

# How do things move?

## Newton's Three Laws of Motion

**LAW 1** - Nothing happens until something happens to it. An object that isn't being pushed or pulled either stays still or keeps moving in a straight line at a constant speed. Nothing moves until a force acts upon it. If something is moving, it will carry on moving at the same speed and in the same direction until a force happens to change it.

**LAW 2** - Forces make things speed up (or accelerate). When a force pushes or pulls the object, the object will move in the direction of the force. The bigger the force, and the lighter the object, the greater the acceleration. It can also make something slow down, speed up or change direction.

**LAW 3** - Every action has an equal and opposite reaction. When a force acts in one direction it creates an equal force in the opposite direction.

### FORCE

#### WHAT IS FORCE?

A force is a push or a pull. Force can make things move, change shape or change their speed. Some forces are direct and happen when two things touch (like a foot kicking a ball) or over a distance (such as a magnet or gravity).

TO CAUSE AN OBJECT TO CHANGE VELOCITY (ie TO ACCELERATE) WE NEED TO APPLY A FORCE



SMALL FORCE = SMALL ACCELERATION



DOUBLE THE FORCE = DOUBLE THE ACCELERATION

Supported by

**Ogier**

as part of Love your  
Castle campaign

## FRICTION

Friction is the force between two objects in contact with each other that will resist an attempt to move them. No matter how smooth an object might look, in reality it is covered with millions of tiny jagged bumps and dents. When two objects rub together, the tiny bumps snag each other and slow the objects down. This slowing force is friction. Friction can slow things down and sometimes make things go faster because of the grip that it causes.

**STATIC FRICTION** is the force that will resist the movement up until it is overcome by a greater force and the motion occurs.

**SLIDING FRICTION** is weaker than static friction and happens when something is already moving.

## MAKING FIRE

When friction happens some of the energy stored in the object turns into heat energy. If you rub your hands together you can feel them start to get warm.

With enough friction, the heat can cause a fire. The fire then creates heat energy which creates force. If there is something in the way of the heat energy, this will cause it to move, like a cannon ball in front of an explosion of heat from gunpowder.

## ENERGY

Potential energy – energy can be saved up and be ready to be used when you need it. One of the laws of physics is that energy can never be destroyed. It gets converted from one form to another whenever it is used.

**KINETIC ENERGY** – is the energy of a moving object – the faster something moves, the more energy it has

**HEAT ENERGY** – the energy of atoms and molecules shaking. The hotter something gets the faster the atoms shake.

**CHEMICAL ENERGY** – this energy is trapped in molecules. Food petrol and other types of fuel

**POTENTIAL ENERGY**  
Energy ready to be used

**KINETIC ENERGY**  
Energy in

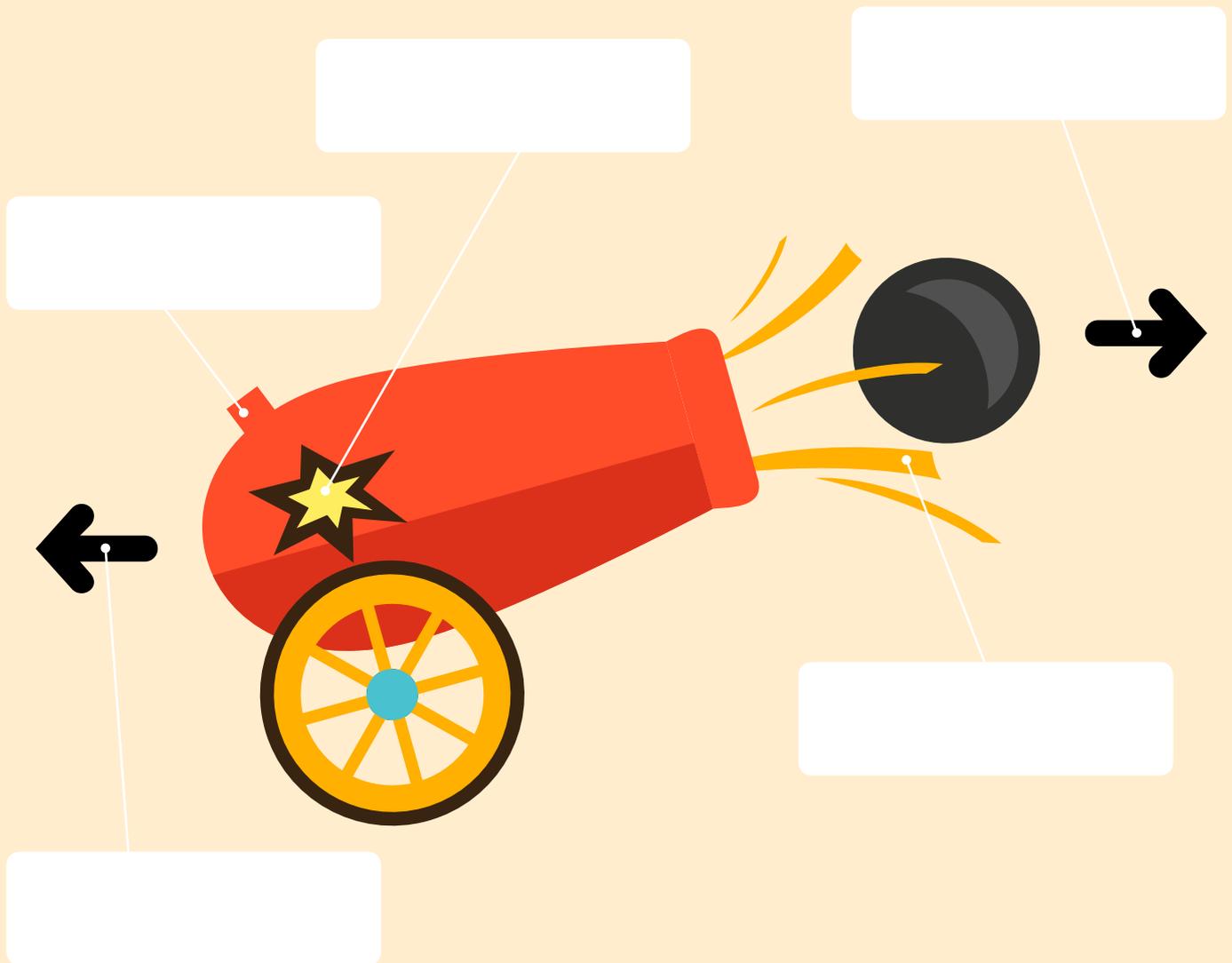


**KINETIC ENERGY**  
Energy out



# FIRING A CANNON

Can you work out and label where there are forces and what types of energy are used when a cannon is fired?



Can you match the energy to where it happens on the cannon?

- Chemical energy
- Heat energy
- Kinetic force
- Sliding friction
- Motion