

SUBJECT: Science

UNIT: Y7 Energy costs and transfers



While you were away.

Lesson 1: Food as fuel

1. What is a fuel?
2. Why do we need energy?

Lesson 2: Non-renewable energy resources

1. What does non-renewable mean?
2. Give examples of non-renewable energy resources

Lesson 3: Renewable energy resources

1. What does renewable mean?
2. Give examples of renewable energy resources.
3. State one advantage of renewable resources.
4. State one disadvantage of renewable resources.

Lesson 4: Energy and power

1. Write the equation that links power, energy and time.
2. What are the units of power?
3. What is the unit of energy?

Lesson 5: Energy costs

1. Write the equations used to calculate energy costs
2. What are the units of energy costs?

Lesson 6: Energy adds up

1. Name 5 different types of energy
2. Name the energy stored in an object that has a high temperature.
3. Name the type of energy stored in food.

Lesson 7: Dissipation of energy

1. What is the law of conservation of energy?
2. Draw the energy transfers in an electric bulb.
3. Where does wasted energy go?

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Types of energy

There are many types or forms of energy. Whenever something happens energy gets transferred from one form into another. By transferred we mean that it has changed from one type of energy to another. Some types of energy are called energy stores – the energy just sits in an object or place until something happens. Conservation of energy. Energy cannot be created or destroyed, only transferred. Energy is measured in joules, J. Forms of energy Magnetic Kinetic Heat (Thermal) Light Gravitational Potential Chemical Sound Elastic Electrical Nuclear

What is a fuel?

A fuel is a '**material which can be burned to release energy**'

We need energy to many things, including walking, breathing and even sleeping! Your brain needs energy to work.

Ambitious Vocabulary

Conservation, dissipation, finite

A fuel is a substance that contains a store of chemical energy or nuclear energy. We use this energy released from the fuels to generate electricity in power stations, which can then be transferred around to homes, schools, hospitals and offices. Some fuels are also used to make materials like plastic, grease, cosmetics and tarmac.

Efficiency

Humans have made machines and devices that do useful energy transfers for us. Unfortunately, we are not able to make devices that transfer all the energy we put into a device into the useful energy we want – there is always some waste energy. Input, useful and waste energy. Efficiency is a number. The bigger the number the better a device is at transferring energy usefully. The lower the number the less useful a device is at transferring energy.

$$\text{Efficiency} = \frac{\text{Useful energy}}{\text{Input energy}}$$

Power

$$\text{Power} = \frac{\text{Energy}}{\text{Time}}$$

$$P = \frac{E}{T}$$

Where: P = Power (Watts, W) E = Energy (Joules, J), t = time (seconds, s)

Non-renewable (finite)

Non-Renewable or Finite fuels cannot be replaced at the rate humans are using them, so eventually we are going to run out.

Example Coal takes about 220 million years to form.

The coal we use today was formed millions of human lifetimes ago.

Once we use that coal, we won't be alive when new coal is available.

Renewable resources

As we are slowly running out of fossil fuels, we need other ways of making electricity and satisfying our fuel needs. A lot of renewable energy resources rely on nature or the weather which means they are not available to use all the time.

Advantages

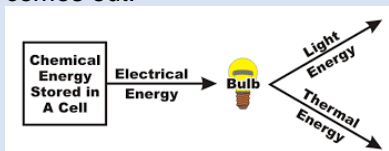
- The resources are not depleted (used up)
- They do not damage the planet by producing pollutants
- They are low maintenance and do not require humans to operate them.

Disadvantages

- Can be unreliable as they depend on the weather
- They are expensive to build
- They do not produce as much power as non-renewable.

Energy transfers

We can represent using diagrams the energy transfers that take place during some processes, whether that be turning on a torch or you are sliding down a slide. We know that the energy we put into something must be the same as the amount of energy that comes out.



Energy costs

Cost = power x time x price

OR

Cost = Number of units x cost per unit

Where: Units = kWh kiloWatthours

Calculations

Values:

Equation:

Substitute

Answer: