

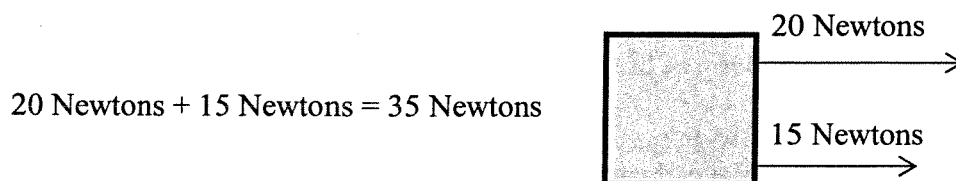
# Balanced & Unbalanced Forces



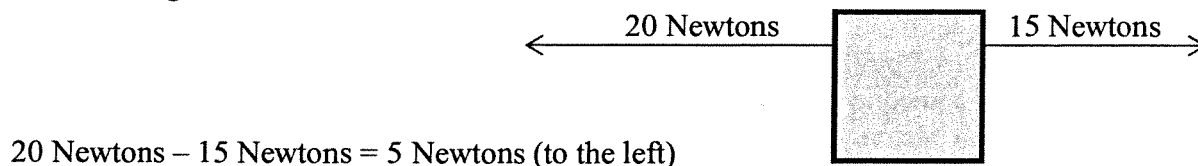
## Reading for Information

A push or pull on an object is a force. We are surrounded by forces acting on objects all the time – some we can see clearly and identify, and others are unseen. Usually, more than one force is acting on an object at the same time. Sometimes these forces are acting in the same direction and other times they are acting at an angle to each other and in opposite directions. Picture a tug-of-war in your mind. If you are stronger, you apply more force to the rope and you pull your opponent across the line. If your opponent is stronger, they will pull you across the line. If you use the same amount of force as your opponent, neither of you wins because the forces are balanced.

Scientists say that the **net force** on an object is the combination of all the forces that are acting on that object. To find the net force on an object when the forces are acting in the same direction, you just add them together.



To find the net force when the forces are acting in opposite directions, you need to subtract the smaller force from the larger force.



When the net force on an object is zero, the two forces are said to be balanced. **Balanced forces** don't cause any change in the motion of an object. Balanced forces are equal and in opposite directions. When balanced forces act on an object it doesn't necessarily mean that the object isn't moving. If the object is not moving, and balanced forces are applied, then the object will remain at rest. If the object is in motion and balanced forces are applied, then the object will continue in its current motion – both in direction and speed. Balanced forces can still have an effect on a stationary object – if you were pushing on an empty pop can on the lunchroom table and so was your friend with equal force – the can might not move but would probably be crushed from the opposing forces.

When the net force on an object is greater than zero, the forces are said to be unbalanced. **Unbalanced forces** cause the object to move or change its current motion. A stationary object will begin to move and a moving object will change the speed or direction of its motion.

Remember that the net force that occurs when two forces are applied in the same direction will combine by adding together. The net force created when two forces are applied in opposite directions can be found by subtracting the two forces. If the net force is zero, no change will happen to the object's motion. If there is an unbalanced force – meaning there is some amount of net force – then the object will move in the direction of the force.



# Balanced & Unbalanced Forces

Name: \_\_\_\_\_

1. What is a force?
2. A combination of all the forces acting on an object is called:
  - A. net force
  - B. unbalanced force
  - C. balanced force
  - D. gross force
3. To find the net force on an object:
  - A. multiply the forces together
  - B. always subtract the amounts of the forces
  - C. divide the larger force by the smaller one
  - D. combine the amounts of the forces acting on the object
4. When the net force on an object is zero, we say that the two forces are:
  - A. cancelled out
  - B. unbalanced
  - C. balanced
  - D. gross
5. When the net force on an object is zero, the object's motion will:
  - A. stop
  - B. not change
  - C. change
6. When forces are balanced, they:
  - A. have no effect on the object
  - B. don't cause any change in the motion of an object
  - C. might crush the object
  - D. both b and c are correct
7. If you are pushing a box toward your friend with a force of 20 N, and your friend is pushing the box toward you with a force of 30 N, what will happen to the box?
  - A. The box will move toward your friend with a force of 50 N.
  - B. The box will move toward your friend with a force of 10 N.
  - C. The box will move toward you with a force of 10 N.
  - D. The box will move toward you with a force of 50 N.
8. If you are pulling on a box with a force of 30 N, and your friend is pushing the box in the same direction with a force of 30 N, what will happen to the box?
  - A. The box will move in the direction of your friend's push with a force of 30 N.
  - B. The box will move in the direction of the push and pull with a force of 60 N.
  - C. The box will not move because the forces are balanced.
  - D. The box will move in the direction of your pull with a force of 30 N.