

## 16.3: Third Law of Motion

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Newton's third law of motion states that forces always come in pairs that act in opposite directions. For example, the Earth exerts a gravitational force on the Moon, and the Moon in turn exerts a gravitational force back on the Earth.

As a more complicated example, consider the forces present when you are standing on the floor:

1. There is a downward gravitational force acting on you due to your mass and the Earth's mass (your weight).
2. There is an upward gravitational force acting on the Earth due to your mass and the Earth's mass.
3. There is an upward normal force acting on you due to the floor.
4. There is a downward force acting on the floor due to you.

Items 1 and 2 are action-reaction pairs, as are items 3 and 4. Two of these forces are acting on you: your weight downward, and the normal force upward. These two forces must be equal, because you're not accelerating, and therefore the net force on you is zero.

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