Energy Types and Transfer! Year 8 Science at Home

You can help! Your child is learning about different types of energy and how energy moves and transforms from one form to another. Energy is at the heart of everything that happens in the universe!

Why are we learning this? Energy in remote community life

Energy is central to life in remote communities. Solar panels convert light energy into electrical energy to power homes and clinics. Generators convert chemical energy (fuel) to electrical energy when the grid is unavailable. The food we eat provides chemical energy that our bodies convert to movement (kinetic energy) and heat. Understanding energy transfer helps your community make better decisions about energy use and sustainability — and helps your child understand why solar power, energy efficiency and reducing energy waste all matter for the environment and the community budget.

My child will learn to:

✓ Classify energy types
Distinguish between kinetic energy (energy of movement — heat, sound, electrical) and potential energy (stored energy — chemical, elastic, gravitational).

✓ Understand energy transfer
Describe how energy can be transferred from one object to another or transformed from one type to another.

✓ Identify energy loss
Recognise that in most energy transfers, some energy is lost as heat — making the system less efficient.

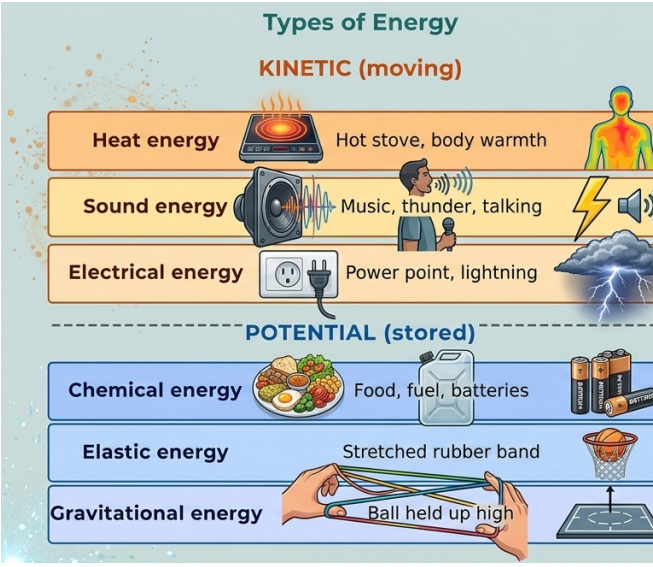
✓ Connect to everyday examples
Link energy concepts to familiar situations like solar panels, food, vehicles and appliances.

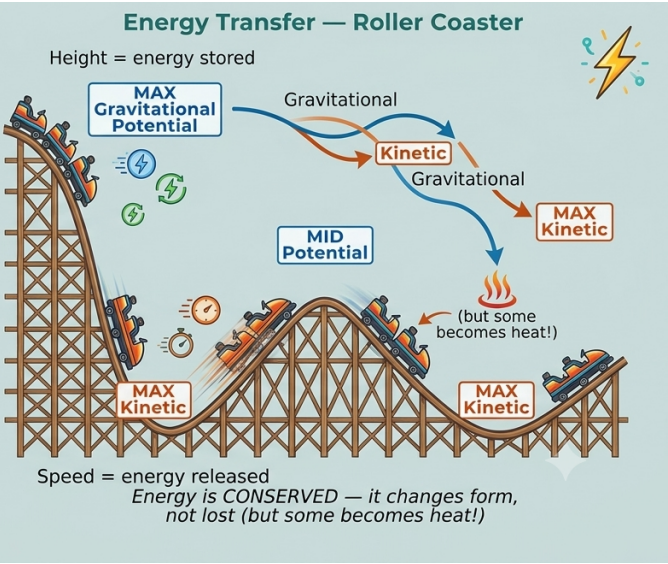
Big ideas to know:

Two big categories
All energy is either kinetic (energy of motion or activity — includes heat, sound and electrical energy) or potential (stored energy — includes chemical energy in food and fuel, gravitational potential energy in objects held up high, and elastic potential energy in stretched springs or rubber bands). Energy constantly converts between these forms.

Energy transformation
Energy cannot be created or destroyed — only transformed from one type to another (this is the Law of Conservation of Energy). When a phone charges, electrical energy transforms to chemical energy stored in the battery. When the phone plays music, chemical energy transforms to electrical, then to sound energy. Each step has a little heat lost — that is why phones get warm.

Efficiency
No system is perfectly efficient — some energy is always "wasted" as heat. A petrol car is about 25% efficient (most fuel becomes heat, not movement). A solar panel is about 20% efficient. An LED light is about 90% efficient (most electrical energy becomes light, not heat). This is why energy efficiency matters.





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Energy transformations in everyday life

Device	Energy in	Energy out (useful)	Energy wasted
Solar panel	Light (solar)	Electrical	Some heat — panels get hot in sun
Generator (diesel)	Chemical (fuel)	Electrical	Lots of heat and sound — very inefficient
Phone battery	Electrical (charging)	Chemical (stored)	Heat — why phone gets warm when charging
LED light bulb	Electrical	Light	Very little heat — highly efficient!
Human body (exercise)	Chemical (food)	Kinetic (movement), heat	About 75% becomes heat — why we sweat!
Petrol car engine	Chemical (petrol)	Kinetic (movement)	Huge amount of heat — only ~25% efficient

Think Like a Scientist — Energy Tracker

Choose a device in your home (torch, fan, solar panel, phone charger). Trace the energy from its source all the way to its useful output. Draw each energy transformation as a flow diagram with arrows. Note where energy might be wasted as heat.

Ask: "Where does the energy start? What form is it in? How does it transform along the way? Is any energy wasted? How could we make it more efficient?" These are the questions engineers ask!

You will need: *(Materials)*

- Paper and pencil (for energy flow diagram)
- A household device to investigate (torch, fan or phone charger)
- Electricity or solar system display (optional)
- Calculator or phone (optional)

Energy chains to trace:

1. Torch: chemical (batteries) → electrical → light + heat
2. Solar-powered fan: light → electrical → kinetic + heat
3. Cooking food on a gas stove: chemical (LPG) → heat + light
4. Your body during a run: chemical (food) → kinetic + heat
5. Radio: electrical → sound + heat

Questions to ask your child

1. What type of energy is stored in food? What happens to it when you eat and exercise?
2. Why do appliances always produce some heat, even when heat is not their job?
3. What is the law of conservation of energy? What does it mean for energy "running out"?
4. Why is a diesel generator less environmentally friendly than a solar panel, even if they produce the same amount of electricity?
5. If you double the speed of a ball, by how much does its kinetic energy increase? (clue: it is more than double!)
6. How does a solar panel transform light into electricity? What happens at the particle level?
7. Why is energy efficiency important for both our power bills and the environment?

A "Sankey diagram" is a visual tool for showing energy transfer — the width of each arrow represents how much energy flows in that direction. If your child draws one for a light bulb, they will see immediately that most energy goes to heat, not light — that is why we switched to LEDs!

Key words to know:

Kinetic energy	Energy of motion or activity — includes heat (thermal), sound, electrical and movement
Potential energy	Stored energy — includes chemical, gravitational, elastic and nuclear potential energy
Energy transformation	When energy changes from one form to another — e.g. chemical to kinetic when a car accelerates
Law of Conservation of Energy	Energy cannot be created or destroyed — only transformed from one type to another
Efficiency	How much useful energy output is produced per unit of energy input — expressed as a percentage
Sankey diagram	A diagram showing energy flows, where arrow width represents the amount of energy
Thermal energy	The heat energy associated with the temperature of an object — always produced in energy transfers

Key words to look up

Kinetic energy · Potential energy · Energy transformation · Conservation of Energy · Efficiency · Thermal energy · Sankey diagram

What school will check

By the end of Year 8, your child needs to classify different types of energy as kinetic or potential, and represent transfer and transformation of energy in simple systems.

Try it at home!

Look at your household electricity or solar system. How many kilowatt-hours does your home use in a day? What are the main appliances using that energy? Which ones might be inefficient and waste energy as heat?