What is Newton's Third Law?

Worksheet

For every action force, there is an equal and opposite reaction force: if object A exerts force F on object B, object B exerts force F on object A, at the same instant.

$$\vec{F}_{AB} = -\vec{F}_{BA}$$

Questions

1. Newton's third law states that every action has...

A) a smaller reaction
B) no reaction
C) an equal and opposite reaction
D) a delayed reaction

2. Action and reaction force pairs act on...

A) the same object
B) different objects
C) no object
D) only massive objects

3. Do action-reaction pairs cancel each other out?

A) Yes, always
B) No, because they act on different objects
C) Only in a vacuum
D) Only if masses are equal

4. A box rests on a table. What is the reaction to the table pushing up on the box?

A) Gravity pulling the box down
B) The box pushing down on the table
C) Friction on the box
D) The box's weight

5. A swimmer pushes water backward with 300 N. What force does the water exert on the swimmer?

6. A rocket expels exhaust gas downward with 5000 N. What force propels the rocket upward?

7. While walking, a foot pushes the ground backward with 150 N. What pushes the person forward?

8. Define: What does Newton's third law state?

9. Define: Do action-reaction pairs act on the same object?

10. Define: Do action and reaction forces happen at different times?

Study this topic with an AI tutor + Apple Pencil in Notek:
https://apps.apple.com/app/id6766946341

Answer Key

1. C) an equal and opposite reaction - Action and reaction forces are always equal in magnitude and opposite in direction.

2. B) different objects - They act on two different objects, so they never cancel out for either object alone.

3. B) No, because they act on different objects - Forces only cancel when they act on the same object; these pairs act on two different bodies.

4. B) The box pushing down on the table - The third-law pair to the table's normal force is the box pushing down on the table with equal force.

5. By Newton's third law, the reaction force is equal and opposite. Water pushes swimmer forward with 300 N.

6. Action: rocket pushes gas down with 5000 N. Reaction: gas pushes rocket up with 5000 N.

7. Action: foot pushes ground backward, 150 N. Reaction: ground pushes foot forward, 150 N - this friction reaction propels the walker.

8. Every action force has an equal and opposite reaction force, acting on a different object.

9. No - they always act on two different objects, which is why they never cancel each other.

10. No, they occur simultaneously, at the exact same instant.

Bounlu

All cards, step-by-step solutions and an AI tutor are in the Notek app.

Promy turns exam dates into automatic reminders.