

Newton's Third Law Lesson Notes

Newton's Third Law:

"For every action, there is an equal and opposite reaction."

... meaning that forces are the result of simultaneous, mutual interactions between two objects. Forces always come in pairs.

Forces...

- are the pushes or pulls between two objects that result when they press or push on each other.
- are not mysterious!
- result when objects contact each other.
- come as interaction force pairs

NOT action ... then reaction **BUT** simultaneous (at the same time) interactions.

Interaction Force Pairs

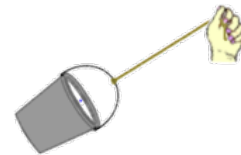
Example: Book pushes down on desk.

 Desk pushes up on book.



Example: Bucket pulls left on the rope.

 The rope pulls right on the bucket.



Force is a vector - it has a magnitude and direction.

- The **magnitude** of the two individual forces in the interaction force pair are **equal**.
- The **direction** of the two individual forces in the interaction force pair are **opposite**.

Question #1: A very massive **bus** moving at highway speed collides with a unsuspecting, little **bug**. Which object - bus or bug - experiences the greatest force?

Question #2: A rifle recoils when fired. The rifle pushes the bullet forward. The bullet pushes the rifle backwards. This is an interaction force pair. Which object - rifle or bullet - experiences the greatest force?

Newton's Third Law: The two individual **forces** on the interacting objects are of equal strength.

Newton's Second Law: The least massive of the two interacting objects has the greatest **acceleration**.