Energy stores and transfers

Name _____ Class _____ Date _____

Energy is never used up. It is stored in different **stores** and moves between them when something happens.

KEY IDEAS

- Energy is measured in joules (J). In a closed system the total energy stays the same.
- Energy is transferred **mechanically** (work done by a force), **electrically** (work done by a current), by **heating**, and by **radiation**.
- Describe a change as: the store it leaves → how it is transferred → the store it ends up in.

Section A · Recall

Grade 4–5

1 Write down the unit of energy. [1]

Joule (J)

2 Complete the table with the eight energy stores, and give an everyday example of each. [4]

#	Energy store	Example
1	Kinetic	A moving car
2	Gravitational potential	A book on a high shelf
3	Elastic potential	A stretched spring
4	Thermal (internal)	A hot cup of tea
5	Chemical	Food, fuel or a battery
6	Magnetic	Two magnets held apart
7	Electrostatic	Two charges held near each other
8	Nuclear	The nucleus of an atom

1 mark for every two correct stores with a sensible example.

3 Name **four** ways that energy can be transferred between stores. [2]

- Mechanically (work done by a force)
- By heating
- Electrically (work done by a current)
- By radiation (e.g. light, infrared)

Section B · Apply

Grade 5–6

4 A ball is thrown vertically upwards. It leaves the hand with 12 J in its kinetic store. Ignore air resistance.

a Describe what happens to the energy in the kinetic store as the ball rises. [1]

It decreases, because the ball slows down.

b Name the store that the energy is transferred to. [1]

Gravitational potential energy store

c How much energy is in this new store at the highest point? Explain your answer. [2]

12 J

All the kinetic energy has been transferred, and energy is conserved.

5 Complete the energy transfer diagram for each example. [6]

a. A gas hob boils a pan of water: **Chemical (fuel)** → (Heating) → **Thermal (water)**

b. A car brakes to a stop: **Kinetic (car)** → (Mechanically) → **Thermal (brakes)**

c. A catapult fires a stone: **Elastic potential** → (Mechanically) → **Kinetic (stone)**

1 mark for the pair of stores and 1 mark for the transfer, in each part.

Section C · Stretch

Grade 7+

6 A ball is dropped onto a hard floor. Explain why it never bounces back up to the height it was dropped from. [3]

• Each bounce, some energy is transferred to the thermal store of the ball and floor, and as sound.

• This energy is dissipated, so less is in the kinetic store as the ball leaves the floor,

so it can't gain as much gravitational potential energy and doesn't reach the same height.

Exam-style question

AQA style

7 A cyclist freewheels from rest down a hill, then brakes to a stop at the bottom.

a Describe the changes in the way energy is stored from the top of the hill until the bike stops. [4]

• Going down: gravitational potential energy store decreases, kinetic store increases (transferred mechanically).

• Braking: kinetic store decreases; friction in the brakes does work,

so the thermal store of the brakes and surroundings increases.

• Some energy is dissipated by air resistance and as sound.

b State what happens to the total amount of energy. Give a reason. [2]

It stays the same.

Energy cannot be created or destroyed, only transferred (it is conserved).

Total: _____ / 26

How confident am I?

	Not yet	Nearly	Got it
I can name all eight energy stores with an example	☐	☐	☐
I can describe energy changes as store → transfer → store	☐	☐	☐
I can explain why energy is conserved but some is dissipated	☐	☐	☐