



energy

1 What Do You Know?

Purpose

To determine your understanding of energy and begin building your collective knowledge

Key question

What do you know and feel about energy?

Key Concept

Energy is all around us, but we do not always recognise it. Energy is the power that drives heat, light, sound, movement and growth

Generate a Pool of Knowledge (class brainstorm sheet that gets added to over time) recording your ideas and thoughts about energy and get a sense of how important energy is to life

Consider

- Where is energy around you and what can it do?
- Where does energy come from?
- How would you feel in a world without energy?
- How would your life be different if you had no electricity?

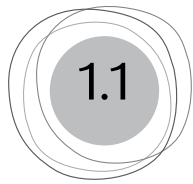
Evaluate/Reflect

- How much did you already know about energy?
- Were there any surprises?
- What questions do you have about energy? (create a 'find out' sheet)
- How can you group your questions?

Activities

- 1.1 Brainstorm
- 1.2 Magazine mindmap
- 1.3 Blackout
- 1.4 Use your initiative
- 1.5 What do we know now?

Little Green Reader – I Use Energy (MAC) – in the Energy kit



1.1 Brainstorm

You will need

- Large sheets of paper (A3)
 - Scrap paper (for ideas) for sticky notes
 - Coloured pens
 - Glue – if using scrap paper
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It is important that students know the basics of brainstorming. It may be useful to practise brainstorming on simple topics in groups to ensure that students are able to work in a cooperative and supportive way.

- 1 Explain that before beginning a unit or study it is good to consider that we already know. Ask students to brainstorm, in groups, what they know about Energy.
- 2 If the group / class is not used to brainstorming, some basic instruction will be required
 - Everyone's ideas count equally
 - When an idea is put forward comments and discussion should be positive
 - The person suggesting the idea may write it down (or draw) and can choose to include their name
- 3 After several minutes of brainstorming it can be a good idea for students to have a brief pause to talk to other groups, as this often sparks more ideas and remembrances.
- 4 When most groups seem to have put all their ideas forward, have each group review their brainstorm:
 - Are there similar or related ideas? – Group these together
 - Is there a theme to each group? – If so write it as a title for that group
- 5 Each group of students can then report back their key ideas / themes to the class in some way – you may need to put a time limit on the preparation and presentation of each brainstorm.
- 6 After all have presented consider
 - Were there any common themes to all? (create your Pool of Knowledge map of these)
 - Are there any obvious gaps in knowledge? If so, write short headings / labels for these. This is the class 'find out' sheet (students can begin to create their own 'find out' sheets as well)

Evaluate / Reflect

- What surprised you about what we already know?
- What else would we like to know?
- How do you think this will help us?
- Did you consider what energy issues your school has?

Extension

- If known knowledge is limited you might like to use 1.2 Magazine Mindmap or 1.3 Use Your Initiative before this activity
- Brainstorm possible questions and reference sources or people can also be helpful for students

1.2 Magazine Mindmap

One way of exploring the invisible force of energy is to create a mindmap showing what you already know about it.

You will need

- Four hoops (or circles made out of wool) on the floor
- Pictures from magazines
- 'Product' energy cards | see 4c.5 Where does it come from, How does it change?
- 'Source' energy cards
- Your 'Find out' sheet

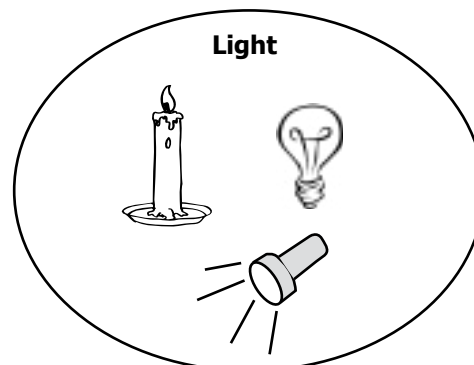
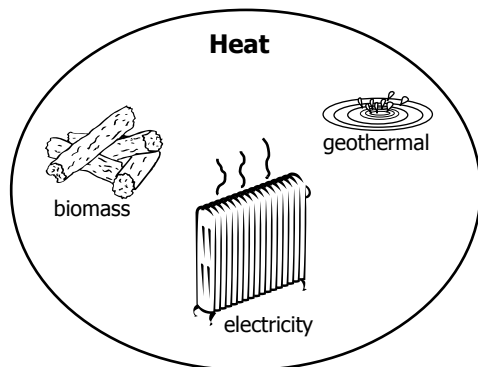
To begin this activity, find and cut out pictures from magazines showing examples of energy around us such as heat, light, growth and movement. "Where is energy around us?"

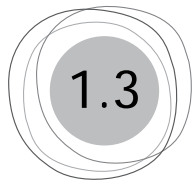
- 1 Label each hoop 'heat', 'light', 'growth' and 'movement'
- 2 Distribute a handful of pictures to each person
- 3 Match each illustration with the form of energy it represents - heat, light, growth or movement
- 4 Use the 'product' energy cards to fill in things you didn't find
- 5 Consider where energy comes from. Take the 'source' energy cards and match them to pictures in the hoops (see activity 4c.5 on page 113)

If you are having difficulty matching up the source of energy for each picture, other learning activities will help to explore this.

Evaluate/Reflect

- Were you surprised at how much/little you already knew?
- What did this activity tell you about where energy is around us, where it comes from and what it can do?
- Do some things fit in more than one hoop?
- Can you think of other energy forms that you couldn't find in the magazines?
- What other questions have you got now to add to your 'Find out' sheet?





1.3

1.3 Blackout

We are used to having energy freely available, and we are used to all the things it provides such as heat, light, food, movement and machines. So we don't often think about how energy makes things happen and that without it many things in our world wouldn't work. This short experiential activity helps us to imagine life without any form of energy.

You will need

- A quiet room, if possible one with blackout curtains
 - Your 'Find out' sheet
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- 1 Sit down and cover your eyes so it is dark.
- 2 Turn off any music, lights, etc. in the room.
- 3 Wait one minute in silence.
- 4 Consider what it would be like if this went on and on, how this would affect you and your environment.
- 5 Discuss other instances when blackouts have occurred. How did people react differently? What preparations do you have at home for blackouts?

Evaluate/Reflect

- How did you feel during the activity?
- What would it be like if there were no energy?
- What wouldn't get done?
- Would you get hungry, bored or cold?
- Would you even exist?
- What other questions have you got now to add to your 'Find out' sheet?

1.4 Use Your Initiative

To further encourage inventiveness and problem solving around the use of electrical appliances.

You will need

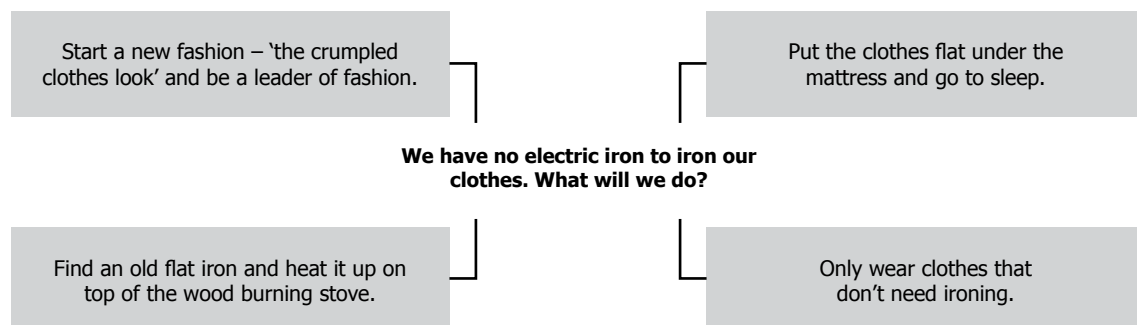
- Several large sheets of paper
- Felts or crayons

- 1 Divide into small groups. Each group has a large sheet of paper with one of the issues from the list written in the centre of the page. The group has a few minutes to think of a way around this.

Possible issues - think of as many different and inventive solutions you could use to manage the following possible situations without using electricity.

- We have no toaster and we want to cook beans on toast
- We want to listen to music but we have no radio or CD player
- We have no iron to iron our clothes
- We have no electric jug and we want to make a cup of coffee
- We have no electric lights and it is too dark to read
- We have no fridge or freezer and we need to keep the milk cool
- We have no TV and we want something to watch

- 2 Each group brainstorms possible solutions for the issue e.g.:



Extension

Each group choose one of their solutions and one person from the group rotates to the next group to mime the action or the whole group mime the action to the rest of the class who have to guess what they are doing and why?

Consider

Limited electricity is available so you can only run one thing in your house by electricity. Which one appliance would you choose to run? Why?

Evaluate/Reflect

- What did you learn?
- Can you action one of your possible solutions?
- Can you think of ways your home or school could manage to run if it only used a very little electricity, or made its own electricity?
- What other questions have you got now to add to your ‘Find out’ sheet?





1.5

1.5 What Do We Know Now?

Which of the following should you do if you want to save energy at home?

Do this in groups during week one then try again at the end of the unit - how much more do you know at the end! P.S. There may be more than one 'correct' answer to these questions!

1	You should defrost a fridge or freezer...
a	once a year
b	twice a year
c	never
d	it automatically defrosts

2	Should you put hot food in the fridge before it cools down?
a	yes
b	no

3	How should you defrost food?
a	in the oven
b	in the microwave
c	in hot water
d	in a fridge

4	When you make a cup of tea, should you...
a	fill the jug from the hot tap?
b	fill the jug from the cold tap?
c	put in only as much hot water as you need?
d	put in only as much cold water as you need?

5	When you are the last person to leave a room, should you...
a	leave the light on the next person who comes in
b	switch the light off

6	Should you dry the washing on fine days in the clothes dryer...
a	often
b	sometimes when really necessary
c	never

7	If you use a heated towel rail, should you...
a	leave it on all the time?
b	switch it off when the towels are dry or use a timer?

8	A 5 star energy rating sticker on a new fridge means
a	the fridge is more energy efficient than a fridge with a 2 star rating
b	the fridge is less energy efficient than a fridge with a 2 star rating

9	When you have finished watching TV, should you...
a	turn it off at the wall?
b	turn it off with the remote and leave it on standby?
c	leave it on?

10	When you boil water in a pot on the stove, should you...
a	turn the element to mid temperature and put a lid on the pot?
b	turn the element to mid temperature with no pot lid?
c	turn the element to full with no pot lid?

11	Which of the following uses less hot water?
a	having a shower
b	having a bath

12	When is a good time to close the curtains?
a	when it is dark
b	when the sun starts to go down
c	when it has got cold in the room

13	You have a convection heater, should you...
a	put the heater on a wall opposite a window?
b	put the heater on a wall under a window?
c	put the heater in the middle of the room?

14	It is cheaper to...
a	boil the kettle to wash a few dishes
b	fill the sink with water from the tap

15	When you finish using the computer for the day, should you...
a	leave it on and running?
b	turn it on to standby?
c	turn it off at the wall?

16	To save energy which lightbulbs should you buy?
a	incandescent bulbs
b	a mixture of incandescent and compact fluorescent bulbs
c	compact fluorescent bulbs

17	If your hot water cylinder is warm to touch, you should...
a	use it to dry your washing?
b	open the cylinder cupboard to warm the room?
c	wrap the cylinder to stop the heat escaping?

18	Your family is going away for three weeks. Should you...
a	turn the hot water cylinder off while are away?
b	turn the thermostat down so the water is not heated to 60°C?
c	leave the cylinder on at the normal temperature?

19	When you have some clothes to wash, should you...
a	wash when you have a full load?
b	wash whenever you feel like it?
c	wash when you have a half a load?

What Do We Know Now - Answers?

1	You should defrost a fridge or freezer...
a	once a year
b	twice a year ✓
c	never
d	it automatically defrosts ✓

2	Should you put hot food in the fridge before it cools down?
a	yes
b	no ✓

3	How should you defrost food?
a	in the oven
b	in the microwave
c	in hot water
d	in a fridge ✓

4	When you make a cup of tea, should you...
a	fill the jug from the hot tap?
b	fill the jug from the cold tap?
c	put in only as much hot water as you need
d	put in only as much cold water as you need ✓

5	When you are the last person to leave a room, should you...
a	leave the light on the next person who comes in?
b	switch the light off? ✓

6	Should you dry the washing on fine days in the clothes dryer...
a	often
b	sometimes when really necessary ✓
c	never ✓

7	If you use a heated towel rail, should you...
a	leave it on all the time?
b	switch it off when the towels are dry or use a timer? ✓

8	A 5 star A 5 star energy rating sticker on a new fridge means
a	the fridge is more energy efficient than a fridge with a 2 star rating ✓
b	the fridge is less energy efficient than a fridge with a 2 star rating

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a	turn it off at the wall? ✓
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c	leave it on?

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b	turn the element to mid temperature with no pot lid?
c	turn the element to full without pot lid on?

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a	having a shower ✓
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b	put the heater on a wall under a window? ✓
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c	wrap the cylinder to stop the heat escaping? ✓

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a	turn the hot water cylinder off while are away? ✓
b	turn the thermostat down so the water is not heated to 60°C?
c	leave the cylinder on at the normal temperature?

19	When you have some clothes to wash, should you...
a	wash when you have a full load? ✓
b	wash whenever you feel like it?
c	wash when the machine is half a load?

Why Is That?

- 1 Defrost your fridge or freezer twice a year to keep it running efficiently, (unless it automatically defrosts). If it frosts up quickly, check the seal as it may need replacing. If your fridge has coils, remove the dust regularly to keep it working efficiently.
- 2 If you put hot food in the fridge, the fridge needs to use more energy to keep it running at the correct cool temperature.
- 3 Using hot water, or an electrical appliance, to defrost food will use energy. Plan ahead and let the food defrost in a fridge, it does not waste energy and keeps the fridge cool.
- 4 By using a kettle, you only use energy to heat the water you need. If you use water from the tap to fill the sink, you have to run the tap for a while before you get hot water. This means you have wasted the energy that was used to heat it in the cylinder.
- 5 Turning a light off means that no electricity is being used for that light. If you leave lights on when they are not needed, you will waste energy.
- 6 The sun's energy is free; use it whenever you can to dry clothes, In winter, clothes can be dried in a covered outdoor area. (Check the laundry label on clothes - some fabrics should be dried out of direct sunlight.) If you use a dryer, don't forget to clean the lint filter regularly so it works efficiently.
- 7 Leaving a heated towel rail on all the time wastes energy. It only needs to be on 3 or 4 hours to dry the towels.
- 8 The higher the number of stars on the star rating, the more energy efficient the appliance is.
- 9 Using the remote control to turn off the TV doesn't stop it using power. If there is a red light or a timer display showing then the TV is still using electricity. Using the remote puts the appliance in standby mode - not off.
- 10 To save energy put a lid on a pot and turn the element to medium. A pot with a lid will boil about three times faster than one with no lid and only requires a medium element setting.
- 11 A bath uses about three times more hot water than a shower. About 40% of your power bill is for heating water (in an average house). Have a short shower.
- 12 Close the curtains just before dark to keep the day's warmth in. Using thermally lined curtains keeps more warmth in the room.
- 13 There are often draughts of cold air under windows. The convection heaters counteract the effect of these draughts. Be careful to keep curtains away from radiant heaters.
- 14 It costs less to heat water in a kettle for a few dishes than to fill the whole sink with hot water from the cylinder. The energy used to heat the water in the cylinder is wasted as the water cools down in the pipes.
- 15 Computers on standby are still drawing electricity. To save energy, turn computers and printers off at the wall when they are not being used. Older monitors can use over half the electricity needed to run the computer so switch the monitor off when you are not using the computer.
- 16 Compact fluorescent bulbs use 80% less electricity than the equivalent incandescent bulb. You can have five CFL bulbs on for the same cost as having one incandescent bulb on.
- 17 If the cylinder is warm to touch it is losing heat and therefore using energy to re-heat the water. By wrapping the cylinder less heat is lost. Heating water accounts for around 40% of the electricity used in an average house.
- 18 If you are going away for more than two weeks, turn off the hot water cylinder. It is more efficient to heat the water when you return than leave the cylinder element on to keep the water hot while no one is using it.
- 19 Washing a full load of washing is more efficient than heating up water for a small load. Some machines can be set to a half load. Most of the energy used by a washing machine is used to heat the water so you save a lot of energy if you do a cold wash.

Evaluate/Reflect

- Were there any surprises?
- Are there any actions you can take from this?
- Is there anything you want to find out more about - add this to your 'Find out' sheet?