

Forces

Gravity, air resistance, water resistance & friction



1. What is a force, and how do we know one is acting?

A force is a push or a pull, measured in **newtons (N)**.

- **Contact forces** need two things touching, like friction or air resistance.
- **Non-contact forces** act at a distance, like gravity and magnetism.

3. What is air resistance, and how does shape affect it?

Air resistance opposes movement through air.

- More **surface area** facing the air means more resistance and slower falling.
- A parachute falls far more slowly than a scrunched-up ball of paper.



5. What is friction, and how do levers, pulleys and gears use force?

Friction opposes movement between touching surfaces.

- **Levers, pulleys and gears** change the size or direction of a force.
- They make tasks easier — like lifting heavy loads or opening a jar.

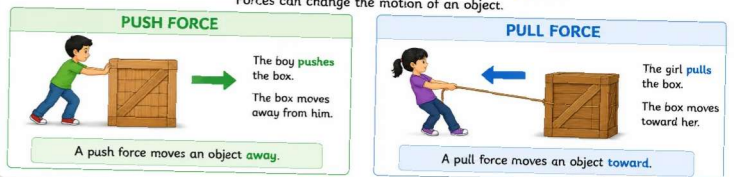
6. How does a streamlined shape reduce resistance?

Shape changes how easily air or water flows around an object.

- Smooth, narrow, pointed shapes let air/water flow around them with **less drag**.
- Flat, wide or rough shapes create more turbulence and slow things down.

Push and Pull Forces on an Object

Forces can change the motion of an object.



2. What is gravity, and how does it affect falling objects?

Gravity pulls every object towards the Earth's centre.

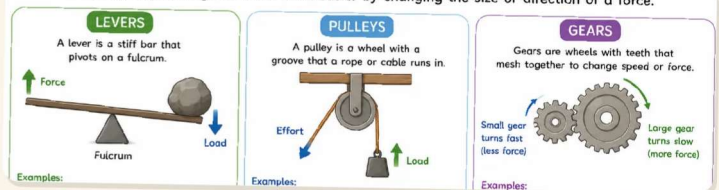
- Without air resistance, heavy and light objects fall at the **same rate**.
- Gravity is why objects fall down instead of floating away.

4. What is water resistance, and how does shape affect it?

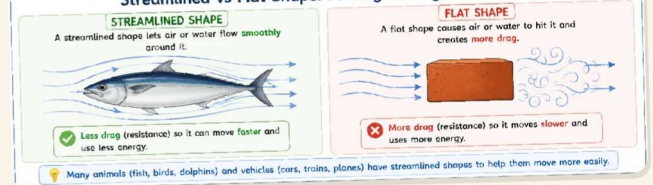
Water resistance (drag) slows objects moving through water.

- A **streamlined** shape — narrow and smooth — reduces drag and moves faster.
- Boats, fish and submarines are shaped to cut through water.

Levers, pulleys and gears make work easier by changing the size or direction of a force.



Streamlined vs Flat Shape: Moving Through Air and Water

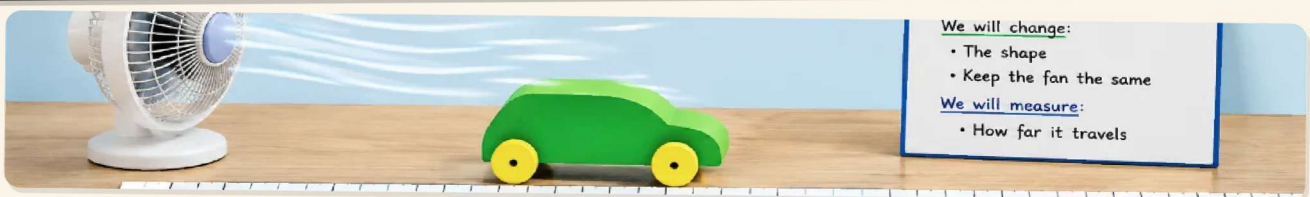


7. TAPS: How do scientists write up a fair test?

FAIR TEST

Our TAPS test: **does a streamlined shape travel further through air or water than a flat shape?** It's a fair test — we change only the shape and keep everything else (weight, force used, surface) the same.

- Question → **prediction** → variables (change / keep same / measure).
- Materials → **method** → carry out the test → **results** → **conclusion**.



KEY VOCABULARY

force newton gravity air resistance water resistance friction streamlined surface area
mechanism lever pulley gear drag mass / weight variable evidence

SKILLS I'LL USE

- Plan & carry out fair tests, controlling variables independently
- Take accurate, precise measurements
- Record data in tables & line graphs
- Report findings using scientific evidence
- **GD:** Identify evidence that supports or refutes an idea