

Effects of a Force

When a force acts on an object, one or more of the following situations can happen to the object.

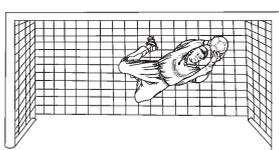
① A Force Can Cause A Stationary Object To Start Moving

A goalkeeper places the soccer ball on the ground. Then he moves a few steps back before running towards it and giving it a hard kick. The soccer ball moves by flying through the air.

② A Force Can Stop A Moving Object

A soccer player who sees the soccer ball rolling towards him can use his foot to stop it.

A goalkeeper jumps to catch the soccer ball to prevent it from entering the net.



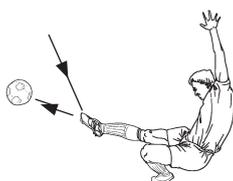
A goalkeeper makes a brilliant save.

③ A Force Can Cause A Moving Object To Move Faster Or Slower

While kicking the soccer ball to make it move, a footballer can choose to kick it with more force to make it move faster, or to kick it with less force so that its speed is reduced.

④ A Force Can Cause A Moving Object To Change Its Direction Of Motion

When the soccer ball moves, it travels in a certain direction. As the ball approaches a football player, he can decide to kick it in a different direction so that a player from the opposing team does not get the soccer ball. He applies a force to change the initial direction of the football.



The direction of the ball is changed.

⑤ A Force Can Cause An Object To Bend, Change Its Shape Or Break

A blacksmith heats a piece of steel to a high temperature (between 649 – 816°C). When he removes it from the super-hot oven called a forge, he hammers along the edge of the steel so that it curves to form the blade of the sword. If the blacksmith removes the steel when it is not yet hot enough (it appears bluish in colour), the steel can shatter upon hammering.



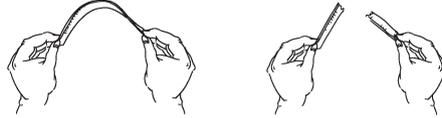
A force is used to bend an object.

A baker has to knead the dough by pressing, pushing and pulling it. Then he shapes the dough into different shapes before baking them in the oven.



A force is used to change the object's shape.

A plastic ruler can be bent by using force. Its shape changes. However, when too much force is applied, the plastic ruler breaks into two.



A force is used to break an object.

Destructive Forces

Although forces can help us to do work such as cutting fruit or pushing the trolley in the supermarket, there are some forces which can harm us.

The force of a hurricane can uproot trees and damage houses.



A house is damaged when a tree is uprooted.



Example

In 2004, a massive underwater earthquake off the coast of Sumatra generated massive tsunami waves. It inflicted massive damage along the coastal lands of ten countries including Indonesia and Sri Lanka. More than 280,000 people were killed in the natural disaster.



People running for their lives away from the tsunami