Newtons Third Law Review

Name: _____
Date: _____

Critical Reading

Read this passage from the text and answer the questions that follow.

Action and Reaction

Newton's third law of motion states that every action has an equal and opposite reaction. This means that forces always act in pairs. First an action occurs, such as two skateboarders pushing together. Then a reaction occurs that is equal in strength to the action but in the opposite direction. In the case of the skateboarders, they move apart, and the distance they move depends on how hard they first pushed together.

You might think that actions and reactions would cancel each other out like balanced forces do. Balanced forces, which are also equal and opposite, cancel out because they act on the same object. Action and reaction forces, in contrast, act on different objects, so they don't cancel out. In fact, they often result in motion.

Questions

1. What is Newton's third law of motion?

2. Describe an example of an action and reaction that result in motion.

3. Compare and contrast action-reaction forces and balanced forces.

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Multiple Choice

Circle the letter of the correct choice.

1. When an action force occurs, the reaction force is always
    1. in the same direction as the action force.
    2. equal and opposite to the action force.
    3. applied to the same object as the action force.
    4. two of the above
2. When you stand on the floor, the force of your body pushing down on the floor is
    1. matched by the floor pushing up on your body.
    2. less than the reaction force applied by the floor.
    3. a reaction to the floor pushing up.
    4. none of the above
3. When a kangaroo jumps, the kangaroo's action force acts on the ground and the reaction force
    1. is exerted by the ground.
    2. acts on the kangaroo.
    3. is greater than the action force.
    4. two of the above
4. If the following objects are all moving at the same velocity, which of the objects has the greatest momentum?
    1. pea
    2. marble
    3. volleyball
    4. bowling ball
5. Momentum is directly related to
    1. mass.
    2. velocity.
    3. distance.
    4. two of the above

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Matching

Match each definition with the correct term.

Definitions

_____ 1. how to calculate momentum

_____ 2. SI unit for momentum

_____ 3. equal and opposite forces that act on different objects

_____ 4. combined momentum of objects remains the same when an action-reaction occurs

_____ 5. property of a moving object that makes it hard to stop

_____ 6. equal and opposite forces that act on the same object

_____ 7. every action has an equal and opposite reaction

Terms

a. momentum

b. Newton's third law of motion

c. balanced forces

d. kg • m/s

e. law of conservation of momentum

f. action-reaction forces

g. mass × velocity

Fill in the Blank

Fill in the blank with the appropriate term.

1. Two objects with the same mass have the same momentum only if they also have the same _____.
2. If a very massive object is stationary, its momentum is _____.
3. A 20-kg object moving at a velocity of 3 m/s has a momentum of _____.
4. For every action, there is an equal and _____ reaction.
5. Action and reaction forces are not balanced forces because they act on _____ objects.
6. When moving objects collide, their combined _____ is conserved.
7. If you double the mass of a moving object, the object's momentum _____.