

LO: Explain changes in energy stores

Do Now:

1. State the name given to the group 1 metals. (1)
2. State the name given to group 7 elements. (1)
3. Define an alloy. (1)
4. State what is required for an experimental method to be described as repeatable. (1)
5. Calculate the mean for the following dataset: (2)

2.25 2.76 3.40 2.98 3.00

New Information – Energy Stores

When a system changes, the way in which energy is stored will be changed. We can think of an energy store as the “potential for a change to happen”.

There are eight ways we can store energy:

1. **Chemical** (e.g. fuel + oxygen): when bonds are made or broken energy will be transferred
2. **Gravitational** (due to the position of an object in a gravitational field): when an object is raised off the ground, against gravity, it gains a store of gravitational potential energy
3. **Nuclear** (released through radioactive decay, fission or fusion)
4. **Elastic** (e.g. in a stretched or compressed spring): when an object is stretched or squashed it gains a store of elastic potential energy
5. **Kinetic** (in a moving object): a moving object has a store of kinetic energy
6. **Thermal** (in a warm object)
7. **Electrostatic** (in two separated electric charges that are attracting, or repelling)
8. **Magnetic** (in two separated magnets that are attracting, or repelling)

Pause Point (Copy and complete the following sentences):

- The eight energy stores are ..

New Information – Energy Transfers

We have talked about energy being stored. When a system changes, where the energy is stored may be different.

For example if I hold this ball at a height and let it go – it starts with a store of gravitational potential energy. As it falls the store of gravitational potential energy decreases. The balls starts to move and accelerate increasing its store of kinetic energy.



But how does the energy store from one place to another → there are four ways in which we can transfer energy. These are:

1. **Mechanically** → when a force is applied and moves through a distance
2. **Electrically** → when charge is moved through a potential difference (i.e.. When there is current flowing)
3. **By heating** → if there is a temperature difference
4. **By radiation** → if a wave is used to transfer the energy e.g. light and sound

Key Knowledge: Complete 2 x LCWC in your book – don't forget to green pen this

State the law of conservation of energy.	Energy can be transferred or stored, but cannot be created nor destroyed
State the units of energy.	Joules (J)
State the eight stores of energy.	Chemical, kinetic, gravitational, elastic, thermal, magnetic, electrostatic, nuclear
State the four ways by which energy can be transferred.	Mechanically → when a force is applied and moves through a distance Electrically → through an electric current By heating → if there is a temperature difference By radiation → if a wave is used to transfer the energy e.g. light and sound

Recall Quiz: Answer the following questions from memory in your books, remember to do this without looking back at your key knowledge

1. The Law of conservation of Energy states that ...
2. If an energy store dissipates, this means that it ...
3. The units of energy are ...
4. Energy can be transferred through these stores by electrical and mechanical means, as well as by ____ and ____
5. Name 3 energy stores

Self-Assess your recall quiz answers using the key knowledge table

I do, We do, You do: Complete the following table, the first two have been done for you as a model:

Example 1: An object is thrown up into the air. When the ball is released from the person's hand:
Model Answer: The transfer is from a <u>kinetic store</u> → <u>gravitational store</u> via a <u>mechanical transfer</u>
Example 2: A moving object hitting an obstacle – e.g. a moving tennisBall being hit by a tennis racket
Model Answer: The energy transfer here is from <u>kinetic store</u> → <u>elastic store</u> via a <u>mechanical transfer</u>
Practice: Example 3: A car speeding up (remember, fuel contains a chemical energy store): _____ → _____ Via a _____ transfer
Example 4: A car slowing down (hint, the brakes get hotter): _____ → _____ Via a _____ transfer
Example 5: Bringing water to the boil in a kettle _____ → _____ Via _____
Application: State energy transfers for each example (write your answers in your book). Use the same format as the previous examples. 1. electric drill 2. Bunsen burner 3. candle 4. desk lamp 5. wind-up toy 6. car at the top of a steep hill 7. sling-shot

Plenary: For each of the following statements, state if they are true or false.

1. Energy is found only in living objects.
2. Energy is a force.
3. Energy is associated only with movement.
4. Energy is a substance or fluid.