

## Forces & Motion

### 9. Cannon and Cannon Ball (3/17)

[Newton's Laws of Motion: 3<sup>rd</sup> Action/Reaction]

**Fact:** In the Ball and Slider activity, you experimented with Newton's Second Law of motion.

**In your notes,** copy the following section of the outline.

B. Second law— $F = ma$

1. a **force** acting on an object is determined by the **mass** of the object and the **acceleration** of the object

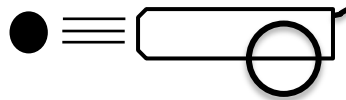
- a) as mass increases, acceleration decreases
- b) as force increases, acceleration increases

There were two ways to push the slider farther. First, you could increase the mass of the ball. A greater mass creates a larger force when it collides with another object. A ping pong ball is larger in volume than the steel spheres, but its mass is smaller. This means the force it applies to the slider is less, so the slider doesn't move as far.

A second way to push the slider farther is to increase the acceleration of the steel sphere. You could do this by making the ramp steeper or by pushing the sphere down the ramp.

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**In your notes,** draw a cannon and a cannon ball.



**Question:** Newton's Third Law of Motion says that for every action there is an equal and opposite reaction. The cannon fires the cannon ball forward. If the **action** is the cannon pushing the cannon ball forward, what is the **reaction**?

When you believe you have completed the activity thoroughly, call your teacher or an assistant over to check your progress.

If the teacher and assistants are busy helping others, go on to the next activity.