



Lesson 1

Topic: Review

Reviewing energy types

Learning alerts and misconceptions

Be aware of students thinking that the source of energy is the same as the type of energy.

Suggested next steps for learning

- Explain that many types of energy can come from a number of different sources (e.g. light energy: the sun, fire, a torch).

Lesson notes

In this lesson, students will review what they already know about energy types and sources of energy. They will review four types of energy: heat energy, light energy, movement (kinetic) energy and sound energy. Students will also identify how each of the energy types are used in daily life.

Energy types refer to the four types of energy students have already learned about: heat, light, movement and sound. Each energy type will have an energy source, which is where the energy comes from. It is important that students understand that energy types can come from many different energy sources; for example, light is a type of energy that comes from sources such as the sun, fire, a torch, electric light bulb.

Heat energy: A type of energy that is transferred between two regions of different temperature, always from hotter to cooler; for example, heat from the heater is transferred to the cooler surrounding air. Electricity is the source of heat in an electrical heater.

Light energy: Light energy is a form of energy that can be detected by the eye. e.g. light from the sun or from a light bulb powered by electricity.

Movement energy: A type of energy that occurs as a result of motion; for example, when a fan is powered by electricity, it results in the movement of the fan blade then the movement of the air. Also known as kinetic energy.

Sound energy: sound energy is an energy type where vibrations are transmitted and can be detected by our ears.

At the end of the lesson, it may be beneficial to identify whether students can:

- identify sources for different energy types
- describe energy use in daily life.

Lesson answers

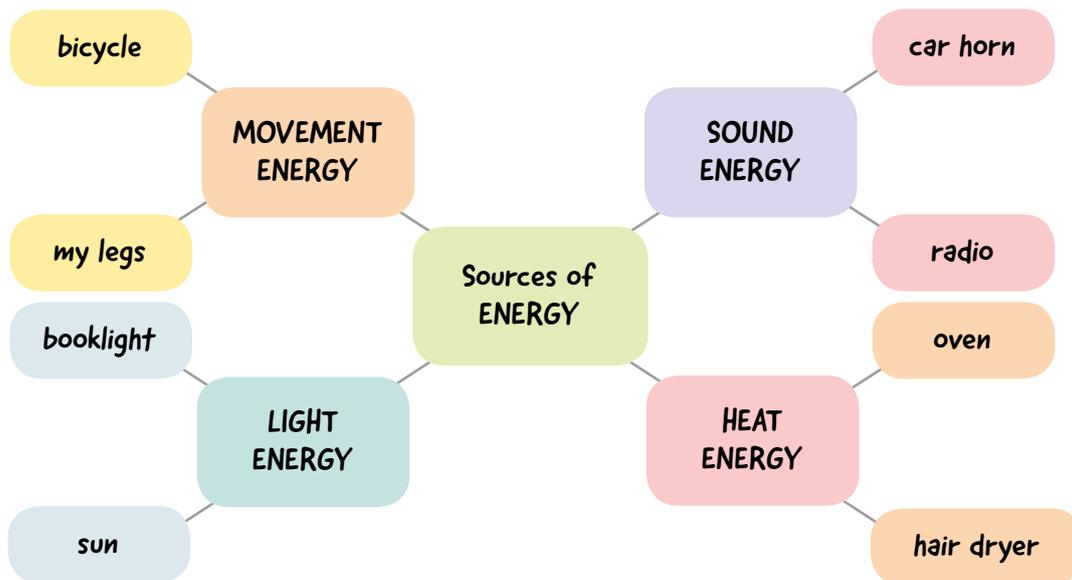
1.

- light energy smell energy loud energy sound energy
 electrical energy heat energy movement energy soft energy

2. Students watch the [Video – Fuelling our futures: Ask a scientist – Part 1](#).

a) Heat, light, sound, wind, chemical, electrical, elastic, gravitational, nuclear

3. For example:



Identify different energy types

4. a)

Source 1



Energy type: Sound energy

Energy source: The air travelling through the vocal cords of the children is the source of the sound energy.

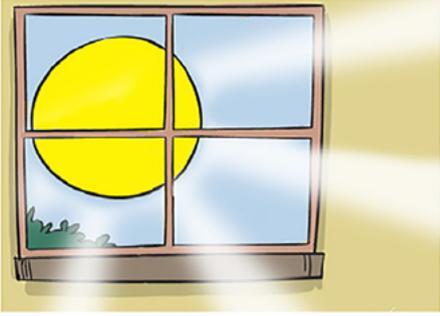
Source 2



Energy type: Heat energy/light energy

Energy source: The fire is the source of the energy

Source 3



Energy type: Light energy

Energy source: The sun is the energy source.

Source 4



Energy type: Movement energy

Energy source: The boy's leg muscles are the energy source.

b)

Source 1
Sound energy can be used in our daily lives to communicate with each other, hear the radio and listen to the TV.
Source 2
Heat energy can be used in our daily lives to cook and heat food, dry our hair and heat rooms.
Source 3
Light energy can be used in our daily lives to light rooms at night.
Source 4
Movement energy can be used in our daily lives to ride our bicycles.

5. The following definitions are located in the [Slideshow 1 – Energy terms](#). Students may develop their own definitions but they must have the following elements to ensure a correct definition is reached.

- Heat energy: A type of energy that is transferred between two regions of different temperature.
- Light energy: A form of energy that can be detected by the eye.
- Movement energy: A type of energy that occurs as a result of motion.
- Sound energy: Sound energy is an energy type where vibrations are transmitted and can be detected by our ears.

Lesson 2

Topic: Alternative energy sources

Investigating waste as an energy source

Learning alerts and misconceptions

Be aware of students thinking that waste products are no longer able to be used for any purpose.

Suggested next steps for learning

- Explain to students that waste products may be used as they are (repurposed), recycled or used as a new energy source.

Lesson notes

In this lesson, students will identify types of waste (biowaste) that can be used as energy sources. Biowaste is organic waste products from industries that can be used as an energy source, for example: crop waste, livestock manure, wood scraps, paper waste, food scraps and sewage. Bioenergy is the renewable energy that can be extracted from biowaste.

Lesson answers

- a) For example: Crop waste, food scraps, paper production waste, wood scraps, livestock manure, sewage.
 - b) For example: Biowaste is the waste products from organic materials, e.g. wood scraps. Bioenergy is the energy that can be extracted from biowaste, e.g. the energy that can be extracted from wood scraps.
- a) For example: Landfill is rubbish that isn't recycled or reused and ends up in landfill sites.
 - b) For example: Over time, the organic materials in landfill decompose and make biogas.
 - c) For example: Biogas is collected from the landfill through a network of pipes. It is then cleaned to isolate methane gas. The methane gas is then burnt to generate electricity.
 - d) False. For example: Biogas is a renewable energy source because there will always be rubbish or organic materials decomposing.
- a) Benefits of recycling food scraps:
 - can be converted to energy
 - generates methane gas which can be used to generate electricity
 - residue can be composted and used to grow more food.
4. No answer required.

Lesson 3

Topic: Alternative energy sources

Investigating sugar cane as an energy source

Learning alerts and misconceptions

Be aware of students thinking that waste products are no longer able to be used for any purpose.

Suggested next steps for learning

- Explain to students that waste products may be used as they are (repurposed), recycled or used as a new energy source.

Lesson notes

In this lesson, students will explore how sugarcane waste (bagasse) is used as a bioenergy source.

Science start-up answers

1. Agricultural waste, wood scraps, paper production waste, crop waste, livestock manure, food scraps, sewage.

Lesson answers

1. a. For example: Crop waste, food scraps, paper production waste, wood scraps, livestock manure, sewage.
2. No answer required.
3. a) Bagasse is the fibrous pulp that is processed into a usable form after sugarcane has been squeezed for its juice.
b) Bagasse is used to produce heat and electricity in sugar mills.
c) Bagasse is a natural by-product of sugar production, requires little energy to repurpose as animal food, is readily available each year, and is environmentally sustainable.
d) False. Bagasse is a renewable energy source because sugarcane crops are grown and harvested on a yearly basis so there will always be sugarcane waste that can be turned into bagasse.