


| Key Vocabulary | |
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| Friction | A contact force acting between two surfaces or objects trying to move across each other. |
| Water resistance | A form of friction made when water pushes against an object moving in the water. |
| Air resistance | A form of friction made when air pushes against an object moving in the air. |
| Streamlined | A shape which reduces the effect of air resistance or water resistance, allowing the object to move quickly. |
| Buovancy | An upwards pushing force that liquids give to an object (helping them to float). |
| Gravity | An invisible, non-contact force made by the Earth. |

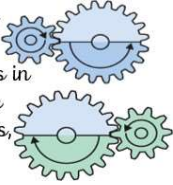
- I can:
- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
 - identify the effects of air resistance, water resistance and friction, that act between moving surfaces
 - recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Everyday uses of forces

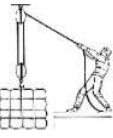
Springs come in many shapes and sizes. Springs work by storing energy or absorbing energy. They return to their original shape when this stored energy is released.



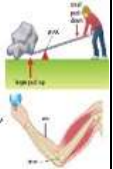
Gears are wheels with teeth that fit together. When one gear moves, the other moves in the opposite way. Gears are found in watches, some toys, bikes and cars.



A pulley is a wheel fixed at one end with a rope passing through it. When the rope is pulled, it can lift an object more easily.




Levers can change the direction of a force or magnify it (make it bigger). Good examples our joints, scissors and bottle openers.




| Famous forces scientists | Water resistance | Air resistance | Gravity, mass and friction |
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Galileo –1564 -> 1642



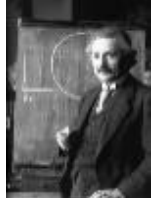
Discovering objects in space.
Used telescopes.
Imprisoned for his work.

Sir Isaac Newton – 1642 -> 1727



Developed first theory of gravity.
Mathematician.
Worked on 'mass' as the *Master of Mint*, making coins.




Albert Einstein – 1879 -> 1955



Supported Newton's work
Claimed there was more that is affected by gravity than just Earth.


Water resistance

- ❖ A form of friction.
- ❖ Can be helpful and unhelpful.
- ❖ Often tear drop shaped.
- ❖ The streamlined (oval) shape of fish reduce the friction caused by water (water resistance) so they can swim quickly when they need to.
- ❖ Submarines are streamlined to reduce the friction, helping it move quickly and smoothly through the water.

Air resistance


- ❖ A form of friction
- ❖ Can be helpful and unhelpful.
- ❖ Wide shapes work best.
- ❖ A parachute is a wide surface that traps lots of air (increasing the friction) and slows down the object falling.
- ❖ Birds have wings that help both create air resistance and allow them to move through the air quickly.



Gravity, mass and friction

Gravity

- Invisible non-contact force between an object and the Earth.
- Objects with different mass will fall at the same rate in free fall (where only force is gravity)
- Gravity has the same force everywhere on Earth
- Weight = how much something is pulled to Earth.
- Greater mass (kg/g) = greater gravitational pull (N).

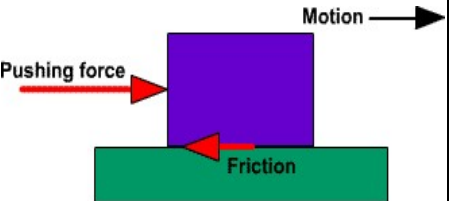


Mass

- ❖ The amount of matter (molecules....'stuff') there is in an object.
- ❖ Measured in kg/g on Earth.
- ❖ On Earth mass and weight seem to be the same.
 - In space where there is no gravity, there is no weight (objects not being pulled to Earth).
 - However, the mass of an object stays the same.

Friction

- ❖ Holds back movement of an object.
- ❖ Two surfaces in contact.
- ❖ Friction acts in opposite direction to the movement



Quiz

Question 1

Which famous scientist created the first theory of gravity?

- a) Galileo
- b) Sir Isaac Newton
- c) Albert Einstein
- d) Thomas Edison

Question 2

Which word completes this sentence correctly? *The ... of an object stays the same when in space.*

- a) weight
- b) air resistance
- c) mass
- d) newtons

Question 3

Which of the following words means *the amount of matter (stuff) there is in an object* ?

- a) weight
- b) air resistance
- c) mass
- d) newtons

Question 4

Which of the following is an invisible non-contact force?

- a) Air resistance
- b) Water resistance
- c) Gravity
- d) Mass

Question 5

Which units of measure do you use to find the gravitational pull on an object?

- a) ml (millilitres)
- b) kg (kilograms)
- c) cm (centimetres)
- d) N (newtons)

Question 6

Which of the following is an example of a mechanism using a lever?

- a) Watch
- b) Arm
- c) Bike
- d) Car