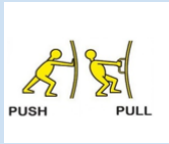
Forces Year 5/6



Prior learning—

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles

A force is a push or pull that **acts upon an object**. **We can't see forces**, but they are an important part of our everyday lives. We **push and pull** objects to do many different things. When we push or pull objects we can **move** the object, **change the shape** of the object **or make the object change direction**.

Key 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 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	A measure of how much matter (or 'stuff') is inside an object.

Water resistance is the force responsible for making it difficult for us to **move through the water**. It acts between a moving object and the **water molecules** around it, **slowing the object down**.

Air resistance is a force that acts in **the opposite direction to gravity**. **It acts between** a moving object and the air molecules around it, slowing the object down. Air resistance is a type of **friction**. **Parachutes** are used to increase air resistance and slow down the parachutist, so they can land safely. Modern cars and planes are **streamlined in design** to reduce air resistance, allowing them to move faster.

Gravity

Gravity attracts all matter towards each other.

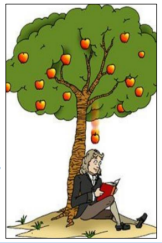
-It has been around since the beginning of the Universe, and applies to all matter in the Universe.

-The bigger an object's mass, the more gravity it will have. The smaller the mass of an object, the less gravity it will be subject to.

-Without gravity we would fly right off the planet! The moon's gravity causes our ocean tides on Earth. The Sun's gravity keeps Earth in orbit around the Sun.

-We don't actually "feel" gravity. We only feel the effects of trying to overcome it by jumping or when we fall.

-Sir Isaac Newton discovered gravity around 300 years ago. The tale is that he saw an apple fall from a tree, and wondered what force made it fall to the ground.



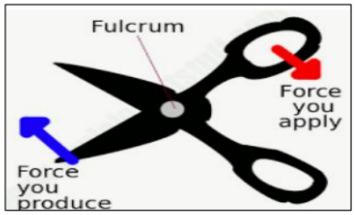
Friction is a **force created between two surfaces when they rub together**. Friction creates heat and always **slows down an object**. Rough surfaces create more friction than smooth surfaces.

Sequence of learning:

1) To identify forces acting on objects
2) To explore the effect gravity has on objects and how gravity was discovered.
3) To investigate the effects of air resistance
4) To explore the effects of water resistance.
5) To investigate the effects of friction.
6) To explore and design mechanisms.

Machines and Mechanisms

-Simple machines and mechanisms include pulleys, gears and levers. They can be used to turn a small force into larger forces. This means that we can use these machines to accomplish things more easily.



-Levers give us extra pushing or pulling force and help us lift greater weights.

-Gears are different sized cogs which work together to give a machine extra force.

-Pulleys are wheels and ropes that work together to life heavy objects.

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 object is buoyant if it floats. This is because the weight of the object is equal to the upthrust.
streamlined	When an object is shaped to minimise the effects of air or water resistance.
mechanism	Mechanisms are simple machines with moving parts that change input forces and movement into a set of useful output forces. Examples of mechanisms are pulleys, gears and levers.
upthrust	A force that pushes objects up, usually in water.