

**Theme: FORCES**

**Year 5**

**Subjects: Science**

**What should I already know?**

**How does this link to past learning?**

- Know what a force is and be able to explain that a push and pull are types of forces.
- That when forces are applied to an object they allow them to move or stop moving.
- The strength of the force determines how far and fast an object moves.
- Friction is the resistance of motion when there is contact between two surfaces
- That magnets have poles, and that opposite poles attract, while similar poles repel.

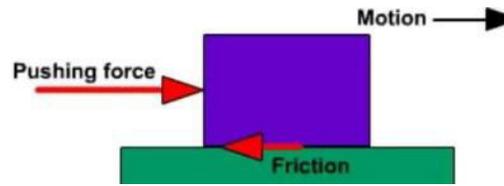
**What vocabulary should I learn?**

friction	the resistance of motion when one object rubs against another
force	the pulling or pushing effect that something has on something else
gear	a part of a machine that causes another part to move because of teeth which connect the two moving parts
gravity	the force that pulls objects to the centre of the Earth
lever	a basic tool used to lift or pry things open
mass	A measurement of how much matter is in an object. The more matter something has, the more it will weigh.
motion	the activity of changing position or moving from one place to another
opposite	Opposite is used to describe things of the same kind which are completely different. For example, north and south are opposite directions
pulley	a simple mechanism that makes lifting something easier. A pulley has a wheel or set of wheels with grooves that a rope or chain can be pulled over.
resistance	a force which slows down a moving object or vehicle
spring	a spiral of wire which returns to its original shape after it is pressed or pulled
streamlined	A streamlined vehicle, animal, or object has a shape that allows it to move quickly or efficiently through air or water
surface	the flat top part of something or the outside of it
weight	Weight is a measure of the force of gravity acting on a mass.

**What should I know by the end?**

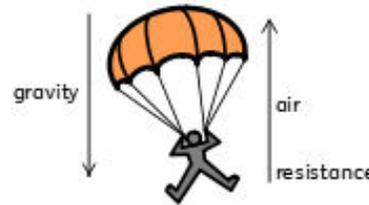
**What is friction?**

- Friction is a force - it is the resistance of motion when one object rubs against another.



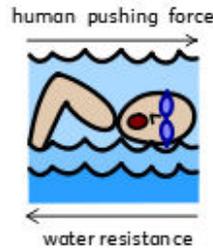
**What is air resistance?**

- Air resistance is a type of friction between air and another material.
- For example, when an aeroplane flies through the air, air particles hit the aeroplane making it more difficult for it to move through the air.
- Air resistance pushes up on the parachute, opposing the force of gravity. This makes the parachute land more slowly.



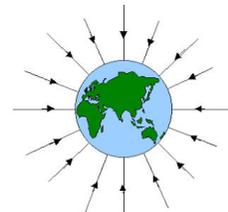
**What is water resistance?**

- Water resistance is also a type of friction. It is the friction that is created between water and an object that is moving through it.
- Some objects can move through water or air with less resistance if they are streamlined.

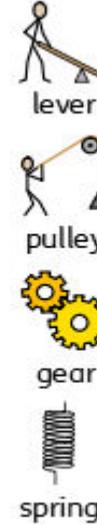


**What is gravity?**

- Gravity is the force that pulls objects to the centre of the Earth.
- Anything that has mass has gravity. The more mass something has (the bigger it is), then the more gravity it will have.
- Gravity exists on the Moon but it is not as strong as it is on Earth. This is because the Moon is much smaller than the Earth.
- Gravity always pulls, it never pushes.
- Sir Isaac Newton discovered gravity about 300 years ago.



**What are examples of mechanisms?**



Some mechanisms can be used to allow a smaller force to have a greater effect.

**Levers** allow us to do heavy work with less effort. For example, trying to pick up a large heavy box is difficult, however if a lever is used it becomes much easier to move it.

**Pulleys** also allow us to do heavy work - objects are attached to ropes and pulley wheels, and so instead of lifting heavy object upwards, we can pull on the pulley rope downwards.

**Gears** are toothed wheels. Their 'teeth' can fit into each other so that when the first wheel turns, so does the next one. This allows forces to move across a surface.

**Springs** can be stretched by pulling them or squashed by pushing them. The greater the force pulling or pushing the spring, the greater the force the spring uses to move back to its normal shape.

**What should I be able to do by the end?**

- Draw diagrams to show how objects move down ramps, through the air and through water, using arrows to show the direction of the forces.
- Investigate how surface area affects air resistance and explain the relationship between them.
- Make parachutes to investigate how air resistance works. Ensure that only one variable is changed while other variables stay the same.
- Explore resistance in water by making and testing boats of different shapes

**How will I use this learning in the future?**

- **Support projects in Design & Technology**
- KS3 Science: forces as pushes or pulls, arising from the interaction between two objects
- using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces
- forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water
- non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity.

