

# Transfer of Energy in Collision

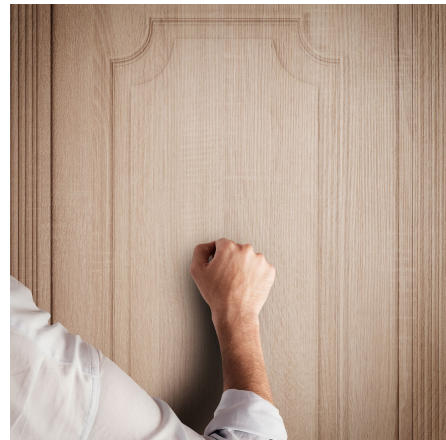
## Reflect

Energy can be transferred, or moved from place to place. One way this can be done is through objects that move and collide. The transfer of this energy changes the way objects behave, and it also releases new types of energy. The energy of two moving objects can create sound and heat energies when they collide. The collision can also cause a change in each object's motion.

**collision** – a forceful impact in which energy is transferred from one object to another

### Collisions can produce sound!

The energy from my moving hand is transferred to your front door when I knock on it. The force of my hand moves that energy into the door and causes it to vibrate. When the door vibrates, the energy is passed to the air on the other side of the door. The energy that comes from vibrations is called sound. This is why you hear a knocking sound when someone's hand hits a door. The energy doesn't go away—it just gets passed from place to place!



These power lines carry energy from one place to another.

Did you know that even the tiniest collisions can cause sound? Look at the picture of the power lines to the left. They are carrying electricity between the power plant and a city. You may have noticed that when you are near power lines, you can hear a humming sound. That humming sound is created from tiny electrons moving through the lines (electricity) and disturbing the air around the outside of the wires. If the electricity stops flowing through them, you will no longer hear the humming sound.

# Transfer of Energy in Collision

## Collisions can produce heat!

Look at the picture of the matchstick. Notice the small bumps on the box. The bumps provide a rough surface for the match to scrape. When the end of the match collides and scrapes across the bumps, it causes the end of the match to heat up! Once the end of the match is hot enough, it starts to burn.



The rough bumps on the box are a source of friction for the matchstick.

What does it sound like when you scrape the match on the box? That scratching sound is produced from the collision between the match and the bumps on the box!



Let's try something else. Clap your hands together. Did your hands make a sound? Clap your hands 12 times. Are your hands getting warm? The energy transferred from the collision of your moving hands created sound and heat.

## Collisions can cause a change in motion!

When objects collide, the energy from one object's motion will transfer to the other object. When this energy gets transferred, it can cause the motion of the objects to change.



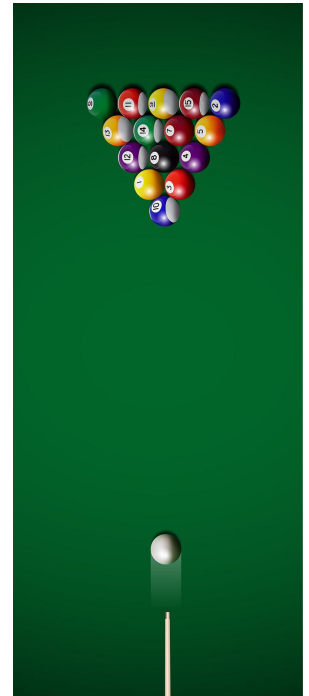
Look at the picture on the left. As the white cue ball races toward the other ball, it has energy and will travel in that direction until another force acts upon it. When the cue ball strikes the blue ball, the collision will allow the energy from the cue ball to move into the blue ball. The cue ball will slow down because it will lose some of its energy. It could also move in a different direction. The blue ball will change its motion and start rolling.

# Transfer of Energy in Collision

## What Do You Think?

What do you think is going to happen when the cue ball hits the group of billiard balls? There will definitely be a transfer of energy.

Describe how energy will be transferred in this collision. What forms of energy will be produced? What will happen to the different billiard balls?



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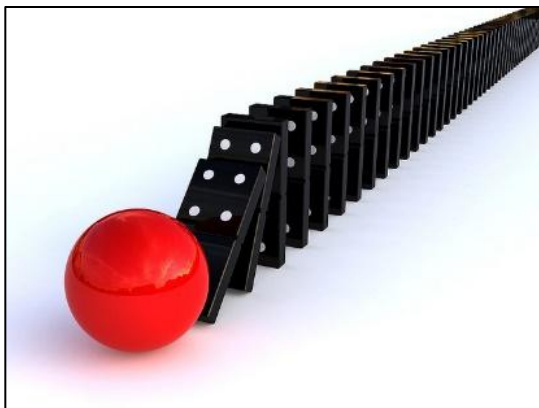
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## Try Now



Energy is always conserved.

You can use the transfer of energy that happens during collisions to create fun designs and neat tricks. Start by setting up dominoes in interesting patterns (for example, try spelling your name). Make sure your domino trail has a starting point and an ending point. Then, roll a small ball into the first domino and let its kinetic energy transfer to the first domino in the pattern. You will be able to watch the energy move through the pattern as the dominoes collide. How can you change the pattern? Does anything change the direction of the dominoes? What would happen if you placed another object, such as another ball, in the pattern?