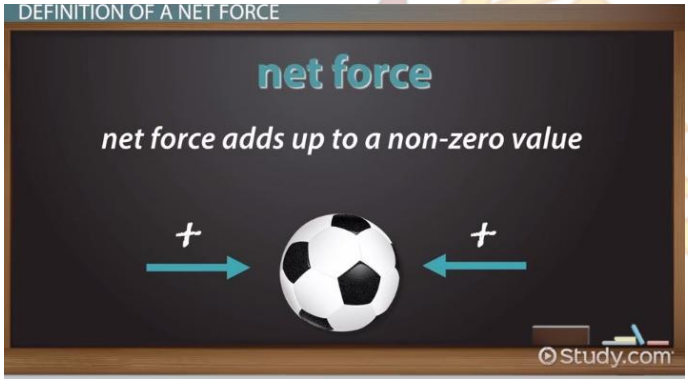
D. Net Force

Net Force: The Sum of All Forces

Have you ever wondered why some objects stay still while others move? It's all about the net force! Let's explore what net force is and how it affects the motion of objects.

What is Net Force?

Net force is the combination of all the forces acting on an object. When you push or pull something, you apply a force to it. If you push a toy car forward while your friend pulls it backward, both forces are acting on the car. The net force is the total of these forces, considering both their size and direction.



Effects of Multiple Forces

Whether an object stays still or moves often depends on the effects of multiple pushes or pulls. Imagine you and your friend are playing tug-of-war with a box. If you both pull with the same strength in opposite directions, the net force is zero. The forces are balanced, and the box stays still.

Zero Net Force

An object at rest typically has multiple forces acting on it, but they result in a zero net force on the object. This means the forces cancel each other out, and the object remains stationary.

Non-Zero Net Force

Forces that do not sum to zero net force can cause changes in an object's speed or direction of motion. For example, when you kick a soccer ball, the force you apply sets the ball in motion. The net force determines how fast the ball moves and in which direction.

Changing Motion

If the forces on an object are unbalanced, meaning they don't cancel each other out, the object will accelerate in the direction of the net force. Acceleration is when an object's

speed changes. For instance, a rolling ball slows down if you apply a force opposite to its motion.

Combining Forces

Sometimes, forces can work together to produce a stronger or weaker effect. When you push a swing at the playground while your friend pushes it from the other side, your pushes combine, making the swing move higher and faster.

Examples of Net Force

1. **Lifting a Backpack**

   When you lift a heavy backpack, the net force is upward, overcoming the force of gravity that pulls it downward.

2. **Sliding on Ice**

   Sliding on ice is fun because the friction is low, and the net force keeps you moving smoothly.

3. **Climbing a Hill**

   When you ride your bike up a hill, the net force is against you. Gravity pulls you down while you pedal to push yourself up.

4. **Flying a Kite**

To fly a kite, you have to balance the force of the wind pushing up with the force of gravity pulling it down.

Net Force and Motion

Understanding net force is essential for understanding motion. It helps us explain why objects move, stay still, or change their speed and direction.

1. What is net force?
   A) The combination of all the forces acting on an object.
   B) The speed of an object in motion.
   C) The force of gravity on an object.

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D) The force of friction on an object.

2. How does net force affect the motion of objects?
   A) It makes objects stay still.
   B) It makes objects move in the opposite direction of the forces applied.
   C) It determines the object's speed and direction of motion.
   D) It has no effect on objects.
3. When forces are balanced, what is the net force on the object?
   A) Zero net force
   B) Positive net force
   C) Negative net force
   D) Unbalanced net force

4. What can happen when the net force on an object is zero?
   A) The object can decelerate
   B) The object can accelerate.
   C) The object can change direction.
   D) All of the above.

5. When forces are unbalanced, what happens to an object's motion?
   A) The object can slow down.
   B) The object changes direction.
   C) The object can accelerate
   D) All of the above

6. What does net force determine in an object's motion?
   A) The object's color.
   B) The object's size.
   C) The object's weight.
   D) The object's speed and direction of motion.

7. If you push a swing at the playground while your friend pushes it from the other side with equal force, what happens to the net force?
   A) The net force is reduced.
   B) The net force stays the same.
   C) The net force is increased.

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D) The net force becomes zero.

8. When forces work together to produce a stronger effect, what happens to the net force?
   A) The net force increases.
   B) The net force decreases.
   C) The net force stays the same.
   D) The net force becomes zero.

9. What is the net force when you lift a heavy backpack?
   A) Zero net force
   B) Infinite net force
   C) Negative net force
   D) Unbalanced net force

10. What force makes a kite fly against the force of gravity pulling it down?
    A) Friction
    B) Rolling force
    C) Net force
    D) Gravity force

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ANSWERS & EXPLANATIONS

1. A) The combination of all the forces acting on an object.
    - Net force is the total of all the forces acting on an object, considering both their size and direction.

2. C) It determines the object's speed and direction of motion.
    - Net force affects the motion of objects by determining their speed and direction. Unbalanced net forces can cause objects to accelerate or change their direction of motion.

3. A) Zero net force.
    - When forces are balanced and cancel each other out, the net force on the object is zero, and the object stays still.

4. D) The object stays still.
    - When the net force on an object is zero, the forces are balanced, and the object remains stationary.

5. D) All of the above.
    - When forces are unbalanced, the object can accelerate, slow down or change direction.

6. D) The object's speed and direction of motion.
    - Net force determines the speed and direction of an object's motion. A larger net force will result in greater acceleration.

7. D) The net force becomes zero.
    - When there are two equal and opposite forces, they cancel out, and the net force is zero.

8. A) The net force increases.
    - When two forces work together, they produce a stronger effect and the net force increases

9. D) Unbalanced net force
    - When you lift a heavy backpack, the focre you exert upward is greater than the force of gravity, meaning that th net force is unbalanced.

10. D) Gravity force.
    - A kite flies against the force of gravity pulling it down. The net force on the kite, created by the wind pushing up and gravity pulling down, allows it to soar through the sky.

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