Newton's Third Law of Motion

Engage

Bring up the video "Newton's Cradle" found at https://www.youtube.com/watch?v=0LnbyjOyEQ8 but don't start it until you have made the predictions below.

1. Predict what will happen when one ball is lifted and allowed to swing and hit the other balls.

_____

2. Predict what will happen when two balls are lifted and allowed to swing and hit the other balls.

_____

3. Predict what will happen when three balls are lifted and allowed to sing and hit the other balls.

_____

4. What happened in each instance?

_____

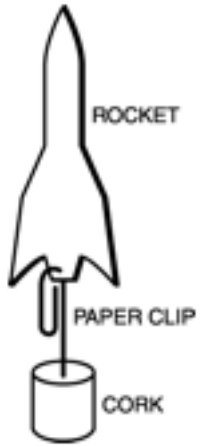
_____

Explore

Materials: vinegar, baking soda, water bottle, beaker with measurements, medicine cup with measurements, tissue, spoon, rocket pattern, index card, cork, paper clip, tape

What To Do:

1. Use the medicine cup to measure 2 ounces of baking soda.
2. Place it in the tissue and roll it up to a size that will fit into the water bottle opening. But don't put it in the bottle yet.
3. Place 100 mL of vinegar in the water bottle.
4. Use the rocket pattern to trace a rocket on the index card.
5. Unbend the paper clip one time and push it into the cork. Tape the rocket pattern to the paper clip.
6. Go outside with your teacher.
7. One group at a time will launch their rocket by putting the baking soda packet into the bottle and putting the cork firmly into the bottle.
8. For safety everyone will stand back from the launch pad and watch.
9. After each group has launched their rocket gather up all materials and return to the classroom.



Questions:

1. What happened inside the water bottle? _____

_____

2. What did the mixing of baking soda and vinegar produce?

_____

3. How did this help the rocket launch? _____

_____

4. The gas from the baking soda and vinegar pushed on the rocket and the rocket pushed back. Which had the stronger force?

_____

Newton's Third

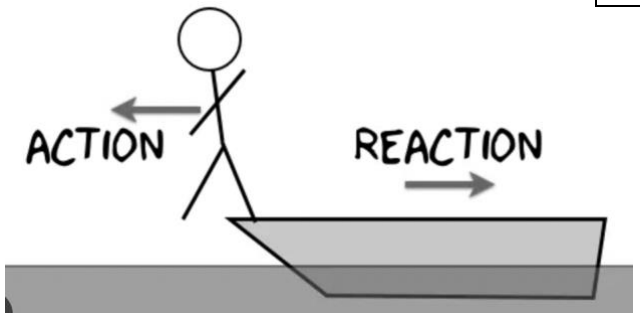
Explain

Isaac Newton

Laws of Motion

Action-Reaction

Elaborate



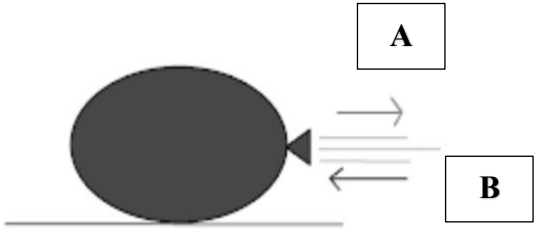
Newton's Third Law of Motion is illustrated by using force pair arrows. Note the arrows in the picture above. They are the same size but pointing in different directions.

1. What is the action in the picture above?

_____

2. What is the reaction in the picture above?

_____



3. Looking at the picture of the balloon above, what do the three lines leaving the balloon represent?

_____

4. What does arrow A represent?_____

5. What does arrow B show the balloon doing? _____

6. Which arrow shows the action? _____

7. Which arrow shows the reaction? _____

8. Someone has just placed the book on the table. What force is pulling it down? _____

9. What force is pushing it up?

_____

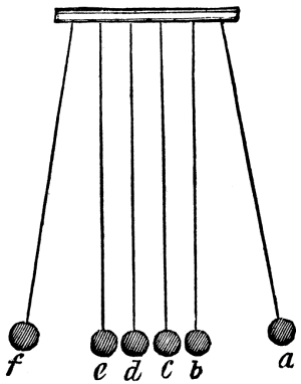
10. What is the action in this picture? _____

11. What is the reaction in this picture? _____

12. Draw and label the force pair arrows that show the action and reaction.

13. How long should the arrows be? _____

14. Looking at the picture of the Newton's Cradle to the right, if the ball at letter a is where the action occurred, what was the action?_____



15. At which letter did the reaction occur?

_____

16. Describe the action-reaction. _____

_____

17. Draw and label the force pair arrows that represent the action-reaction.

18. How long should the arrows be? _____

Evaluate

Name _____ period ____

Exit Ticket

Newton's Third Law of Motion

1. Which of the following is an illustration of Newton's third law of motion?

A. A person flying through a windshield after a crash.
B. A boat moving backward when someone step off of it.
C. A car speeding down a hill.

2. According to Newton's Third Law, if someone places a book on a table

A. the mass of the book is the same as the mass of the table.
B. the pull of gravity on the book will change.
C. the force that is pushing up is the same amount as the force pushing down.

3. Which of the following is Newton's third law?

A. Objects in motion will remain in motion.
B. Force equals mass times acceleration.
C. For every action there is an equal and opposite reaction.

4. When a rocket ship blasts off what is the action?

A. The lift off of the rocket.
B. The pushing out of propellants against the earth.
C. The landing of the rock on the moon.