Year 5: Science Knowledge Organiser – Forces (Physics)

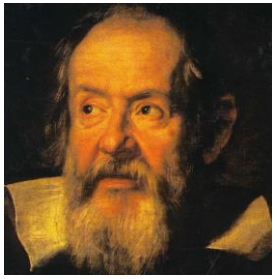
Sticky Knowledge

- ✓ Gravity pulls objects that are the same shape downwards at the same speed, even if one is heavier than the other.
- ✓ Without friction we would not be able to walk. We move forwards by pushing our supporting feet backwards. This is why we slip on smooth surfaces such as ice.
- ✓ Buoyancy is the ability of an object to float. Heavy ships float because they are less dense than that water due to pockets of air inside them.

Learning Components:

- ➢ I know that forces push or pull and that gravity is a force which pulls objects towards their centres of mass.
- ➢ I know what friction is and that it slows objects down and creates heat.
- ➢ I know what air and water resistance are and that they slow down movement.
- ➢ I know that levers are simple machines which can be used to move objects easier.
- ➢ I know that pulleys are simple machines which can be used to make lifting objects easier.
- ➢ I know who Isaac Newton was and that he contributed towards our understanding of forces, gravity and light.

Isaac Newton (1643-1727)



- ✓ To know that Sir Isaac Newton (1643-1727) was an English mathematician and scientist.
- ✓ He is known as one of the most influential scientists of all time. He developed Newton's law of universal gravitation.
- ✓ Know that he is said to have 'discovered' the concept of gravity when sitting under a tree and an apple fell to the ground near him.

Big Idea

Forces can move objects, change their direction of travel and their shape. Forces are pushes and pulls and can be contact forces such as friction or non-contact forces such as gravity. Friction, air and water resistance can slow the movement of objects. Simple machines such as gears, levers and pulleys can transform the direction and strength of forces. Forces are measured in Newtons (N).

Friction:

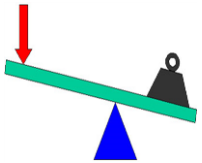
Friction is a force that acts between two surfaces or objects that are moving, or trying to move across each other.

Resistance:

Air resistance is a type of friction between air and another material (this is sometimes called drag). As an object moves, air resistance slows it down.
Water resistance acts in the same way that air resistance does. If you go swimming, there is friction between your skin and the water particles. This is known as water resistance.

Gears, Pulleys, Levers

Levers, pulleys and gears are mechanisms that allow a small force to have a greater effect.



Vocabulary

Force: The strength of a physical action or movement measured in Newtons (N).

Gravity: Gravity is a force which tries to pull two objects toward each other.

Air Resistance: Air resistance is a type of friction between air and another material. For example, when an aeroplane flies through the air or a parachute falls to Earth.

Water Resistance: If you go swimming, there is friction between your skin and the water particles, making it harder to move.

Levers: A lever can be described as a long rigid body with a fulcrum along its length.

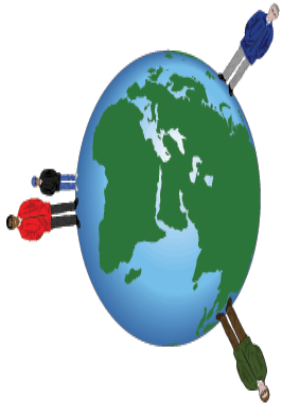
Pulleys: Pulley is a simple machine and comprises of a wheel on a fixed axle, with a groove along the edges to guide a rope or cable. They are used to lift heavy objects more easily.

Gears: Gears are wheels with teeth that slot together. When one gear is turned the other one turns as well, but in the opposite direction. Smaller gears turn more quickly than larger gears.

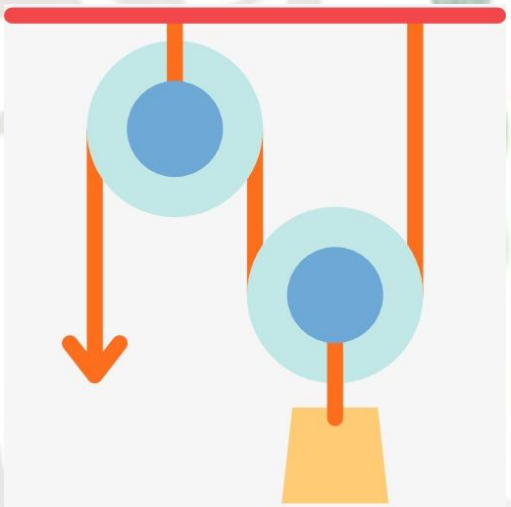
Friction: Friction is a force between two surfaces that are sliding, or trying to slide, across each other.

Force

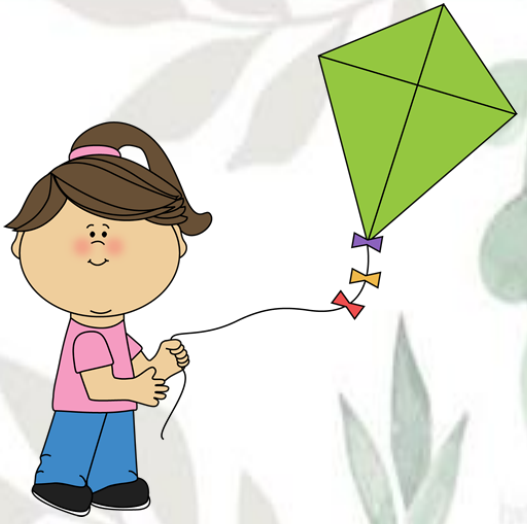
Gravity



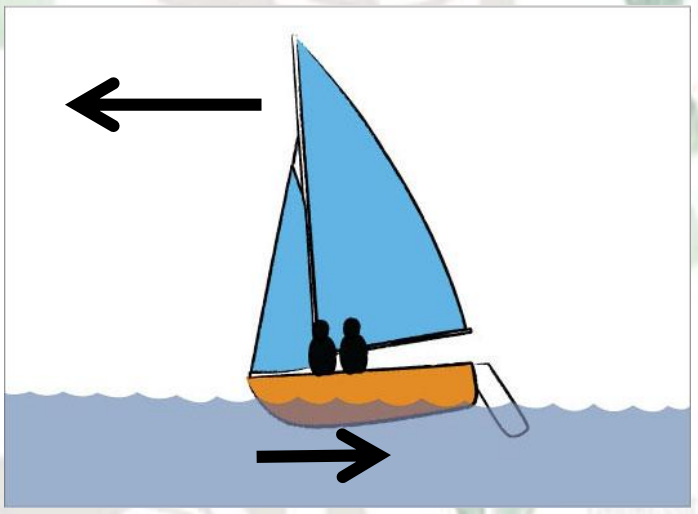
Pulleys



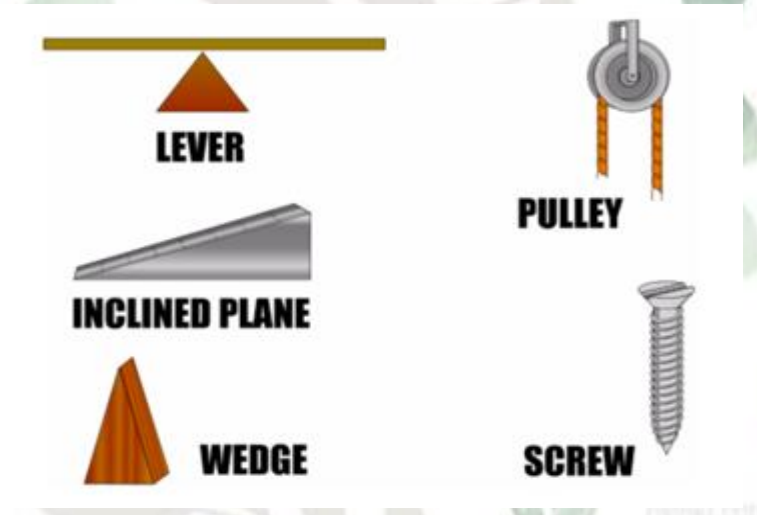
Air Resistance



Water Resistance

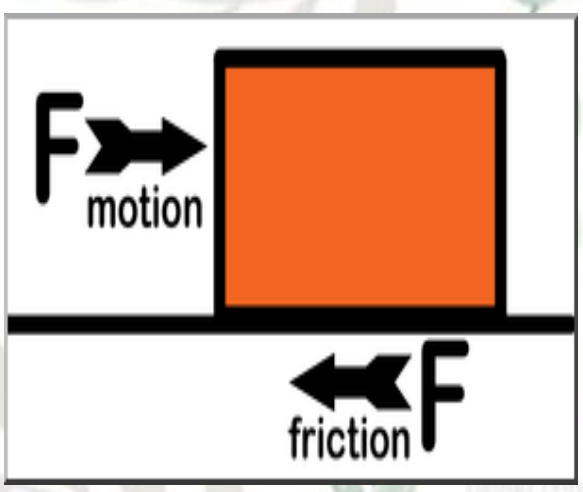


Simple Machines

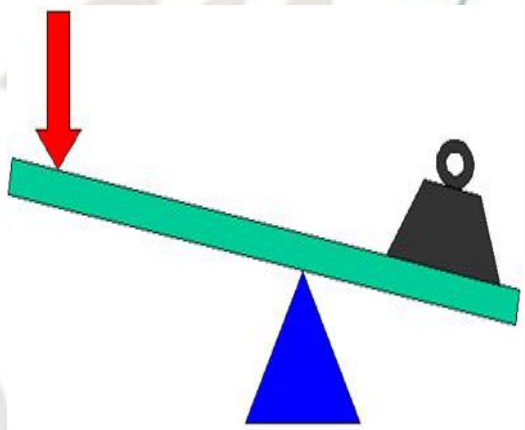


Mechanisms

Friction



Levers



Gears