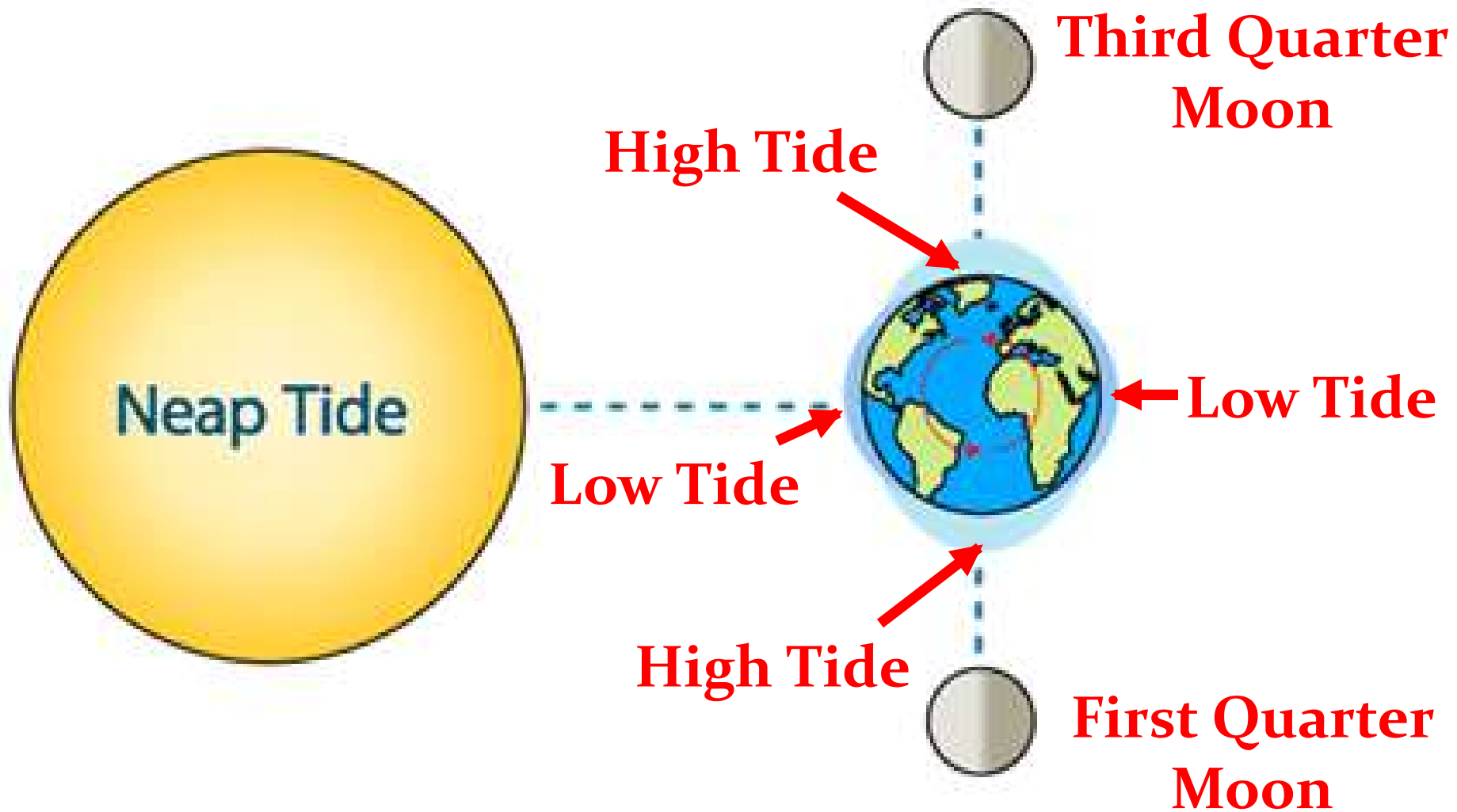
Spring Tide

- Neap tides occur in between spring tides, at the first and third quarters of the Moon when the Sun and Moon pull at right angles to each other.
- Neap tides are not as high or low as normal tides.





Neap Tides



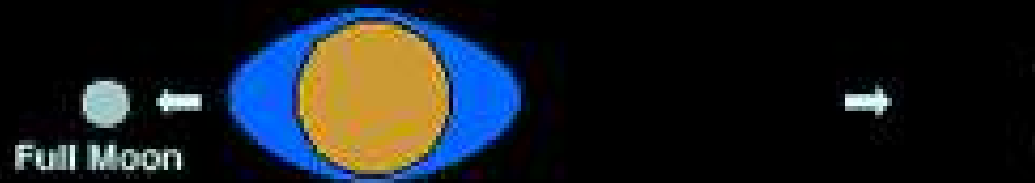
Neap Tide

Tides

Spring Tide:
new moon



Spring Tide:
full moon



Neap Tides:
quarter phases of moon



The Moon has a 70% effect on the tides and the Sun has a 30% effect on the tides



http://ww2.valdosta.edu/~cbarnbau/astro_demos/tides/neap_sp.html

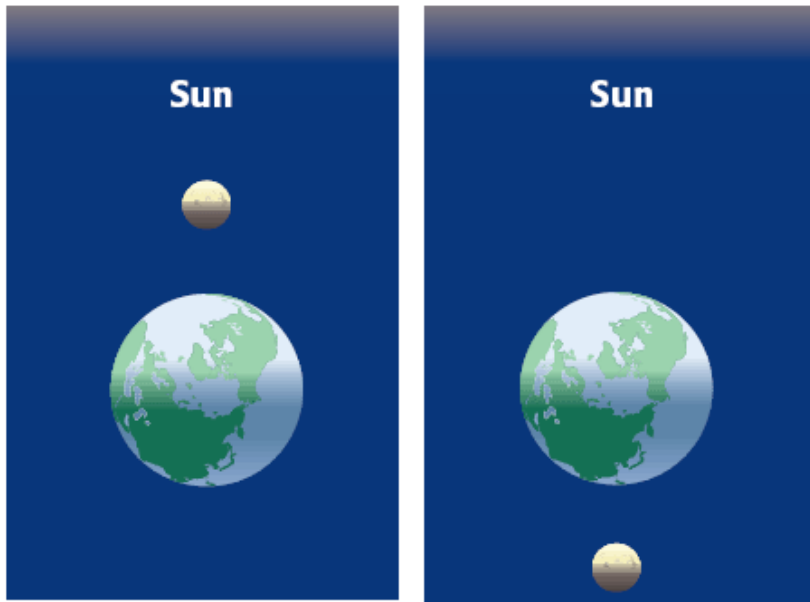
Spring and Neap Tides



Think, Pair, Share:
Compare and Contrast
Spring Tides and Neap
Tides

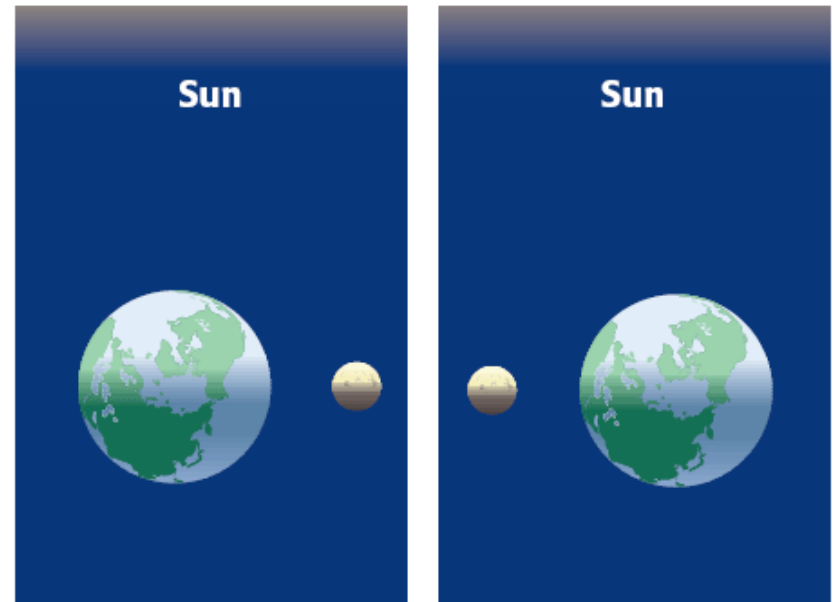
Tidal Variations: Spring Tides; Neap Tides

Spring Tides During the full moon and the new moon, the sun, Earth, and the moon are aligned. The gravitational force of the sun reinforces the high tides created by the gravitational force of the moon.




“Strong Tides”

Neap Tides The sun and the moon are at right angles to each other relative to Earth. In this arrangement, the gravitational forces of the sun and moon work against each other.



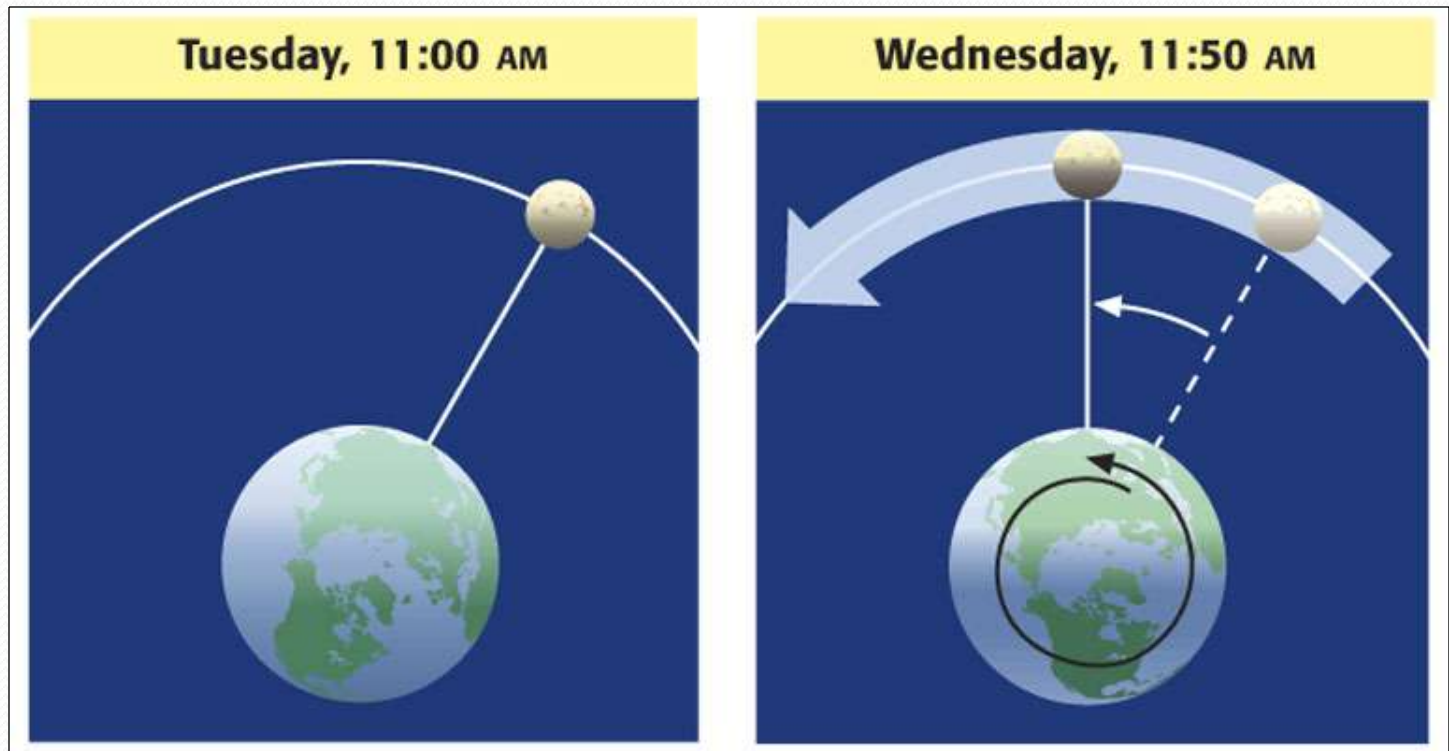
“Weak Tides”



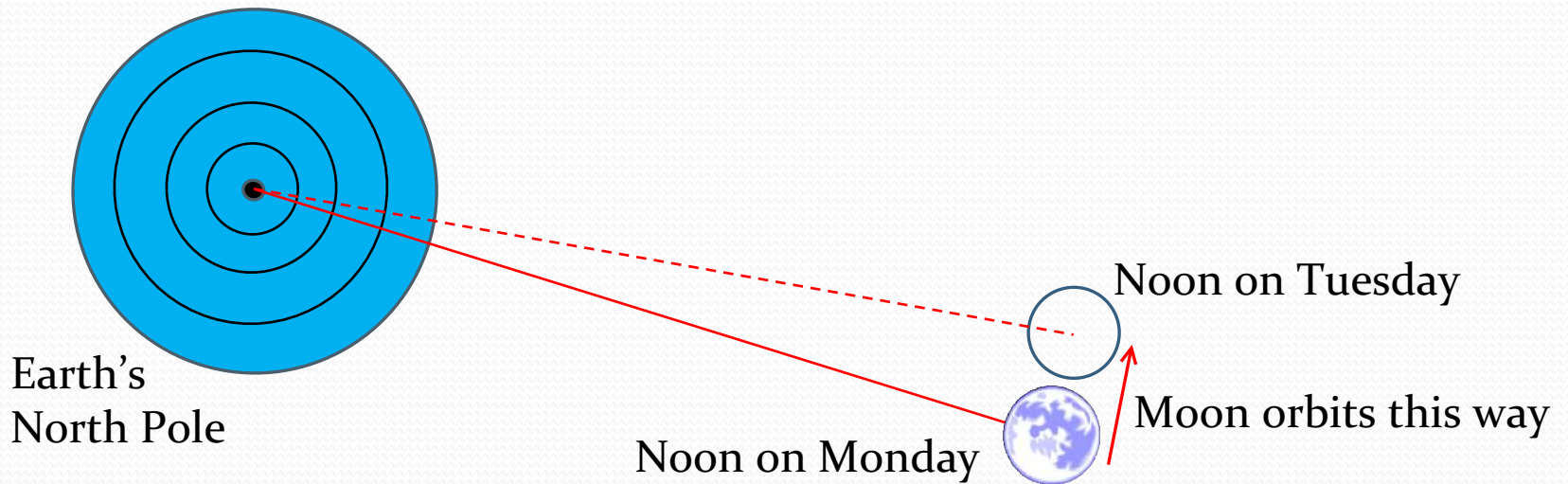
On Saturday at the beach, the water is highest at 11:15 a.m. On Sunday, the water is highest at 11:55 a.m. Why does the tide come in later?

The moon has moved a little, so the beach is closest to the moon at a later time.

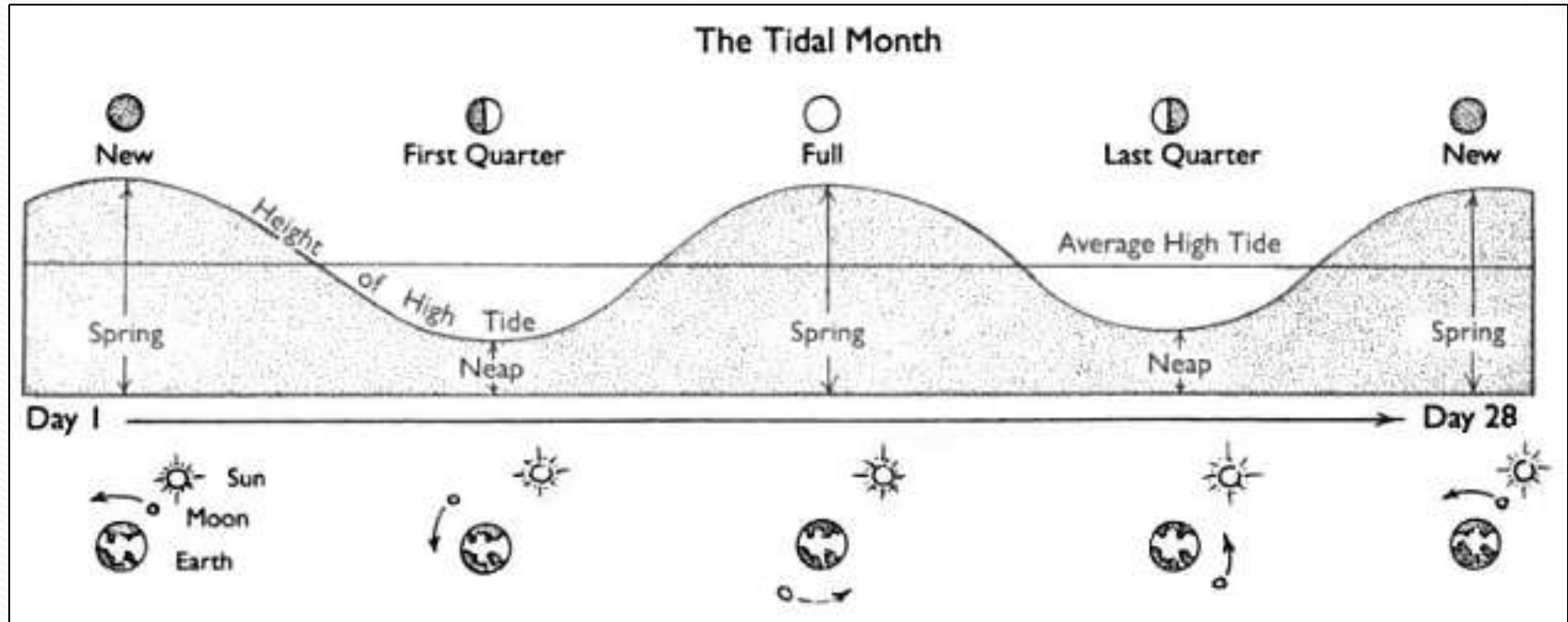
Tides occur at different times each day because the Earth rotates more quickly than the moon revolves around the Earth.



Another view...



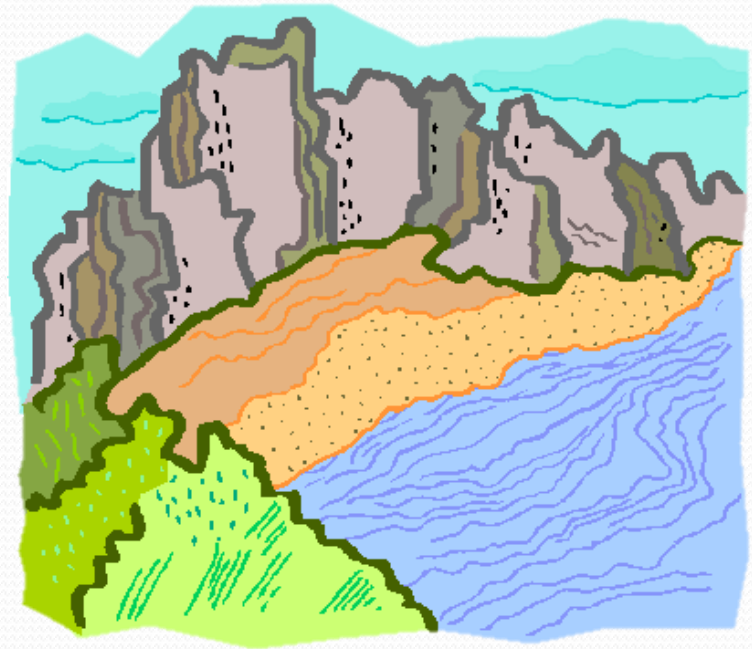
Tides at a Monthly Glance



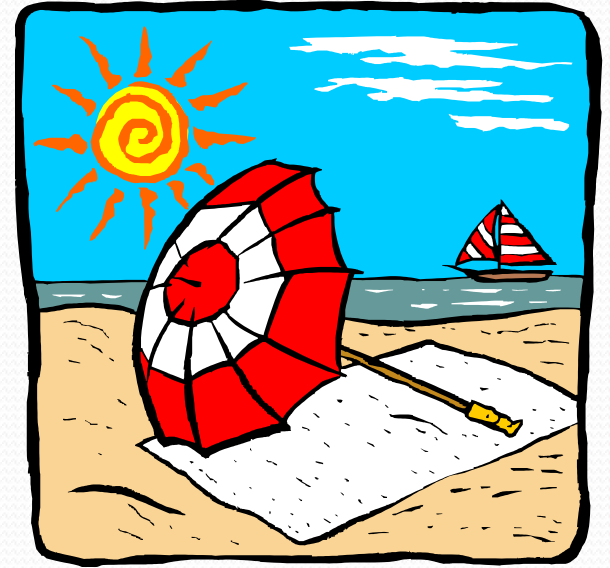
Study Jams Video




Show What You Know...



You arrive at the beach at 9:00 A.M. You lay a towel on the sand, and then you run 30 steps to reach the water's edge. By 3:00 P.M., the water has almost reached your towel. What do you think happened?



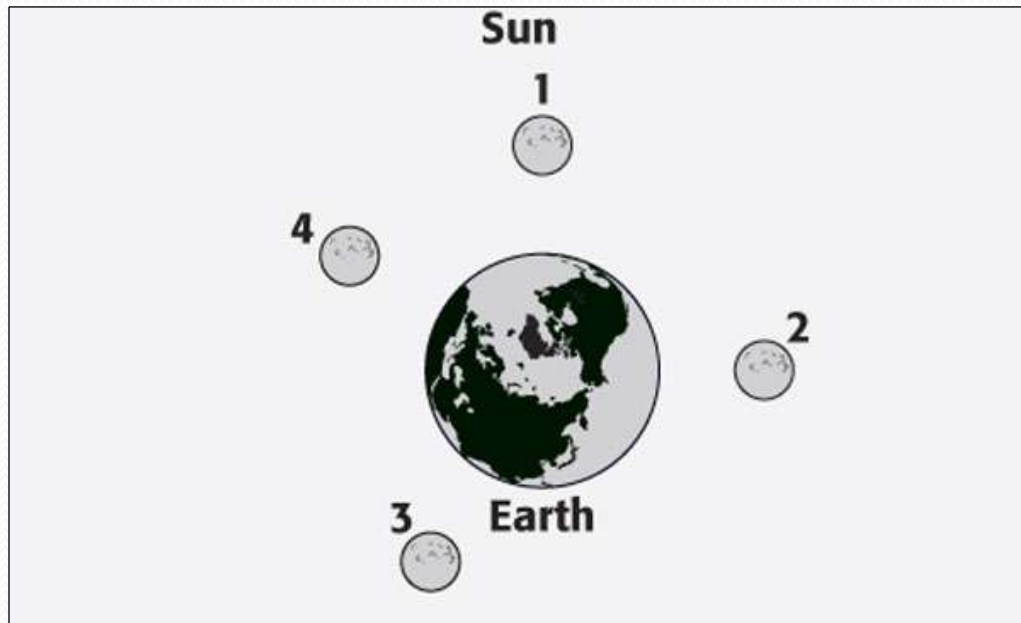
The tide came in.



You're on the beach at midnight. The moon is right overhead. Is the tide low or high? Why?

High tide because the moon is closest as it can be

The diagram below shows the possible positions of the moon relative to the Earth and sun during different tidal ranges. Use the diagram below to answer the questions that follow.



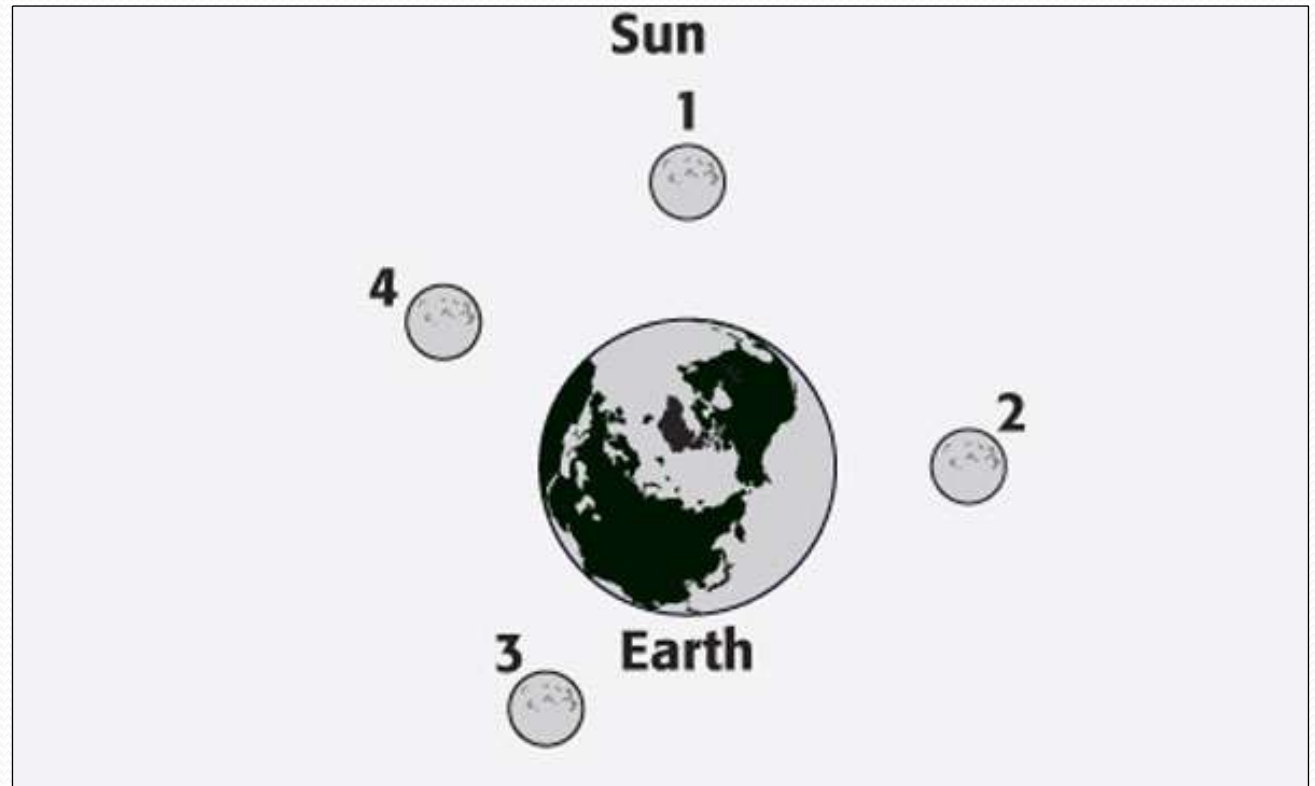
At which position would the moon be during a neap tide?

A. 1

B. 2

C. 3

D. 4



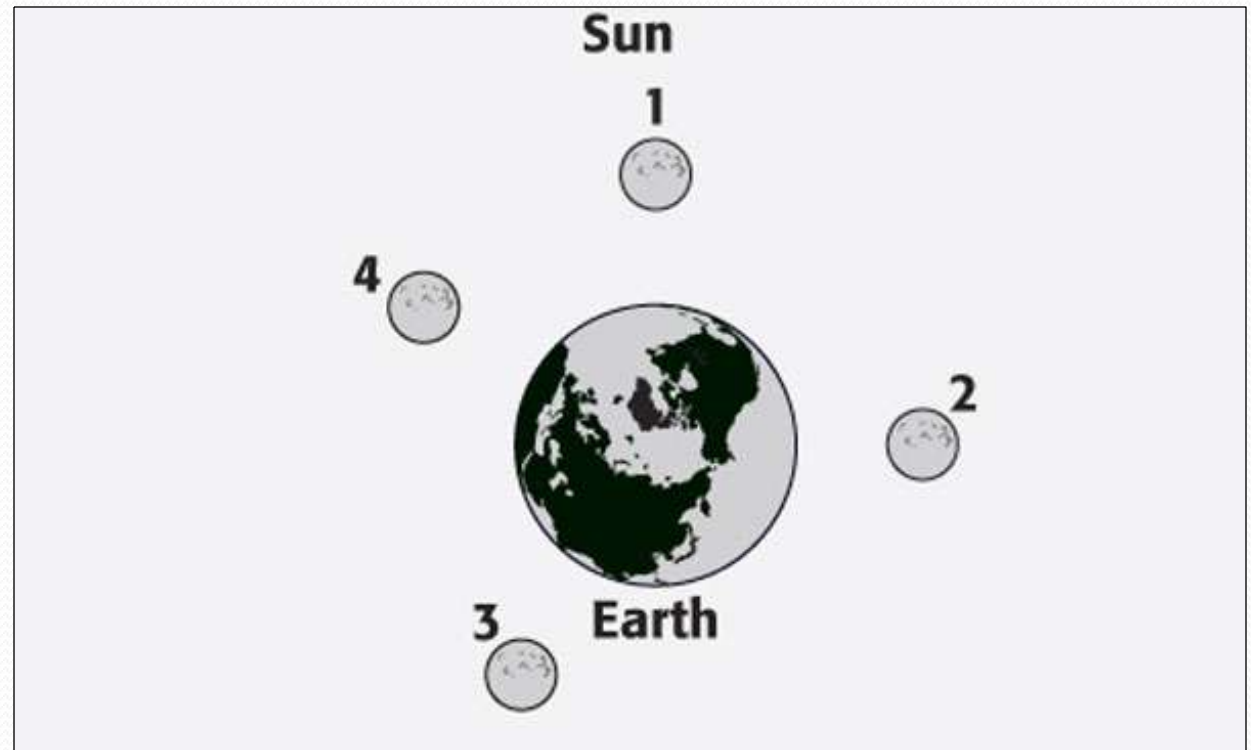
At which position would the moon be during a spring tide?

A. 1

B. 2

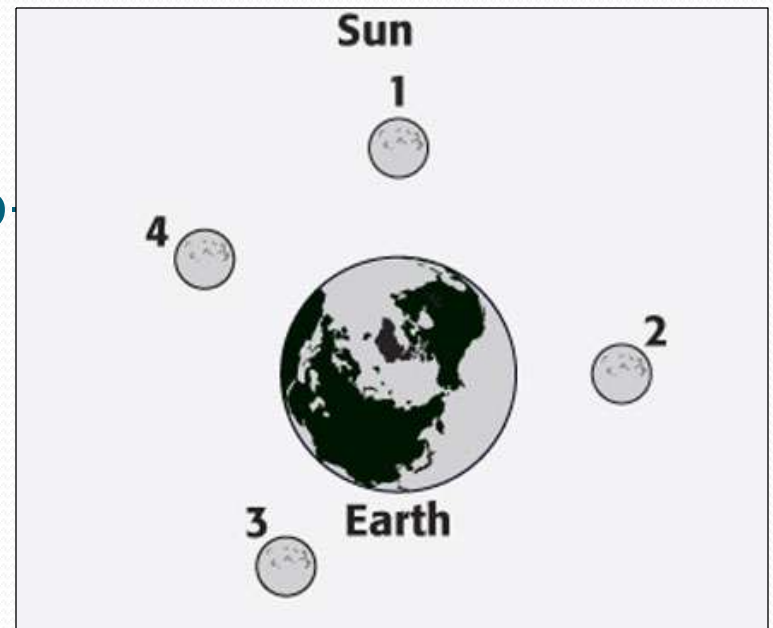
C. 3

D. 4



The tidal range would be greater when the moon is at position 3 than when the moon is at position 4 because...

- A. position 4 forms a 90° angle with the sun and the Earth.
- B. position 3 is very near a neap-tide position.
- C. position 3 is very near a spring-tide position.**
- D. position 4 is very near a spring-tide position.



Tides Summarizer

Tides Summarizer

Name _____ Date _____ Period ____

1. What causes Tides?

2. Label Spring Tide and Neap Tides in the diagram.

3. Which type of tide has the highest high tide and the lowest low tide? Why?

