

Be **REFLECTIVE**: Review your learning



# KNOWLEDGE ORGANISER

## PHYSICS: Energy – Transfer & work

Name: \_\_\_\_\_

### Key vocabulary

Energy	Associated with changes in temperature or with work
Joule	The unit of energy, symbol J.
Law of conservation of energy	Energy cannot be created or destroyed, only transferred.
Chemical energy store	Energy stored in the bonds of substances.
Thermal energy store	Energy in objects as a result of the motion of their particles
Kinetic energy store	Energy of moving objects.
Gravitational potential energy store	Energy of due to the position of an object in a gravitational field.
Elastic potential energy store	Energy stored when objects change shape.
Dissipation	Becoming spread out wastefully
Lubrication	Reduces friction by using oil or grease
Streamlining	Reduces air resistance (by reducing drag or resistance to motion.
Work	A way of transferring energy that does not involve heating.
Simple machine	A simple machine makes it easier to lift, move or turn things by reducing the force required to do the job.
Lever	A simple machine that multiplies the force.
Gear	A rotating lever that reduces the force required to do work.

### Key facts

The **Law of conservation of energy** states that energy cannot be created or destroyed, only transferred from one store to another. So the total energy change has the same value before and after a change.

Five important energy stores are **chemical, thermal, kinetic, gravitational potential** and **elastic**.

Energy to do with...	Type of store
food, fuels, batteries	chemical
hot objects	<b>thermal</b>
moving objects	<b>kinetic</b>
position in a gravitational field	<b>gravitational potential</b>
changing shape, stretching, or squashing	<b>elastic</b>

When energy is transferred, it moves from one store to another, but the total amount of energy does not change. E.g. lifting a book empties chemical store in the person and fills gravitational potential energy store of book.

Energy is **dissipated** when it is transferred to the thermal store of the surroundings. This energy is **wasted** because it is difficult to use for a useful purpose.

You can show how much energy is transferred usefully using the ideas of **efficiency**:

$$\text{Efficiency (\%)} = \frac{\text{useful energy}}{\text{energy input}} \times 100$$

You can reduce energy dissipation in a car by reducing air resistance using **stream lining** or reducing friction in the engine by **lubrication**.

Energy can be transferred by doing **work**. For instance you do work by lifting a book against gravity. Work done (J) = force (N) × distance (m). A simple machine makes it easier to lift things, move things, or turn things. It reduces the force that you need do a job, or increases the distance that something moves when you apply a force.

The **gear** system on a bike is a **simple machine**.

**Levers** can be used to multiply an input force by increasing the distance from which the force is applied

