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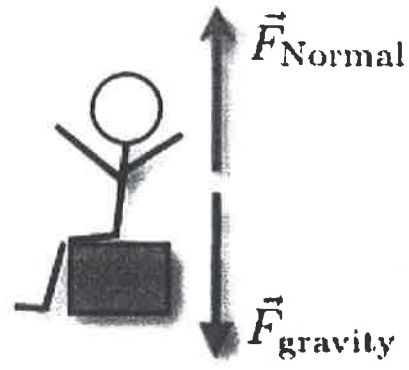
### Newton's Third Law of Motion

#### Why?

Forces result from interactions. Today we will explore the forces that exist whenever objects interact with each other.

### Newton's Third Law of Motion

According to Newton, whenever objects A and B interact with each other, they exert forces upon each other. When you sit in your chair, your body exerts a downward force on the chair and the chair exerts an upward force on your body. There are two forces resulting from this interaction a force on the chair and a force on your body. These two forces are called *action* and *reaction* forces and are the subject of Newton's third law of motion. Formally stated, Newton's third law is:



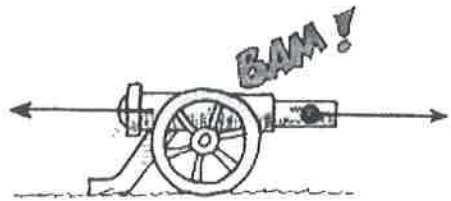
**For every action, there is an equal and opposite reaction.** (opposite direction)  
(equal in magnitude or size)

All forces come in pairs. Action and reaction pairs follow a simple general rule: "If the ACTION is A acting on B, then the reaction is B acting on A."

The following illustrations show several action and reaction forces:

The block contains three separate illustrations. The first shows a boy pushing a wall to the right with a force of 5 N, and the wall pushing the boy to the left with a force of 5 N. The second shows a hammer hitting a wooden stake with a force of 200 N down, and the wooden stake pushing the hammer up with a force of 200 N against the hammer. The third shows a boulder being pulled down by Earth with a force of 5000 N, and the boulder pulling Earth up with a force of 5000 N.

Identify the action or reaction force of each situation. (Remember to apply the rule above)



**Action:** The cannonball pushes the cannon to the left with a force of 3500 N.  
**Reaction:** The cannon pushes the cannonball to the right with a force of 3500 N.



**Action:** The wheels of the car push against the road.  
**Reaction:** The road pushes against the wheels of the car.