

St. Mary's Catholic Primary School



Subject: **Science**

Topic: Forces

Year: 5

What should I already know?

- Different surfaces create different amounts of friction
- The amount of friction created by an object moving over a surface depends on the roughness of the surface and the object, and the force between them
- Forces will change the motion of an object. They will either make it start to move, speed up, slow it down or even make it stop
- A magnetic field is invisible

The driving **force** pushes the bicycle, making it move.



Friction pushes on the bicycle, slowing it down.

What am I going to learn?

- Mass and weight are not the same thing.
- Pulleys, gears and levers are all ways to measure different types of forces.

Mass is how much matter is inside an object. It is measured in kilograms (kg).

Isaac Newton is famously thought to have developed his theory of **gravity** when he saw an apple fall to the ground from an apple tree.

Weight is how strongly **gravity** is pulling an object down. It is measured in newtons (N).

Pulleys



Pulleys can be used to make a small **force** lift a lighter load. The more wheels in a pulley, the less **force** is needed to lift a **weight**.

Gears/Cogs



Gears or cogs can be used to change the speed, **force** or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other.

Lever



Levers can be used to make a small **force** lift a lighter load. A lever always rests on a pivot.

Vocabulary

- Forces- pushes or pulls
- Gravity- A pulling force exerted by the Earth (or anything else which has mass)
- Earth's gravitational pull- The pull that the Earth exerts on an object, pulling it towards Earth's centre. It is the Earth's gravitational pull which keeps us on the ground
- Weight- The measure of the force of gravity on an object
- Mass- The measure of how much matter (or 'stuff') is inside an object
- Friction- A force that acts between two surfaces or objects that are moving, or trying to move, across each other
- Air resistance- A type of friction caused by air pushing against any moving object
- Water resistance- A type of friction caused by water pushing against any moving object
- Buoyancy- An upward force that a liquid applies to objects
- Streamlined- When an object is shaped to minimise the effects of air or water resistance
- Mechanism- Parts which work together in a machine. Examples of mechanisms are pulleys, gears and levers

The Moon has a smaller **mass** than Earth so the **gravitational pull** on the Moon is smaller than it is on Earth.



Jupiter has a greater **mass** than Earth so the **gravitational pull** on Jupiter is stronger than on Earth.

Examples of **forces** in action:

swimmer's **force**

water **resistance**

gravity

air **resistance**

cyclist's driving **force**

friction

Water resistance and **air resistance** are forms of **friction**. **Friction** is sometimes helpful and sometimes unhelpful. For example, **air resistance** is helpful as it stops the skydiver hitting the ground at high speed. **Friction** on a bike chain can make the bike harder to pedal so it is unhelpful.

Investigations

Design a break pad- Children will be testing different materials to see which one has the most friction when a scooter goes over it.

Children will also be designing, making and evaluating their own mechanisms.