Flicking With Force

Summary

Balls of varying weights are used to discover the results of force applied to an object.

Time Frame

1 class periods of 30 minutes each

Group Size

Small Groups

Materials

For each group: 1 ping pong ball and golf ball 1 cm/in ruler Optional (for entire class): spherical objects of varying weights (such as tennis ball or basketball)

Background for Teachers

Force is anything that tends to change the state of rest or motion of a an object (NY Public Library Science Desk Reference, 274). forces cause changes in the speed or direction of the motion of an object. the greater the force placed on an object, the greater the change in motion. The more massive an object is, the less effect given force will have upon the motion of the object. This activity uses working definitions. A working definition is a definition determined by students. It may or may not be completely correct; however, it should be used and corrected by the students as they gain more experience with and understanding of the concept. The strength of a woking definition is that it is an indicator of student understanding and can be used by the teacher to guide further experiences.

Intended Learning Outcomes

1. Make observations 2. Conduct investigations 3. Explain science concepts 4. Cite examples of how science affects life.

Instructional Procedures

1. Give each group one ping pong ball, one ruler, and one golf ball. 2. Instruct students to predit and observe what happens when force is applied to an object, and compare the relative effects of a force of the same strength on objects of different weight by flicking the ping pong ball gently with a finger and measuring the distance the ball covered with a ruler. Record the distance in centimeters on the force chart (see chart below). Instruct the students to flick the ping pong ball as hard as possible with one finger and measure and record the distance the ball covered on the force chart. 4. Repeat steps 2 and 3 using the golf ball. 5. Using the information recorded on their charts, have students compare data and draw conclusions about force applied to objects and it's outcome in direction of the object. 6. Allow students time to explore with force applied to objects by haing available other sperical objects of varying weights. 7. Gather students together and discuss what they have discovered. The following questions may be used to guide the discussion. *what did you discover about the ping pong ball as a force in motion? *What did you discover about the golf ball as a force in motion? *Which ball produced the greater direction/distance and why? *Did the balls move farther when a greater or lesser force was applied to the balls? *How would the speed of the object and distance change if force had increased or decreased in strength? *What does weight have to do with force? 8. Guide students in making a list of forces they see every day (examples could include batting or kicking a ball, strong winds and breezes blowing, flowing water). 9. Guide students in defining that the greater the force applied to an object, the greater the change in speed or direction of the object.

Strategies for Diverse Learners

Using a baseball bat, kickball, and softball, have students predict which ball they think will go the greater distance. Why? What would happen if the bat were exchanged for a golf club? Allow students to explore with hitting the balls of differing weights using the bat and golf club.

Extensions

Ask students to make a model of force applied to an object and its outcome to demonstrate for the class.

Assessment Plan

1. Ask students to write a paragraph telling what would happen if a golf team decided to practice with a golf club and a ping bong ball instead of a golf club and a golf ball. 2. Ask students to explain the relationship between force applied to an object and the speed or direction of the object. 3. Knowing what we now know about force and outcome, design and draw a paddle you would use to win a ping pong tournament.

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