KS3 SCIENCE · PHYSICS

Forces revision sheet

Name _____



1. What forces do

- A **force** is a push or a pull.
- A force can change the **speed** of an object, the **direction** it moves in, or its **shape**.
- Forces are measured in **newtons (N)** with a newton meter. An apple weighs about 1 N.

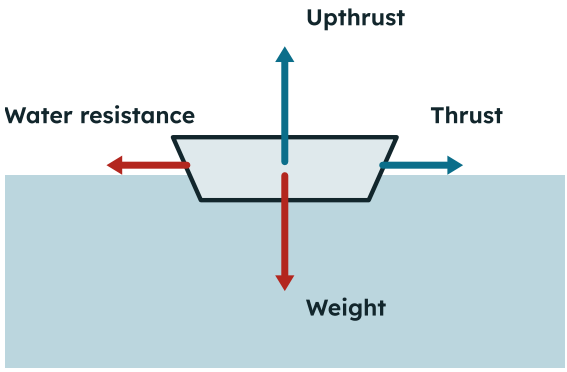


2. Contact and non-contact forces

CONTACT FORCES (THINGS MUST TOUCH)	NON-CONTACT FORCES (ACT ACROSS A GAP)
Friction, air resistance, water resistance, upthrust, tension	Gravity, magnetic force, electrostatic force

- **Gravity** is a pull between any two objects. **Weight** is the pull of gravity on an object, in newtons.
- **Upthrust** is the upward push of water or air on an object. It is what makes a boat float.

3. Force diagrams



The four forces on a boat moving at a steady speed



A longer arrow shows a bigger force

- Each force is drawn as an arrow. Its **direction** shows which way the force acts. Its **length** shows the size of the force.



4. Balanced and unbalanced forces

- The **resultant force** is the single force left when the forces on an object are combined.
- Forces in **opposite directions**: subtract. 500 N left and 300 N right give 200 N to the left.
- Forces in the **same direction**: add. 500 N and 300 N give 800 N.
- **Balanced forces** on an object are equal and opposite. The resultant is zero and the object is in **equilibrium**.



5. Friction

- **Friction** is a force between two surfaces that touch. It acts against sliding.
- Even a smooth surface has tiny bumps that catch on the other surface. Rough surfaces usually grip more.
- **Useful:** brakes, tyres on a road, the soles of your shoes.
- **A nuisance:** in machines it wears the moving parts and makes them hot. Oil is a **lubricant**: it reduces friction.



6. Air and water resistance

- Air resistance and water resistance are friction forces from air and water. Both are called **drag**.
- Drag acts against the motion. More speed or a bigger area means more drag.
- A **streamlined** shape reduces drag, because air or water slips past it easily.
- In a **vacuum** there is no air, so there is no air resistance. A hammer and a feather fall together.
- A skydiver falling at a steady speed has balanced forces: her weight equals the air resistance.



7. Forces and motion

FORCES ON THE OBJECT	WHAT IT DOES
Resultant force forwards	Speeds up
Resultant force backwards	Slows down
Resultant force sideways	Changes direction
Balanced, and it is still	Stays still
Balanced, and it is moving	Keeps going at a steady speed in a straight line

Key words

Force: a push or a pull
Newton meter: measures the size of a force
Non-contact force: acts without the objects touching
Air resistance: drag from moving through air
Upthrust: upward push from a liquid or a gas
Tension: the pulling force in a rope or string

Balanced forces: equal and opposite forces on one object
Equilibrium: when the forces on an object are balanced
Lubricant: a substance, such as oil, that reduces friction
Newton: the unit of force
Contact force: acts only when objects touch
Friction: opposes sliding between two surfaces
Water resistance: drag from moving through water
Weight: the pull of gravity on an object
Resultant force: the single force left when forces are combined
Unbalanced forces: forces that do not cancel out

Streamlined: shaped to cut down drag

Pictures are illustrations made for this sheet, not real photographs.