Ebb and Flow

Engage

Watch the " Fall and rise of the tides in the Bay of Fundy" video
https://www.youtube.com/watch?v=OP0cpXpw8yk
(You may want to turn off the sound)

1. What do you notice?

2. What do you wonder?

Watch the video, "Hammer vs Feather," video at
https://www.youtube.com/watch?v=KDp1tiUsZw8

1. Where was this video filmed? _____

2. What force caused the hammer and feather to drop to the moon's surface? _____

3. What force causes things on the Earth to drop to the ground?

_____

4. If the moon has gravity and the earth has gravity, do you think the Sun has gravity? _____

5. Why do the planets in our solar system stay in the solar system and not fly away? _____

Explore

Materials: (per table) small box or piece of cardboard (8 ½" x 11") Push pin, large paper clip, 6 small round magnets, Orbit of the Moon Sheet

Part A

What To Do:

1. Place the Orbit of the Moon Sheet on the cardboard and place the large paper clip over the solid dot in the center of the Earth.
2. Place the push pin through the paper clip and into the cardboard at the solid dot. Make sure the paper clip can move freely.
3. Separate the magnets into a stack of 2 and a stack of 4.
4. Place the stack of 2 magnets on the Orbit of the Moon circle and the stack of 4 magnets about 4 cm outside the circle.
5. Move the stack of 2 magnets around the circle and observe the movement of the paper clip.
6. Take away the stack of 2 magnets and note any movement of the paper clip toward the stack of 4 magnets.

Observations:

1. What did the paper clip do when the stack of 2 magnets went around the circle? _____

2. Does the stack of 4 magnets seem to have any effect on the paper clip? _____

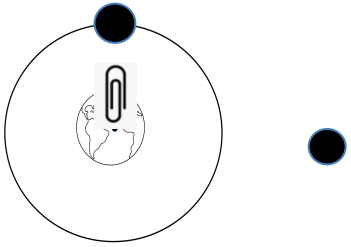
Questions:

1. What does the circle on the paper represent? _____
2. What does the stack of 2 magnets represent? _____
3. What does the stack of 4 magnets represent? _____
4. What on the earth goes up and down every day? (Think about the first video.) _____
5. What does the paper clip represent? _____
6. What does the pull of the magnets represent in this model?

_____

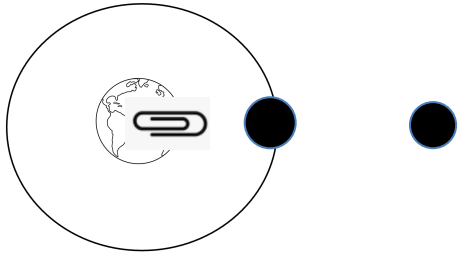
7. Why do you think the stack of 2 magnets had a greater effect on the paper clip than the stack of 4 magnets? _____

Part B
What To Do:
1. Line up the stack of 2 magnets, the paper clip, and the stack of four magnet as shown in the drawing below.
2. Label the Moon and the Sun in the drawing.
3. Answer the questions below.



Questions:
1. In the drawing the moon and the sun are pulling on the ocean water (paper clip). Which object do you think has the most pull on the ocean water? _____
2. Why do you think this is true? _____

Part C
What To Do:
1. Line up the stack of 2 magnets, the paper clip, and the stack of four magnets in a line, as shown in the drawing below.
2. Label the Moon and the Sun.
3. Answer the questions below.



Questions:
1. In the drawing the moon and sun are pulling on the ocean water. Do you think the pull would be stronger or weaker than the picture in Part B?

_____

2. Why do you this this is true? _____

OCEAN TIDES

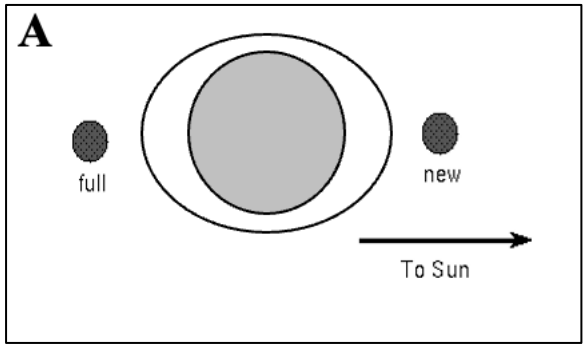
Explain

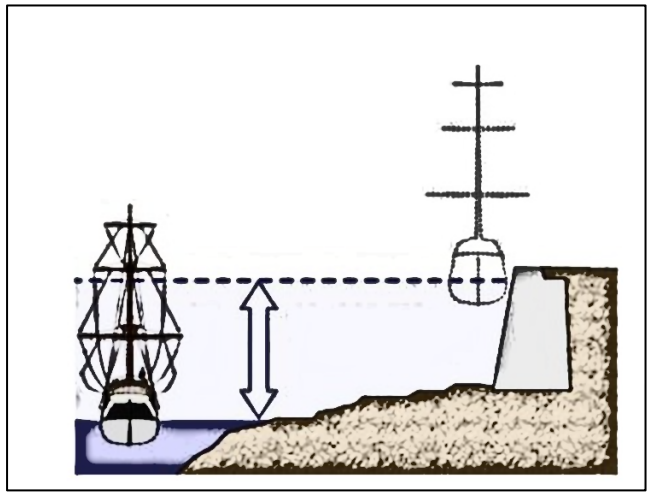
DAILY TIDES

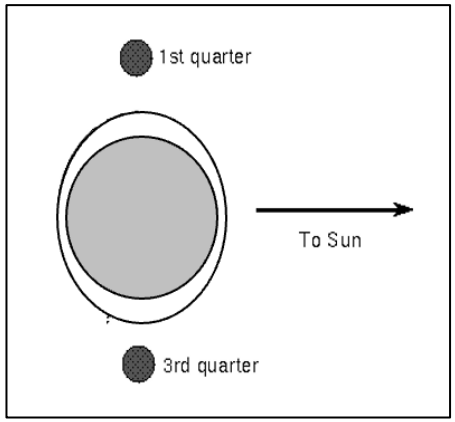
NEAP TIDES

SPRING TIDES

Color and cut out the pictures below. Glue them on the back of the flaps.







Watching a Video Protocol

1. Read through the questions below and then Watch the video, "What Causes Tides?" from https://www.youtube.com/watch?v=tcGEjzt_4is
2. Just listen and watch the first time through.
3. Read through the questions again and watch the video again.
4. This time fill in the blanks.

What Causes Tides?

1. The tides cause the ocean to rise and fall _____ each day.
2. The water's highest point is called _____ tide.
3. The water's _____ point is called low tide.
4. The _____ is the main cause of tides in the Earth's _____.
5. As the moon's _____ pulls on the Earth's water, the water _____ in the direction of the moon.

Use the words in the Word Bank to complete the following.

WORD BANK				
Neap	gravitational	greatest	moon	high
Spring	low	Sun		

Ocean tides are caused by the _____ pull of the _____ and the _____. The moon has the _____ effect on the tides. When the Sun, moon and earth are in a straight line, we have _____ tides. When the Sun, moon and earth are at right angles we have _____ tides. Spring tides are especially _____ tides while neap tides are especially _____ tides

Elaborate

Graph the following Tidal Readings from Galveston Bay, Texas.

Day	High Tide Reading
1	3.0
2	1.5
3	1.9
4	4.0
5	2.5
6	1.5
7	2.0
8	3.5

Questions:

1. Which day was probably a full moon? _____
2. Why do you think so? _____
3. Which day was probably the 3rd quarter? _____
4. Why do you think so? _____

Evaluate

Name _____ period _____

EXIT TICKET

Ebb and Flow

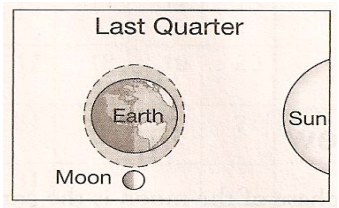
1. What is **true** during a spring tide?

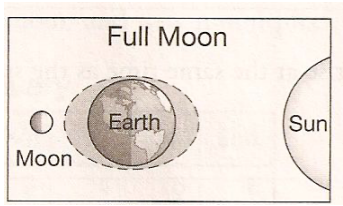
   A. The moon is in a straight line with the earth and the Sun.
   B. The moon is waning toward a new moon.
   C. The moon is waxing toward a full moon.
   D. The moon is at a right angle to the line between Earth and the Sun.

2. Which of these is **never** true during a neap tide?

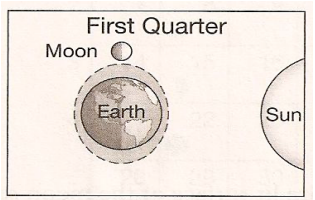
   A. The moon is in a straight line with the earth and the Sun.
   B. The moon is waning toward a new moon.
   C. The moon is waxing toward a full moon.
   D. The moon is at a right angle to the line between Earth and the Sun.

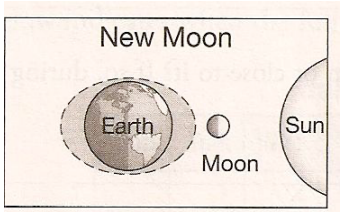
3. Circle the diagram that shows a spring tide.





4. Circle the diagram that shows a neap tide.





ORBIT OF THE MOON