

Merrylands High School



Science homework booklet

Energy



Due date: Thursday November 14

Name: _____

How to complete this homework booklet

This homework booklet is divided into lessons. There are 5 lessons altogether. Each lesson has a video for you to watch and then some worksheets for you to complete. If you don't understand the concepts that are explained in the video, you can rewind the video and re-watch it. If you still don't understand, you can ask Miss Leung on Edmodo or at school. Posting a question onto Edmodo will also allow other students in your class to help you.

The video lessons are online at www.youngscientistsmhs.weebly.com/homework-and-assignments. If you don't have internet at home, ask Miss Leung to give you a USB with the videos so you can watch the videos with no internet connection.

After you watch each video, the worksheets require you to hand write answers and contribute to discussions on Edmodo if you have internet at home.

When to hand in this homework booklet

This homework booklet needs to be shown to Miss Leung every Tuesday. She will mark the work that you have done each week. You need to complete at least one lesson every week, but you can do more if you want to and finish the booklet early.

The whole booklet needs to be finished and handed in **by Thursday November 14**.

Energy Lesson 1 - Types of Energy

Watch the Energy Lesson 1 video before doing any of the activities in this booklet for lesson 1. Go to www.youngscientistsmhs.weebly.com/homework-and-assignments or use the videos Miss Leung gave you.

Learning intention – To understand there are different types of energy

Success criteria

- I can describe different kinds of energy
- I can define kinetic and potential energy
- I know the difference between renewable and non-renewable energy

Activity 1 – Types of energy

Read the information in the box below.

energy come from greek words meaning 'containing work', Energy was what you needed to do work or to change something. energy may be difficult to describe but you can see the changes caused by it. Energy can be divide into different types. you are already familiar with heat enrgy, light energy and sound energy as they are detected by your senses. Heat energy is detected by your skin light energy by your eyes and sound energy bye your ears Another form of energy is electrical energy. this is the type of energy that is most easily changed into other forms of energy. A electrical heater, electric light and sound system are designed to change electrical energy into heat light or sound energy at the flick of a switch.

The text above has mistakes: punctuation, incorrect verbs, tense and spelling. The text is also written as one long text with no paragraphs.

Write out the text below, correcting all the errors and beginning new paragraphs where they are needed.

Activity 2 – Kinetic and potential energy

Read the information in the box below.

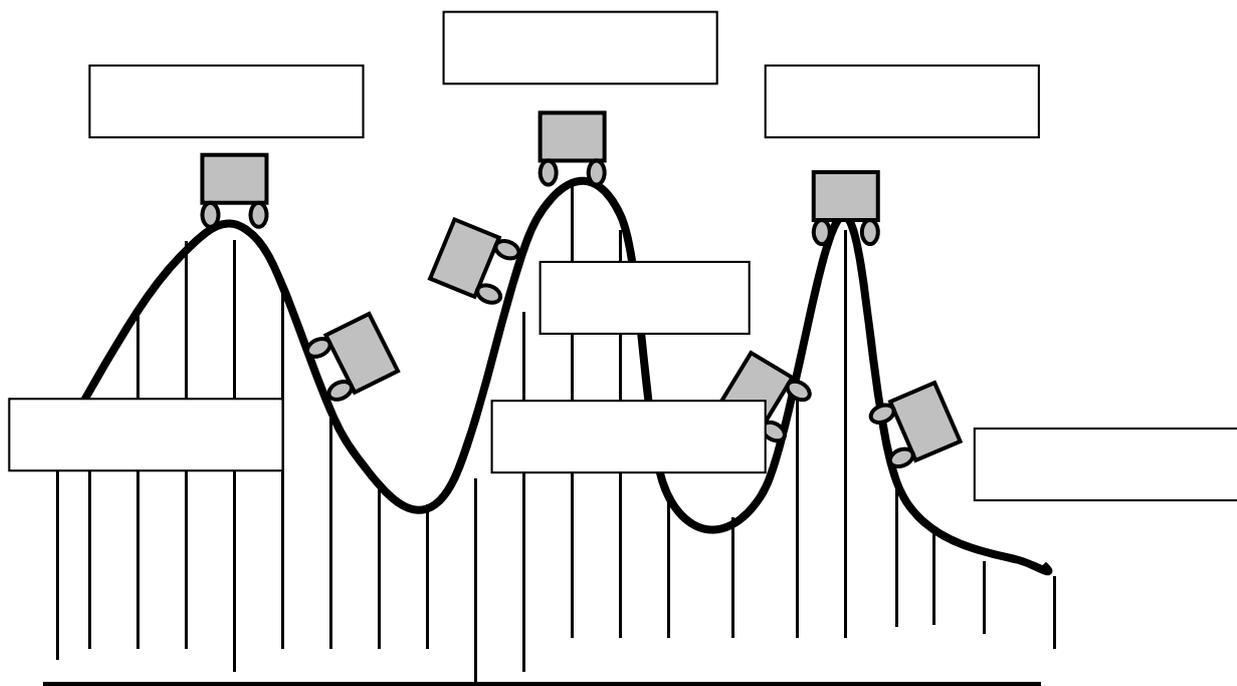
Moving objects have energy called **kinetic energy**. You feel the effects of kinetic energy if a moving object hits you.

Energy stored in an object is called **potential energy**. Potential means having the ability to do something. When an object has potential energy, it means it has the ability to do work. An object has potential energy when it is placed up high and can fall down. Potential energy can be stored in any object that can be stretched, bent, compressed (squashed) or twisted out of shape. If the object is allowed to return to its original shape the potential energy changes to kinetic energy.

Kinetic and potential energy can be explained in a rollercoaster ride.

When the rollercoaster is moving up and down the ride, it has kinetic energy because the rollercoaster is moving. When the rollercoaster is at a peak, it is not moving but it has the ability to move downwards. Therefore the rollercoaster has potential energy.

Label whether the rollercoaster has potential energy or kinetic energy in the diagram above.

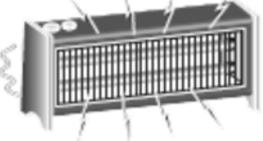
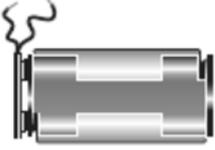
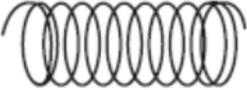


Activity 3 - Describing energy situations

Complete the table by using one of the terms below to describe each situation.

- a person running
- a radiator giving out heat
- a glowing light globe
- a squashed spring
- listening to the radio
- batteries for a torch

Name the energy in each situation using the list of energy words:
electrical, heat, kinetic, light, potential, sound.

Situation involving energy	Describe the situation	Name given to the energy
	Eg. A radiator giving out heat	Eg. Heat
		
		
		
		
		

Activity 4 - Edmodo Discussion

Go <https://merrylands.edmodo.com/post/164214067> and reply to the post "What do you think is the most important type of energy? Why? Do you think people need to use more renewable sources of energy? Why or Why not?"



Also reply to at least one student's post on this thread.

Energy Lesson 2 – Energy Changes

Watch the Energy Lesson 2 video before doing any of the activities in this booklet for lesson 1. Go to www.youngscientistsmhs.weebly.com/homework-and-assignments or use the videos Miss Leung gave you.

Learning intention – To understand that energy changes from one type to another

Success criteria

- I can identify energy changes
- I can say that energy cannot be created or destroyed
- I can describe the law of conservation of energy
- I can use arrows to show energy changes

Activity 1 - Describing energy transformations

Transform means change. One type of energy can be changed into another type of energy. For example, when you turn on a light, electrical energy is transformed into light energy. When you roll a ball down a ruler, potential energy is transformed into kinetic energy.

You can demonstrate that energy undergoes transformations by completing the sentences below.

In an electric heater electrical energy is changed into h_____ energy.



When lightning strikes electrical energy is changed to l_____ energy that you can see and s_____ energy that you can hear.



When you lift an object upwards the object gains p _____ energy. If you let the object fall this potential energy is changed into k _____ energy of the moving object.



An electric fan changes e _____ energy to kinetic energy.



Activity 2 – Using arrows to show energy transformations

For each of the following situations, use arrows to show the kinds of energy transformations taking place.

Situation	Energy transformation with arrows
A heater is changing electrical energy into heat energy. 	Electrical → Heat
Lightning is changing electrical energy into light and sound energy. 	Electrical → Light + Sound
A spoon being dropped is changing potential energy into kinetic energy. 	_____ → _____
An electric fan is changing electrical energy into kinetic energy. 	_____ → _____
A candle is changing chemical energy into light energy. 	_____ → _____
A vacuum cleaner is changing electrical energy into kinetic energy and sound energy. 	_____ → _____ + _____
Clapping your hands is changing kinetic energy into sound and heat energy. 	_____ → _____ + _____

Activity 4 – Edmodo discussion

Go to <https://merrylands.edmodo.com/post/164214254> here and reply to the post “When you clap your hands, you change kinetic energy into sound and heat energy. How much of the energy you put into clapping are changed into the sound and heat energy? All of it or some of it?”



Also reply to at least one student’s post on this thread.

Energy Lesson 5 – Light and sound energy

Watch the Energy Lesson 3 video before doing any of the activities in this booklet for lesson 1. Go to www.youngscientistsmhs.weebly.com/homework-and-assignments or use the videos Miss Leung gave you.

Learning intention – To understand how sound and light energy travels from one place to another

Success criteria

- I can identify that sound energy travels through vibrations
- I can identify that light travels in straight lines
- I can explain why sound cannot travel through a vacuum
- I can recall that light can travel through a vacuum

Activity 1 – Sound energy

Read the information and fill in the missing words.

What is sound energy?

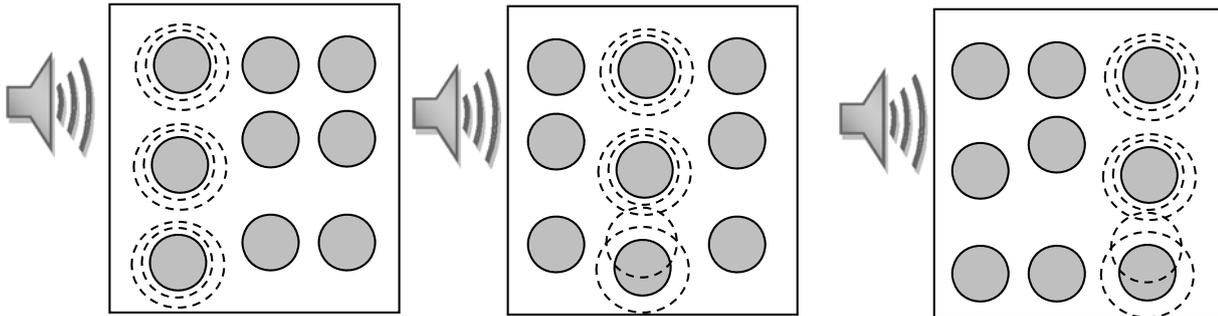
All sounds are caused by vibrations. When you speak or sing, the vocal cords in your throat vibrates. You can feel the vibrations if you put your hand over the front of your throat. These vibrations cause the air in your throat and mouth to vibrate. The air around you vibrates. The sound is heard by you or someone else when air surrounding you vibrates. The travelling vibration is called a sound wave.

Sound energy needs to travel through a medium. A medium is any substance or matter such as air or water. There is no matter in space so sound cannot travel through space.

How does sound energy travel

The way sound energy travels is explained by the particle model. The particle model states that all substances are made of particles and these particles vibrate. Sound makes particles in a substance vibrate forwards and backwards. These moving particles hit the particles beside them, passing on the energy so the next particles start to vibrate. And so on it goes, until the energy has passed right through the substance.

Example: sound travelling through a solid



All substances are made of particles. The sound energy makes the particles in the solid closest to it vibrate.

The particles vibrating pass on their energy to the next particles by bumping them, carrying the sound energy.

The vibrations carrying the sound energy is passed on to all of the particles in the solid.

Fill in the missing words

Sound can only move through _____ because sound energy needs to travel by making particles in matter vibrate forwards and backwards in a pattern called a sound wave. Sound cannot be heard in space because space has no _____. The substance that sound energy travels through is called _____. The way sound energy travels is explained by the _____ model. The particle model states that all matter are made of _____. When vibrating particles hit other particles, they pass on energy. Energy can be passed from one particle to another particle without changing the _____ that is heard.

Word Bank

medium
particle
particles
sound
matter
matter

Activity 2 – Light energy

Fill in the missing words in the passage below.

Light is a form of e_____ that does not require a m_____ to travel. This means light can travel through a vacuum (an area with no matter). The sun's rays travel through the vacuum of s_____ before finally reaching Earth. But we don't hear the massive explosions on the sun since sound cannot travel through a vacuum.

Light travels in s_____ lines. We can see this when we examine the light shining from a torch. The l_____ have edges that are s_____. If you hold up your hand in front of a light projector you will notice the shadow has a sharp edge.

Like any other kind of energy, light can be t_____ into other types of energy. Other types of energy can also be transformed into light energy. For example, light energy can t_____ into e_____ energy into solar powered calculators. Chemical energy can transform into light energy in glow sticks.

Activity 3 – Edmodo discussion

Go to <https://merrylands.edmodo.com/post/164214414> here and reply to the post "Explain the phrase *In space no one can hear your scream*" by explaining why no one can hear you if you scream in space.



Energy Lesson 4 – Electrical energy

Watch the Energy Lesson 4 video before doing any of the activities in this booklet for lesson 1. Go to www.youngscientistsmhs.weebly.com/homework-and-assignments or use the videos Miss Leung gave you.

Lesson intention – To understand what is and how electricity moves

Success criteria

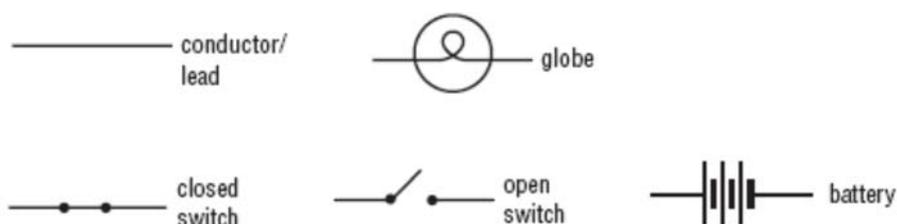
- I can describe electrical energy as energy of moving charges
- I can identify that electrical energy moves through a circuit
- I can name the main parts of a circuit
- I can use symbols to interpret electrical circuits

Activity 1 – What is electricity?

Fill in the missing words in the passage below.

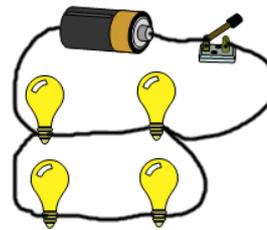
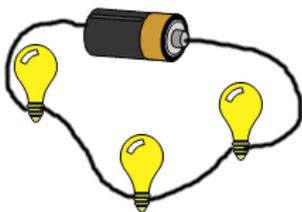
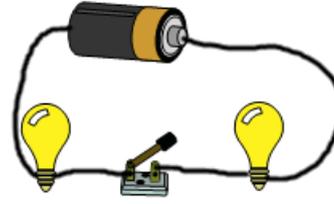
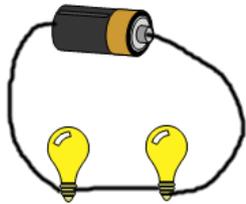
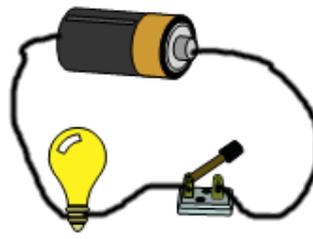
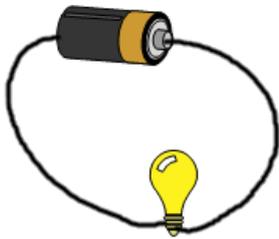
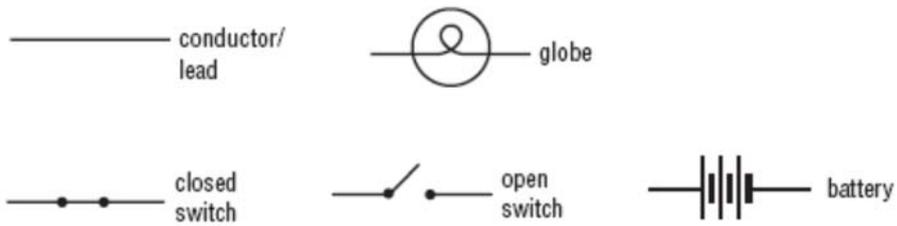
Electricity is the most useful form of energy as it is most easily transformed to another form of energy. Energy is transferred in electric circuits. When you touch on a light or torch, turn on a computer or press 'play' on a DVD player, you are completing an electric circuit. This allows electric charges to travel around the circuit. These charges carry electrical energy, which is transformed to useful forms of energy by electrical components in the circuit. An electric circuit usually has an energy source such as a transformer or battery, a conducting path such as wires, a switch and a load, which changes electrical energy into another type of energy. To save time describing circuits, symbols are used to form a circuit diagram. A circuit diagram shows the parts or components of a circuit, what each is connected to and the order in which they are connected.

Below are common symbols used to draw electric circuits.



Activity 2 – Drawing electric circuits

For each circuit below, use circuit symbols to draw a diagram for each circuit. The first circuit has been done for you.



Activity 3 – Edmodo discussion

Go to <https://merrylands.edmodo.com/post/164214530> here and reply to the post "Why do we as scientists use symbols to draw circuits?"



Energy lesson 5 – Heat transfer

Watch the Energy Lesson 5 video before doing any of the activities in this booklet for lesson 1. Go to www.youngscientistsmhs.weebly.com/homework-and-assignments or use the videos Miss Leung gave you.

Learning intention – To understand how heat is transferred or moved from one place to another

Success criteria

- I can describe conduction, convection and radiation

Activity 1 – Conduction, convection and radiation

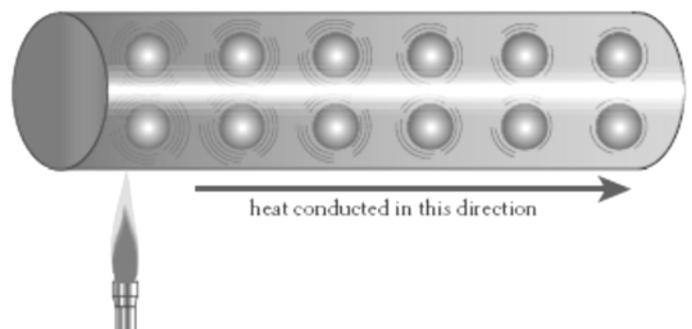
Read the information and answer the questions.

Heat energy – conduction, convection and radiation

Heat energy can increase the temperature of a substance. Heat can move from one place to another in three ways – conduction, convection or radiation.

Conduction

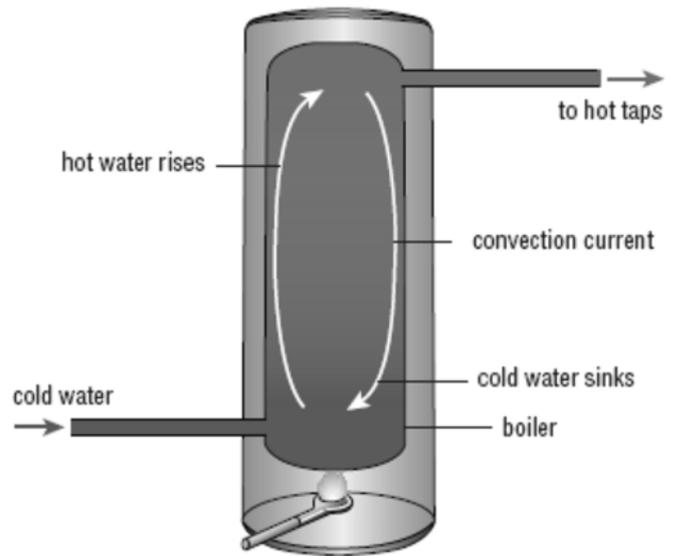
Heat is transferred in solids by conduction. Conduction occurs when the particles in the part of an object near the heat source vibrate more, and these vibrations are passed on from particle to particle through the object. The particles do not move along the length of the object; they only pass on the increased vibrations.



Different substances conduct heat at different rates. Substances that allow heat to travel through them quickly are called **conductors**. Substances that do not allow heat to travel through them quickly are called **insulators**. Metals are generally good conductors of heat while non-metals like paper and plastic are insulators of heat.

Convection

In liquids and gases (fluids), heat is transferred by convection. When a liquid or gas is heated, the particles in the heated region gain more energy. As a result, they spread out and rise. The cooler particles then come in and take their place. These particles are heated and gain more energy. As they reach the stop, they cool down and have less energy and fall back down to be heated again.



Radiation

Radiation is the transfer of heat energy by invisible waves and does not need a material to travel through. All objects give out heat radiation – the hotter an object is, the more heat it radiates. Dark objects give out more radiation than light-coloured objects.

Questions

1. Identify the three ways that heat can move from one place to another.

2. Explain how conduction occurs in terms of particles.

3. Contrast conductors and insulators of heat.

4. True or false: convection is heat transfer in a liquid. _____

5. Explain how convection occurs in terms of particles.

6. Define radiation.

7. Many people wear light-coloured clothes in summer to keep cool and dark-coloured clothes in winter to keep warm. Propose a reason for this.

8. Alex wanted to know which type of saucepan will be the quickest at heating water. She performed an experiment to find this out. Her results are shown in the table below.

	Saucepan material			
	Aluminium	Copper	Glass	Stainless steel
Time (in seconds) to heat 500 mL of water from 15°C to 100°C	120	100	200	150

- (a) Which saucepan material was the quickest at heating water? _____
- (b) Which saucepan material is the best conductor for heat? _____
- (c) Which saucepan material is the poorest conductor for heat? _____

Activity 2 – Edmodo discussion

Go to <https://merrylands.edmodo.com/post/164214801> and reply to the post "Why is the second floor of the school hotter than the first floor of the school? Explain this using conduction, convection or radiation."



Also reply to at least one student's post on this thread.