

STEAM MACHINES

WHERE DOES PUFFING BILLY GET ITS ENERGY FROM?

LEVEL

Level 3 – Level 4

ACTIVITY DESCRIPTION

Students explore the concept of energy. They learn about different types of energy with a focus on light, sound and heat energy. They learn energy related definitions and use scientific language to describe their findings.

THEME

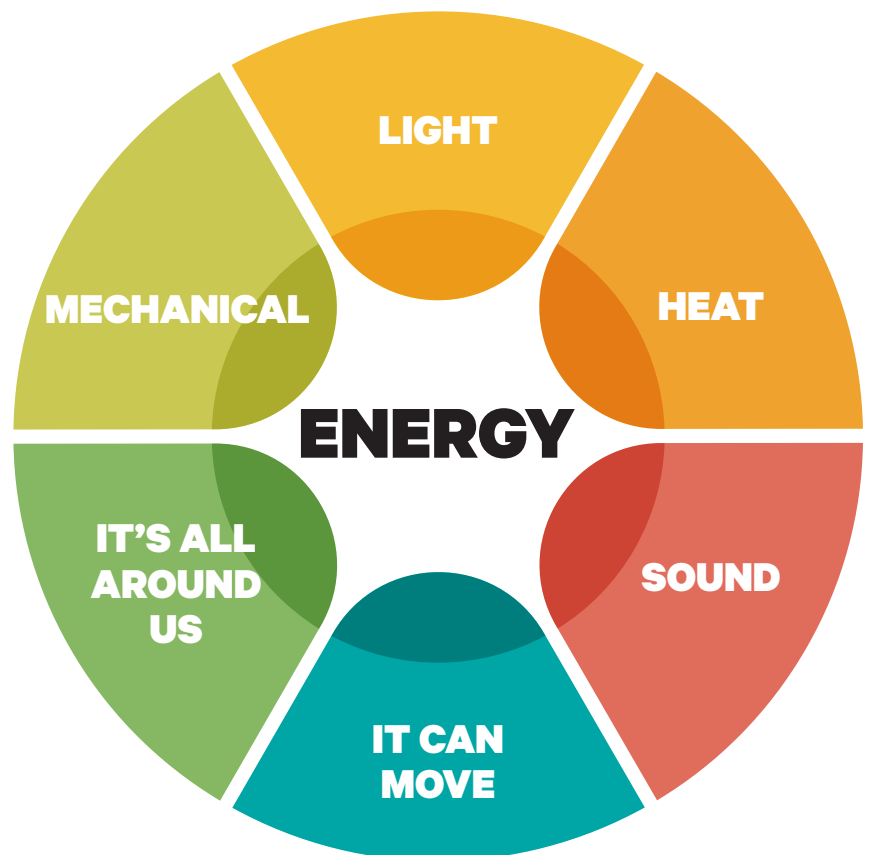
- Energy
- Different forms of energy

MATERIALS REQUIRED

- “Energy – Find a word and definitions” worksheet
- “Energy Sources” worksheet
- Coloured pencils
- Pens
- Scissors
- Glue

INSTRUCTIONS

Ignite student’s excitement for their excursion to Puffing Billy Railway by asking them if they know where Puffing Billy gets its energy from? What is energy? What other words have we heard when we talk about energy. What form of energy makes Puffing Billy move along the track? As a whole group on a white board, start building a mind map about “Energy”.



INSTRUCTIONS CONT.

Once students have demonstrated they are familiar with the words used around the concept of “energy”, integrate the meaning and sources of sound, light and heat energy. Discuss items that students use in their daily lives, that fit into these categories.

Hand out the worksheet on “Energy Sources”. Allow students to discuss and complete the worksheet as individuals. Encourage small group discussions to extend their knowledge.

Hand out the “Energy - find a word” worksheet. Students will be starting to use scientific language when referring to energy concepts. Encourage students to work individually or in pairs to discuss the definitions of the words and build their skills and understanding.

Once the students have finished the “find a word” as a whole group activity, discuss the definitions. Add the definitions to the mind map, reinforcing the concepts and extending student learning.

Ask the students, where do you think Puffing Billy gets its energy from? Let the students know they will find out the answer when they visit Puffing Billy Railway on their excursion!

SUGGESTIONS FOR ASSESSMENT

Participation in class and small group discussions. Ability to contribute to the “Energy” mind map. Use of key scientific vocabulary. Successful completion of the worksheets.

CURRICULUM LINKS

SCIENCE

Science knowledge helps people to understand the effects of their actions ([VCSSU056](#))

Heat can be produced in many ways and can move from one object to another; a change in the temperature of an object is related to the gain or loss of heat by the object ([VCSSU063](#))

BACKGROUND INFORMATION

ENERGY DEFINITIONS

Electricity is the flow of tiny particles called electrons and protons. It can also mean the energy you get when electrons flow from place to place. Electricity can then power such things as heaters, light bulbs, and computers. Electricity provides most of the energy to run the modern world.

Energy is “the ability to do work”. Energy is how things change and move. It is everywhere around us and takes all sorts of forms. It takes energy to cook food, to drive to school, and to jump in the air.

Renewable energy is made from resources that nature will replace, like wind, water and sunshine. Renewable energy is also called “clean energy” or “green power” because it does not pollute the air or the water.

Non- renewable energy comes from sources that will run out or will not be replenished for thousands or even millions of years. Examples are coal, oil and gas.

Fossil Fuels include petroleum (oil), coal, and natural gas. These materials are called fossil fuels because, like fossils, they are the remains of organisms that lived long ago. All fossil fuels are non-renewable.

Light energy is a form of electromagnetic radiation. Light consists of photons, which are produced when an object’s atoms heat up. Light travels in waves and is the only form of energy visible to the human eye.

Sound is a type of energy made by vibrations. These particles bump into the particles close to them, making them vibrate and causing them to bump into more air particles. This movement, called sound waves, keeps going until they run out of energy. If your ear is within range of the vibrations, you hear the sound.

Solar energy is light, heat, and other forms of energy given off by the Sun. Solar energy can be collected and used to heat buildings and to make electricity.

Heat energy is the result of the movement of tiny particles called atoms, molecules or ions in solids, liquids and gases. Heat energy can be transferred from one object to another.

Pollution is when gases, smoke and chemicals are introduced into the environment in large doses that makes it harmful for humans, animals and plants. Some forms of pollution can be seen, some are invisible.

Climate Change. Climate is the average measurements of temperature, wind, humidity, snow, and rain in a place over the course of years. Climate Change is the change in weather, over a long time.

Sustainability means using natural resources in a way that we could keep doing for a long time. We can be more sustainable by reducing our use of natural resources. We can also help restore natural resources.

Coal is a fossil fuel and is the altered remains of prehistoric vegetation that originally accumulated in swamps and peat bogs.

Steam is water in the gas phase. It is commonly formed by boiling or evaporating water.

Gas is one of the four states of matter that has no fixed shape or volume. Solids, liquid and plasma make up the other three states of matter.

ENERGY – FIND A WORD

Complete the find a word and write a definition for each of the words below.

U	D	C	K	N	A	D	P	B	F	I	Z	D	C	L	R	T	V	A	I	K	G	Z	P	I
Q	L	E	D	M	D	Z	B	Y	R	E	N	E	W	A	B	L	E	P	S	R	S	F	C	G
W	X	S	E	S	F	A	J	N	F	P	Z	I	O	B	W	Y	Z	W	A	H	O	U	A	T
G	H	D	L	O	U	H	W	K	A	O	X	M	G	M	J	P	T	T	O	Q	L	T	F	J
T	D	S	E	N	J	X	E	X	V	S	S	Q	E	L	V	D	U	T	U	J	A	H	J	T
M	N	P	C	T	O	H	L	Z	C	W	U	S	Q	A	X	X	I	M	C	D	R	B	D	B
M	Z	K	T	L	E	N	D	K	T	G	J	S	I	J	A	O	H	E	Y	V	P	J	H	X
B	A	S	R	U	I	G	R	X	P	I	D	V	T	L	G	Q	I	S	C	A	O	D	Q	B
V	W	G	I	Q	O	M	M	E	N	O	X	H	Z	A	F	N	B	W	A	F	W	B	A	G
M	P	Z	C	V	A	O	A	G	N	F	L	S	D	W	I	U	M	D	V	O	E	D	P	E
G	D	J	I	Z	O	Z	U	T	N	E	U	L	S	P	Z	N	E	L	L	O	R	K	I	N
P	O	J	T	P	J	E	Z	E	E	N	W	M	U	Y	W	G	A	L	D	R	C	M	D	E
O	C	S	Y	E	Q	G	O	G	C	C	J	A	Q	T	L	M	Q	B	X	U	W	G	A	R
Z	W	F	G	S	G	T	A	H	C	G	H	T	B	C	I	I	D	L	I	R	N	G	C	G
P	Y	W	O	A	E	X	Z	L	Q	M	Y	A	Z	L	R	O	G	A	A	L	K	P	K	Y
V	C	K	L	L	H	Z	J	Q	Q	L	I	Q	N	F	E	R	N	H	K	T	I	R	G	E
E	J	E	S	L	W	U	G	Y	O	H	E	A	T	G	Q	E	A	W	T	B	F	T	O	U
K	N	V	H	C	S	M	G	N	S	B	L	Z	N	I	E	P	K	E	Z	G	P	K	Y	D
H	V	X	V	J	F	X	L	L	C	Y	Q	D	T	C	U	U	F	B	Y	W	I	U	J	O
O	H	C	B	X	T	C	O	A	L	X	E	J	A	M	E	J	P	Y	D	W	Z	F	F	V
G	B	R	L	E	E	H	J	J	G	X	B	C	D	C	P	J	T	Z	G	E	V	J	P	X
A	C	U	F	N	S	H	Q	X	J	E	Q	M	R	B	N	B	X	R	R	F	F	R	Z	I
S	K	C	A	G	H	M	Z	F	J	X	Y	Z	V	C	Y	J	W	Q	I	F	B	Z	F	U
J	E	C	A	Q	C	D	B	M	P	Y	O	K	G	W	E	L	S	O	U	N	D	F	Q	W
B	P	M	A	E	T	S	N	N	D	D	D	N	B	J	N	B	W	H	O	K	S	J	C	Z

Electricity

Energy

Renewable

Non- renewable

Light

Fossil Fuel

Sound

Solar Power

Heat

Pollution

Climate Change

Sustainability

Steam

Coal

Gas

ENERGY SOURCES

Cut, sort and paste the pictures on the next page into the correct column in the table.

LIGHT ENERGY	SOUND ENERGY	HEAT ENERGY

ENERGY SOURCES

Cut, sort and paste the picture into the correct column in the table.

<p>A HOT AIR BALLOON</p> 	<p>A TORCH</p> 	<p>THE SUN</p> 
<p>A CLOCK</p> 	<p>A CANDLE BURNING</p> 	<p>A DRUMKIT</p> 
<p>A LIGHT SWITCH</p> 	<p>FIREWORKS</p> 	<p>BIRD</p> 
<p>A PERSON SINGING</p> 	<p>A WOOD FIREPLACE</p> 	<p>A LIGHT GLOBE</p> 