

DESIGN &amp; TECHNOLOGY · Y3-Y6

# Mechanisms

Knowledge Organiser — KS2 D&amp;T

## Key vocabulary

1

**Mechanism**

A part of a machine that makes something move.

2

**Lever**

A bar that pivots around a fixed point. Pushes a small effort to lift a heavier load.

3

**Pivot / Fulcrum**

The fixed point a lever turns around.

4

**Linkage**

Two or more levers connected together — change direction of movement.

5

**Cam**

A shaped wheel that turns and lifts a follower up and down.

6

**Follower**

The part that rests on a cam and moves up and down as the cam turns.

7

**Gear**

A wheel with teeth that meshes with another gear to transfer movement.

8

**Pulley**

A wheel with a groove for a rope or belt — used to lift things or change direction.



9

**Axle**

A rod that a wheel turns around.

10

**Input**

What you do to make a mechanism move (turn a handle, push a lever).

11

**Output**

What the mechanism produces (a wheel turns, an arm lifts).

## Levers

Three types you'll meet

- FIRST CLASS: pivot in the middle. Examples: see-saw, scissors, crowbar.
- SECOND CLASS: load in the middle. Examples: wheelbarrow, nutcracker.
- THIRD CLASS: effort in the middle. Examples: tweezers, fishing rod, your forearm.
- Levers help you move heavier loads with less effort.
- The further the effort is from the pivot, the easier it is to move the load.

## s and followers

Turning round into up-and-d

- A CAM is a shaped wheel attached to an axle.
- When the cam turns, a FOLLOWER rests on top and moves up and down.
- Different shaped cams give different movements:
- CIRCULAR cam (off-centre): smooth up-and-down
- PEAR-SHAPED cam: long pause, sudden lift
- HEART-SHAPED cam: smooth rise, smooth fall
- Used in toys to make figures bob up and down — like a duck on water.



## Gears and pulleys

Transferring movement

- GEARS have teeth that lock together. Bigger gear = slower but more powerful turn.
- Small gear driving big gear: slows movement down but increases force.
- Big gear driving small gear: speeds movement up but decreases force.
- Examples: bicycle gears, car gearbox, clocks.
- PULLEYS use a rope or belt to transfer movement.
- Two pulleys connected by a belt: both turn together (like a fan belt).
- Pulleys with multiple ropes/wheels: lift heavy weights with less effort.
- Examples: lifts, cranes, flagpoles.

## Making a moving toy

Steps to follow

- 1. RESEARCH: look at existing moving toys. How do they work?
- 2. DESIGN: sketch your idea. Label the mechanism you'll use.
- 3. PLAN: list materials. Think about how parts will fit together.
- 4. MAKE a prototype — your first try. It probably won't work perfectly.
- 5. TEST: does it move how you wanted?
- 6. EVALUATE: what works? What needs improving?
- 7. IMPROVE: change things and test again. This is iteration.
- Real engineers do exactly this — design, test, improve, repeat.

