

Y7 KNOWLEDGE ORGANISER

BIG IDEA: ENERGY

TOPIC: ENERGY AT HOME

Key Word	Definition
fuel	A compound that stores chemical energy. Burning the fuel in oxygen releases thermal energy
fossil fuel	Fuels that have been made over millions of years such as coal, oil and natural gas.
non-renewable	Cannot be replenished and will run out
renewable	Can be replenished and will not run out
power	The amount of energy used in 1 second
efficiency	Using the least amount of energy to complete a task
input energy	The energy a device starts with
output energy	The energy released by a device
carbon dioxide	The gas released when we burn fossil fuels which contributes to global warming
kWh	Kilowatt hour – it is a large amount of energy
appliance	Device to perform a specific task
turbine	An engine that turns fluid movement into usable energy
generator	Moving a magnet inside a coil of wire produces electricity
power station	A facility that generates electrical power

Making Electricity

Most electricity is produced by turning a turbine, which turns a generator, generating electricity.

Making the turbine spin can be done by:

- Wind
- Water
- Boiling water into steam



Boiling water can be done by burning fuels or by nuclear reactions

Energy Resource	Is it renewable?	Does it release CO ₂ ?
Coal	No	Yes
Oil	No	Yes
Natural gas	No	Yes
Nuclear	No	No
Wind	Yes	No
Geothermal	Yes	No
Hydroelectric	Yes	No

Power

- Appliances transfer energy
- How much energy depends on their power rating
- We can find the power rating on the devices label
- If we know how long the device is on for then we can work out the total energy transferred using the equation:

$$\text{Energy Transferred (J)} = \text{Power (W)} \times \text{time (s)}$$

If this hairdryer is used at full power for 100 s
Then the energy transferred is:

$$\text{Energy Transferred} = 2000 \text{ W} \times 100 \text{ s}$$

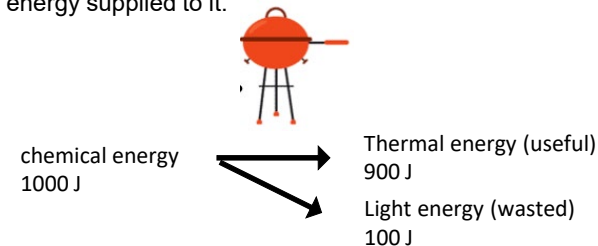
$$\text{Energy Transferred} = 200,000 \text{ J}$$



Model SG620
230-240V ~ 50Hz 1850-2000W
Patented Reg Design Applied
Made in China
DO NOT IMMERSE IN ANY LIQUID

Efficiency

The efficiency of a device or appliance is a comparison between the energy it transfers as useful energy and the total energy supplied to it.



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

Using the example above:

$$\text{Efficiency} = \frac{900 \text{ J}}{1000 \text{ J}} \times 100$$

$$\text{Efficiency} = 90\%$$

The Cost of Energy

The amount of energy used by most devices gives really large numbers in joules. These numbers are too big to be convenient so instead we need a different unit to make the numbers manageable.

From the equation:

$$\text{Energy transferred (J)} = \text{power (W)} \times \text{time (s)}$$

We can see that 1 J is the same as 1 W x s or Ws.

To make the numbers more manageable, instead of watts we use kilowatts, and instead of seconds, we use hours.

This means that a 2 kW heater being used for 2 hours would transfer 4 kWh of energy.

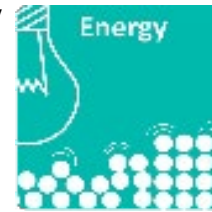
And a 3 kW heater being used for 4 hours would transfer 12 kWh of energy.

Energy suppliers charge people for how many kWh's they use.

- If 1 kWh costs £0.25 and then having the heater above on for 2 hour would cost 4 kWh x £0.25 = £1

Knowledge organiser

Big idea: Energy



Y7 topic: Energy at home

I have already learned:

In KS2: (no related content in KS2 nat.cur.)

In Y7 energy intro: Energy is the amount of change that happens. Energy cannot be created or destroyed. It is measured in joules.

This topic links to:

Y8 thermal energy Y8 electrical energy

KS4 P1 energy; P2 electricity; P3 particle model; P4 atoms and radiation; P5 forces; P6 waves; P7 magnets

It is important to study about Energy at Home because...

Energy is the amount of change that can happen. We use energy in our homes to make all kinds of changes. The electricity comes from non-renewable or renewable sources of energy. All these energy sources have advantages and disadvantages. Using energy costs money. More efficient appliances cost less and may have less effect on the environment.

Possible careers involving Energy at Home are...

There are so many careers where knowing about energy at home is a huge part. Here are a few:

Energy engineer

Climate scientist

Electricity distribution worker

Ecologist

Wind turbine technician

Domestic appliance engineer

Design and development engineer

Electrical engineer

Nuclear engineer

Geoscientist

Civil engineer

Electrician