Suitable for Students Aged 8-12

EARTH HOUR

Your Future Your Say

Education Pack

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WWF

ISBN 978-0-949380-69-2

www.earthhour.org

Produced by Ryebuck Media Pty Ltd
www.ryebuck.com.au

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Designed by Polar Design Pty Ltd

Outdoor photography courtesy of
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To the teacher

At 8:30pm on 26 March 2011, cities towns and municipalities across the world will turn off their lights for one hour- Earth Hour- sending a powerful global message that it's possible to take action on global warming. Earth Hour 2011 aims to send a message to world leaders that we, the citizens of the planet, demand commitment to actions that will reduce greenhouse gas emissions for the benefit of the planet and will stop harmful climate change. The first step is easy, just switch off your lights on Saturday 26 March, 8:30-9:30 for Earth Hour.

Young people are the future leaders of our world and are a powerful voice in the call for change. How can young people get their voices heard? These educational resources are specifically designed to achieve the following learning outcomes:

- Help students to understand the issues surrounding global warming
- Help students to develop informed opinions
- Provide strategies to enable world youth to have a voice in international decision-making
- Encourage students to develop positive strategies to address the issue of global warming at local, national and international levels.

Everyone has an opinion on the world they live in and how things are going, but having information can help turn that opinion into a voice for real change. When you are informed about the issues, you understand the challenges and can help think of solutions. That's a voice that people want to hear!

This kit adopts an inquiry learning methodology especially structured to help students become informed and active global citizens – to make a meaningful contribution to the climate change debate.

The Steps of Inquiry Learning:

1. Set the focus of the investigation i.e. climate change
2. Brainstorm to consider existing ideas
3. Research the issue of climate change individually or in groups
4. Make a summary of findings
5. Research strategies that can help reduce the rate of climate change at local, national and international levels
6. Action dimension of learning – Implement these strategies
7. Make a summary of findings.

A series of worksheets have been provided for each of these steps. The worksheets are most effective for students age 9–12 in either group or individual work.

Earth Hour Lantern Project enables children around the world to show they care for the earth in a tangible way and tell world leaders that children – the future leaders and caretakers of our planet – are a big voice in the call for action. Lanterns are symbols of good luck and long life. The lanterns created by the children act as a visual reminder of the "good luck" and the "long life" we all want for our planet and our world.

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Thorndon Primary School Takes Action

Rebecca Brown, Teacher at Thorndon Primary School in New Zealand said:

"Our students really enjoyed making the lanterns. It is a simple pattern and is very effective to have lots up in one space. The older children helped the younger children with the cutting. When decorated, the lanterns are really stunning. Great clear instructions and engaging, meaningful activities."

List of worksheets

INQUIRY STEPS	WORKSHEETS	ACTIVITIES
Brainstorm Existing Knowledge	**1**	Brainstorm – Climate Change – what's it got to do with you?
Research	**2**	What evidence is there that climate change is happening?
	3	What are the causes of climate change?
	4	Understanding CO_2 and the Greenhouse effect
	5	(A) What human activities contribute to climate change?
	6	(B) What human activities contribute to climate change?
	7	What are the results of climate change?
	8	Can we make a difference?
	9	Your Action Tree
Action Learning	**10**	Local Action – Light Use Survey
	11	'Power Down' versus 'Life as Usual' families
	12	National Action – Carbon Trade game
	13	Carbon Trade game
	14	Petition for action
	15	International Action – Earth Hour Lantern Project
	16	How to make your Earth Hour Lantern
	17	Lantern cut-out
	18	Lanterns for your home and school

Useful websites

www.earthhour.org

www.panda.org

www.epa.gov/climatechange/kids/

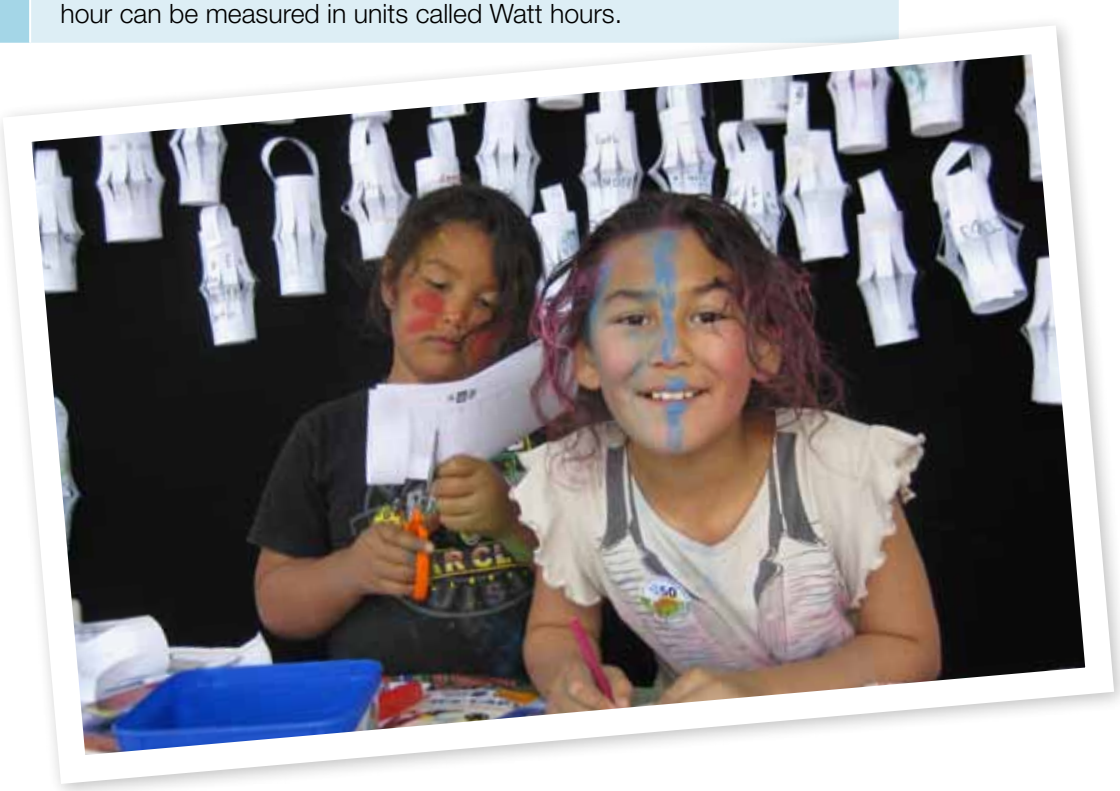
www.carbonfootprint.com

www.zerofootprintkids.com

http://timeforchange.org/climate-change

Glossary of key words and phrases

Climate Change	Climate change is any long-term change in the earth's temperature and weather patterns over periods of time that range from decades to millions of years.
Carbon Dioxide (CO_2)	An invisible gas in the atmosphere. It is the main greenhouse gas produced by human activities largely through burning coal, oil and natural gas to produce energy.
Carbon Emissions	This is a term used to describe the production of CO_2 by human activities and its escape into the atmosphere.
Greenhouse Gas	Gases in the atmosphere that trap heat. These include carbon dioxide (CO_2) which is the main greenhouse gas linked to global warming. Although it is naturally present in the atmosphere human activities are producing more and more of it.
Global Warming	Global warming is the rise in the average global air temperature near the earth's surface.
Fossil Fuels	Coal, natural gas, and oil are non renewable sources of energy. They are made from fossilised plants, trees and animals buried deep beneath the sea millions of years ago. There is a limited amount of these fuels on the planet. Once they are used up they are gone. That is why these energy sources are called non-renewable.
Renewable Energy	This is energy produced from natural resources such as sunlight, wind and the tides. Because we can't run out of wind and sun these energy sources are called renewable.
Watt hours (W-h)	The amount of electricity measured in watts which can be used in one hour can be measured in units called Watt hours.



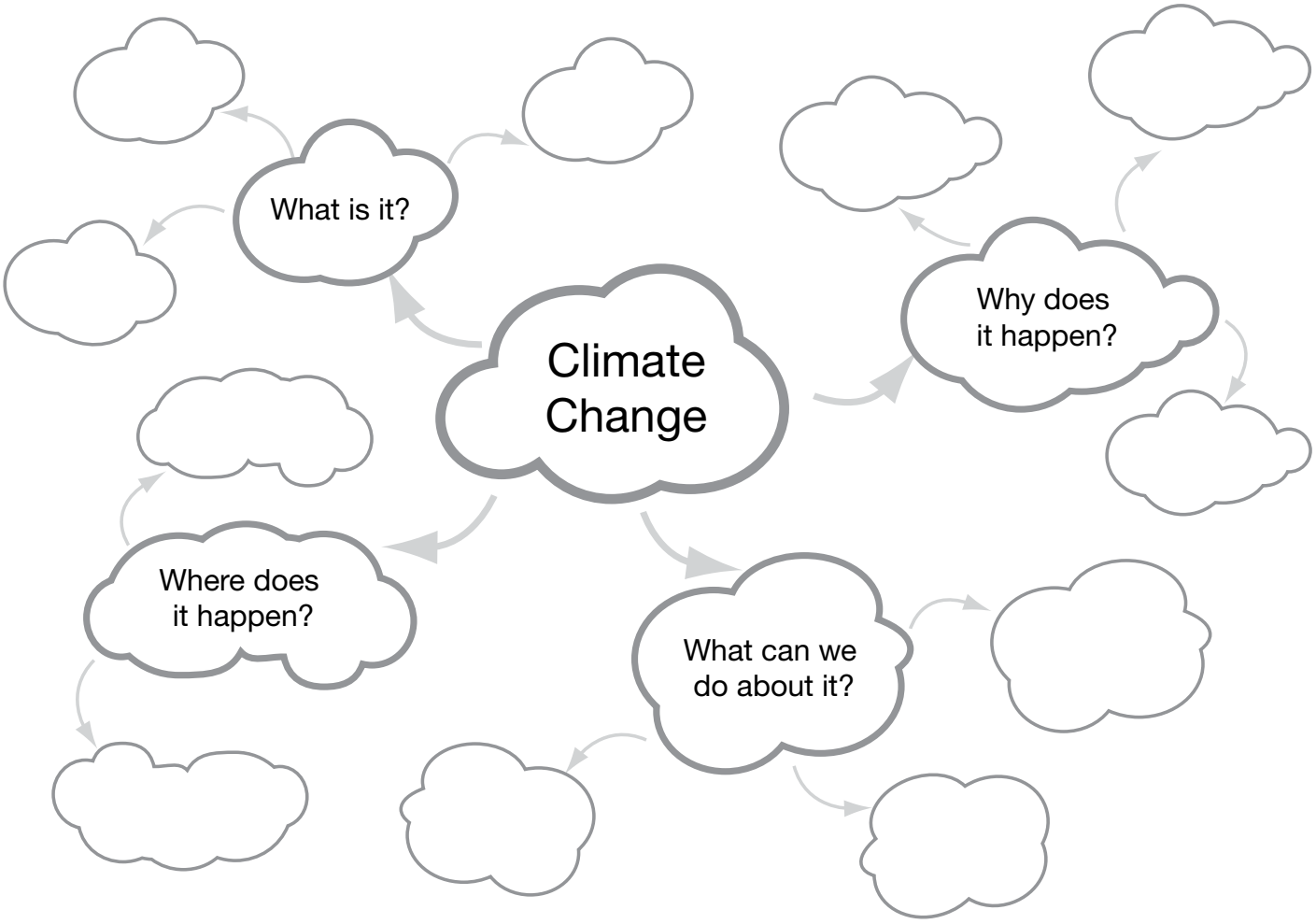
WORKSHEET

1 What is climate change?

It doesn't matter if you don't know much about climate change at the moment.

However let's brainstorm what we think we know and put all of the ideas on a diagram like this or on a whiteboard in the classroom. A few **word prompts** have been listed to help you make a start.

You can return to you brainstorm diagram and add more as you learn more about the issue of climate change.



Weather	Sun	Gas	Heat	Population increase	Drought	Cars
Factories	Plants	Lights	Energy	Carbon dioxide	Solar power	Animals
Cyclones	Forests	Trees	Oceans	Atmosphere	Fossil Fuels	Planes
Electricity	Food	World	Floods	Wind power	Tidal power	

WORKSHEET

2

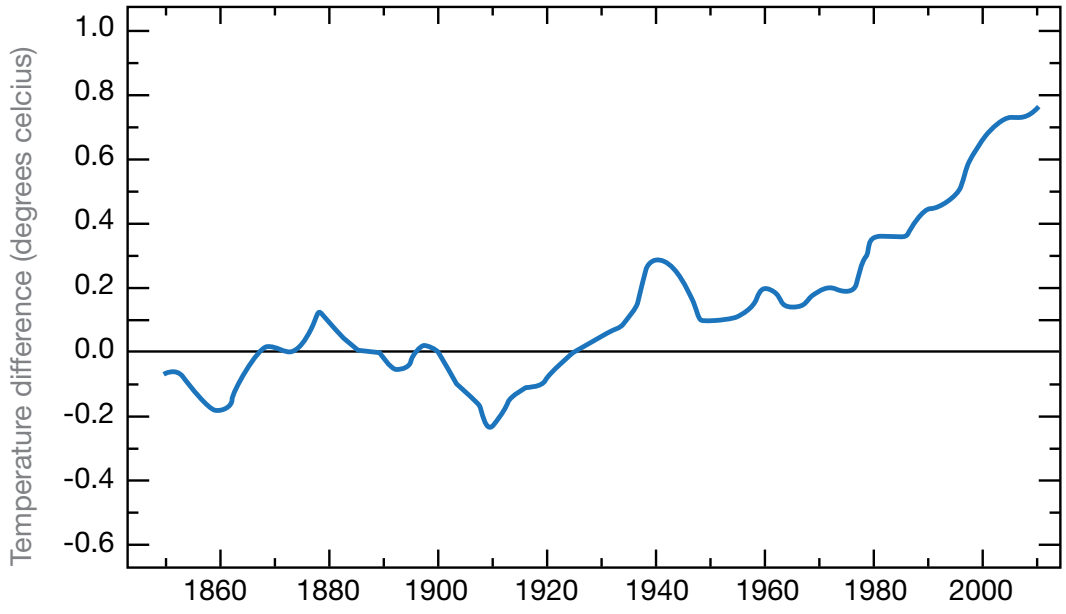
What evidence is there that climate change is happening?

'Climate change' is the name scientists use to describe any long-term change in the earth's temperature and weather patterns over periods of time that range from decades to millions of years. Scientists believe that climate change has been happening slowly over millions of years and that Earth's temperature has changed naturally many times.

Today however, scientists believe that in the last 150 years Earth has become hotter than it has been in over 400 000 years.

1. Look at the graph and describe what it shows.
2. In what decade did the average temperature begin to rise sharply?
3. How many degrees has it increased between 1860 and 2009?
4. Can you think of any possible reasons for this? Check your brainstorm diagram and the key words box in Worksheet 1 to see if this helps.

Global Climate Change



Photos: istock

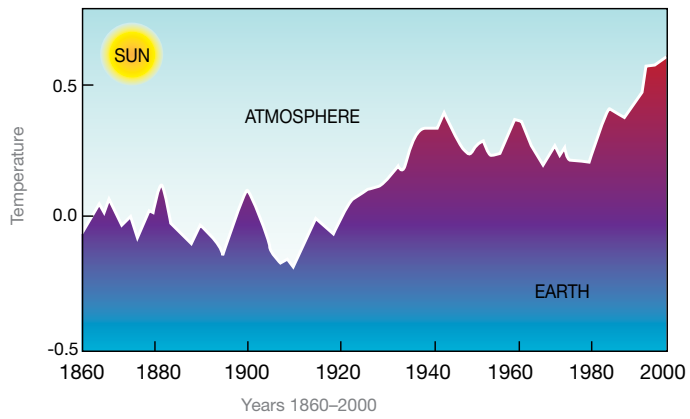
WORKSHEET

3 What is climate change?

Scientists believe that the temperature of the earth is rising because of an increase in the amount of greenhouse gases, the main one being carbon dioxide (CO_2), into the atmosphere. They describe the release of CO_2 into the atmosphere as carbon emissions.

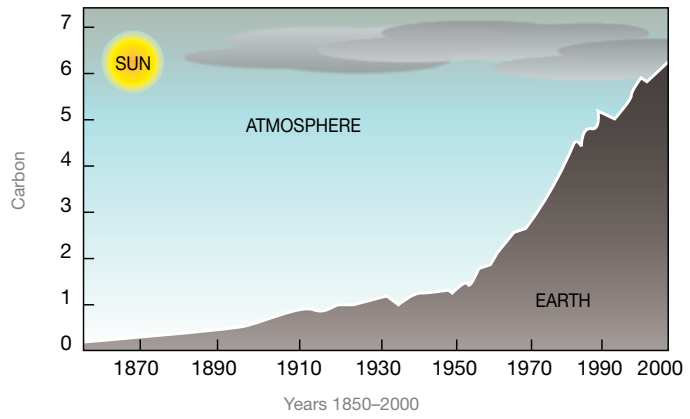
Its getting warmer

Temperature Change (°C)



Emissions increasing

Carbon (billion tonnes)



1 Look up a dictionary to find the meaning of the word emissions.

emissions _____

_____

2 Look carefully at the two graphs? Are they in any way similar?

_____

_____

3 Write a sentence describing the link between global warming and the increase of carbon released into the atmosphere.

_____

_____

4 Do you agree with the scientists? ☐ YES ☐ NO

WORKSHEET

4

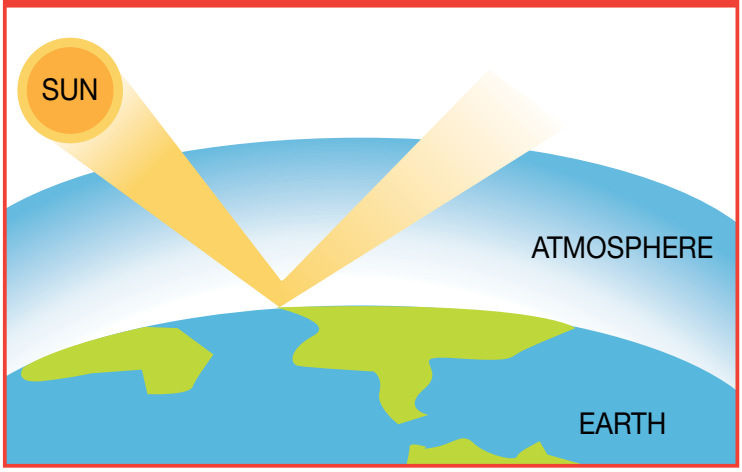
Understanding CO_2 and the greenhouse effect

But what is CO_2? Is it a bad gas?

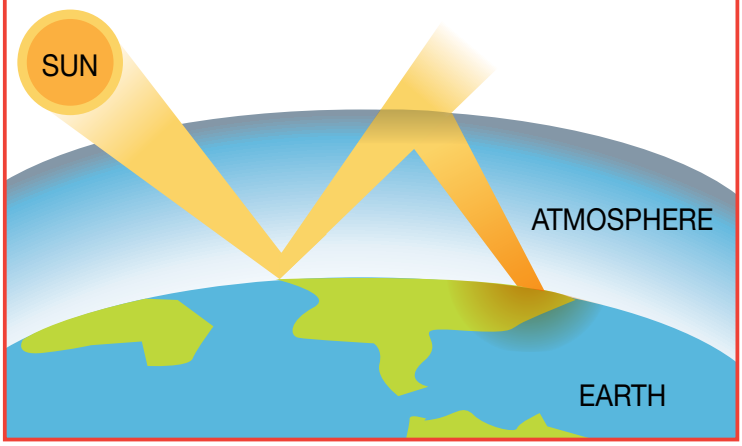
NO! There has always been a layer of gases around the earth and CO_2 is one of them. This layer of gases is an important part of keeping the earth the right temperature to allow life to exist as we know it. The normal condition of the sun heating the earth and the gas layer allowing some heat to escape back into space but holding some in to keep the earth warm is called the 'greenhouse effect'. In fact it works just like a greenhouse in a garden or plant nursery.

Today however the layer of gasses has become thicker due to more carbon dioxide (CO_2) and other greenhouse gases being trapped in the atmosphere. Here is how it works.

Normal conditions of sun heating the earth



Some of sun rays trapped causing earth to heat up



1 Select the right words to complete this sentence to explain the greenhouse effect.

The sun's _____ hit the earth and some are reflected back into _____. However _____ in the _____ such as carbon dioxide (CO_2) form a barrier for sunlight. The sun's rays hit the _____ but when reflected back into space they are _____ in the atmosphere. The sun's rays cannot _____ from the atmosphere and the earth _____ up.

atmosphere	heats	rays	earth	gases	trapped	escape	space

WORKSHEET

5 What human activities are contributing to climate change?

Look at the sketch on Worksheet 6 of an imaginary community somewhere in the world.

Many of the activities that you see happening in this community produce carbon (CO_2) and other greenhouse gases.

Cut out the labels at the bottom of this page and paste them in the correct places on the community to show what is happening. When you have done this write two sentences that explain how human actions have helped cause climate change.

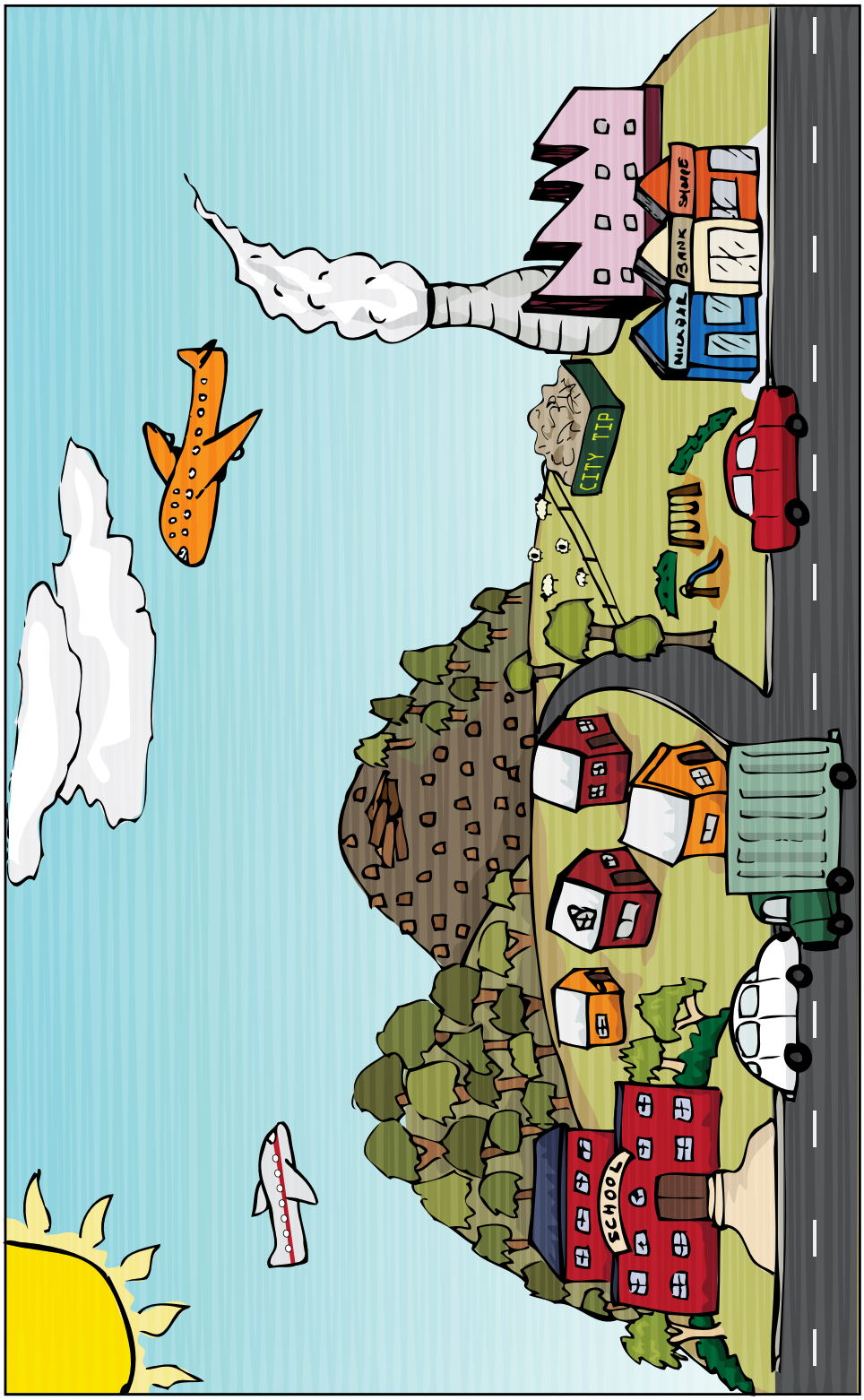
After you have done this you may want to make a simple sketch of your own community and do the same thing.

Deforestation	Trees have been cut down to make buildings and clear the land for agriculture. This is called deforestation. Trees are important because they breathe in carbon dioxide and breathe out oxygen. Because there are less trees breathing in carbon dioxide now, there is more carbon dioxide in the atmosphere.
Power stations	Power stations burn fossil fuels, such as wood, oil and coal to produce power for electricity in order to run industries, and to light, heat and cool our homes. Burning these fuels produces carbon dioxide, so the more electricity needed the more CO_2 is produced.
Cars and trucks	Also because there are more people on the earth there are many more motor vehicles burning gas, petrol, or diesel. Burning these fuels puts a lot of carbon dioxide into the earth's atmosphere. The more cars on the road the more CO_2 in the atmosphere.
Aeroplanes	Again, because there are more people on earth there are many more aeroplanes burning gas, petrol or diesel. Just like with cars and trucks, burning these fuels puts a lot of carbon dioxide into the atmosphere. The more aeroplanes in the air, the more CO_2 in the atmosphere.
Homes and schools	Most homes, schools and buildings use electricity that is produced from burning fossil fuels. Appliances like clothing dryers, refrigerators, computers, and air conditioning use lots of electricity each day.
Waste	The increase in population has led to an increase in waste or garbage. This garbage is usually buried in the earth. This is called landfill. The garbage decomposes (rots) and releases carbon dioxide and methane gas, another gas linked to climate change. The more garbage we make the more CO_2 we release in the atmosphere.
Farm animals	Many farm animals produce another greenhouse gas called methane through waste and passing gas. The increasing demand for meat products and dairy products worldwide has led to an increase in the amount of methane being released into the atmosphere.

Cars and trucks	Aeroplanes	Deforestation	Power stations
Homes and schools	Waste	Farm animals	

WORKSHEET

6 What human activities are contributing to climate change?



Human actions contribute to climate change because...

WORKSHEET

7 What are the effects of climate change and what needs to be done?

Evidence points to the earth getting hotter. Should we be concerned?

Think about what you have learned about the effects of climate change on the earth and what that might mean in terms of changes to the planet.

1. Discuss as a class how a warmer planet might effect:
   - Animals in both hot and cold climates?
   - Plants, forests, oceans and ice caps?
   - People around the world and the way they live?
   - You personally and how you live?

Scientists believe that to prevent harm to the environment in which people, plants and animals live we should keep global warming well below 2 degrees Celsius. To do this we must cut emission of the gasses that cause climate change by at least 80% by the year 2050.

To put it simply – Global warming below 2 degrees = 80% cuts.

2. Make a list of the things that you think could be done at local, national and international levels to achieve an 80% cut in greenhouse gases. You might like to add other things to your list when you have completed Worksheets 10-13.

3. Now write a few sentences or draw a picture (or perhaps design a postcard) explaining how you feel about climate change.

HOW I FEEL ABOUT CLIMATE CHANGE

WORKSHEET 8

Can we make a difference?

Imagine that you have been asked to set up your own International Climate Change Conference in your school.

Remember that at an international conference there will be people from many nations putting many different views and suggesting many possible solutions to climate change, with the special aim of lowering carbon emissions.

Divide your class into three groups or perhaps get three different classes involved in your international climate change conference.

One group must come up with LOCAL ACTIONS that might work in your school, home or community.

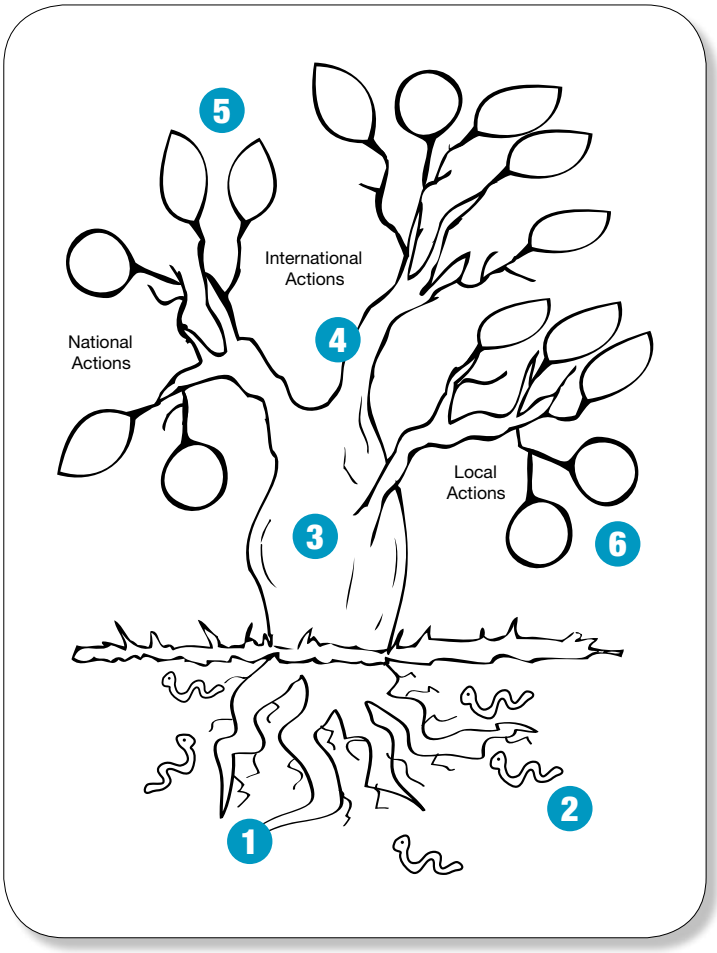
A second group might work out some NATIONAL ACTIONS to combat climate change.

The third group must come up with some INTERNATIONAL ACTIONS to try to combat climate change.

All good action plans begin with thought, discussion and an ACTION TREE! An action tree is a map of tasks you need to set to solve a problem.

Use the Action Tree on Worksheet 9 to come up with suggestions for what we can do at all three levels.

1. The roots – here you should list the tools or resources you will need to carry out your actions.
2. Worms – these are the people or groups that might help you achieve your goals.
3. The trunk of the tree – here you should list the goals of your international conference. That is what you are hoping to achieve.
4. The three branches – these represent local, national and international actions. Here you might list the group or class responsible for this area of action.
5. The leaves – in each leaf you should list possible actions that we can take to reduce our 'carbon footprint'. These might include direct actions such as turning off lights or indirect actions such as making people more aware of the issue e.g. a letter to the local paper.
6. The fruit – this could show what you have achieved. So you will need to list these after you have carried out your actions.

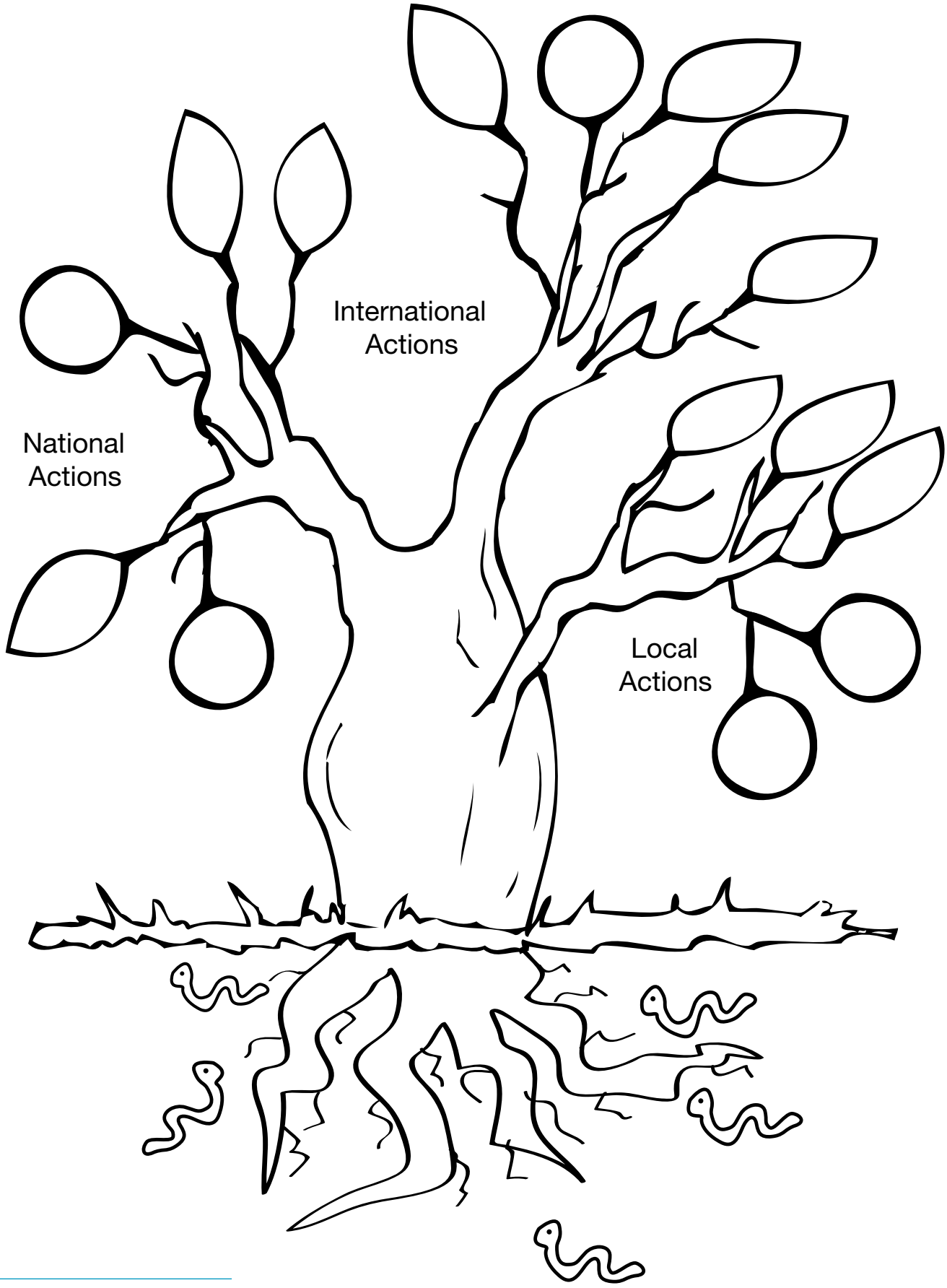


Worksheets 10–18 provide possible local, national and international actions that you might like to include in your actions for climate change.

WORKSHEET

9

My Action Tree



WORKSHEET

10 Local action – a light use survey

As you now know lights use a lot of electricity, which is usually supplied by power stations that burn fossil fuels.

Your class has decided to try to reduce the amount of electricity that is used in school.

1 Make a survey sheet like the following to see if your school is able to reduce its electricity use. One example has been done for you.

Room number	Number of lights found on	Time of day	Sunny or dark day	Necessary (N) or unecessary use (UN)
3A	6	2.00pm	Sunny	UN

2 Now make a top ten list of things that the school could do to use less lights. Two examples have been done for you.

1	
2	
3	
4	Raise the blinds to let in the sun
5	
6	
7	
8	Put up posters to encourage students and staff to 'turn off'!
9	
10	

3 Now you might like to conduct a heating or air conditioning survey to see whether these appliances are used efficiently in your school. Are there times when they could be turned off? Do they come on automatically or only when needed? How high or low is the temperature set? Are door and windows left open? Are there blinds to keep out the heat and keep in the cool air?

WORKSHEET

11 ‘Power Down’ families vs. ‘Life As Usual’ families

There are other things that we can do as well as turning off lights to reduce the amount of carbon released into the atmosphere.

1. Survey your class or group to find out whether their families are ‘Life as Usual’ or ‘Power Down’ Families.

   ‘Life as Usual’ families don’t worry about switching appliances off at the power point when not in use. And they don’t use energy-saving light bulbs.

   ‘Power Down’ families turn things off when they have finished using them. For example they never leave the TV on stand-by. And they use energy efficient light bulbs.

2. The amount of electricity appliances use is measured in units called Watt-hours (W-h). Look carefully at this diagram which shows the amount of electricity each appliance uses when on for a stand-by hour and a full power hour.

Appliance	Stand-by (w-h)	On full power (w-h)
Television	10	100
DVD Player	7	12
Computer	15	130
Old light bulbs		100
New energy efficient light bulbs		18

3. Which of the appliances uses the most electricity?

4. How much electricity (W-h) would be saved If 10 families decided to switch the above appliances off rather than leaving them on Stand-by and also changed their light bulbs?

5. How much would you save if all families in your class did this?

6. Approximately how many families do you think there are in your school community? If they all become ‘Power Down’ families, how much electricity would be saved?

7. Write a summary sentence explaining how this would help our environment.

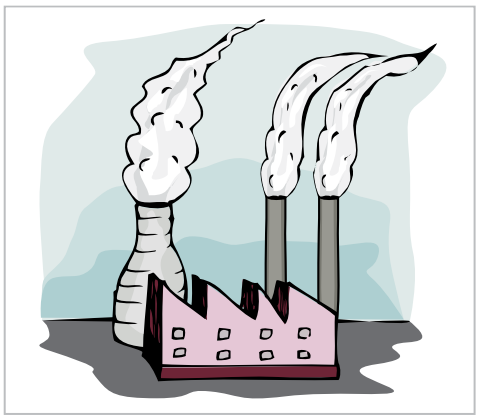
WORKSHEET

12 National action

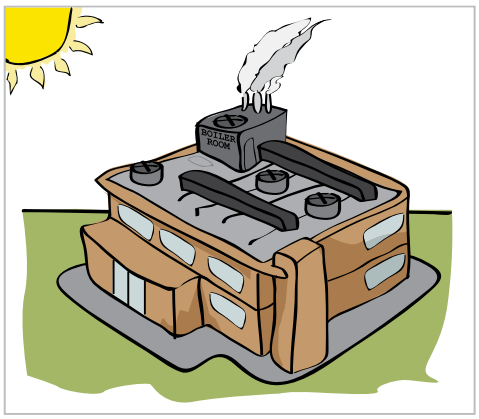
There are many things that nations can do to reduce the amount of CO_2 being released into the atmosphere. For example natural resources such as sunlight, wind, rain and the tides can be used to generate power.

Let's play a game of 'carbon swap'.

Cut out the swap cards on Worksheets 12 and 13. Select a partner to play with, shuffle the cards and give 6 to each person. Select a card from one another and when you have a card that solves a problem, you have a pair. The person to get the most pairs wins. You can make more cards if you wish.

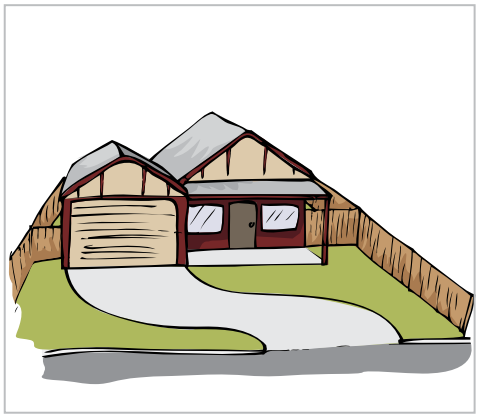


Coal Power Station

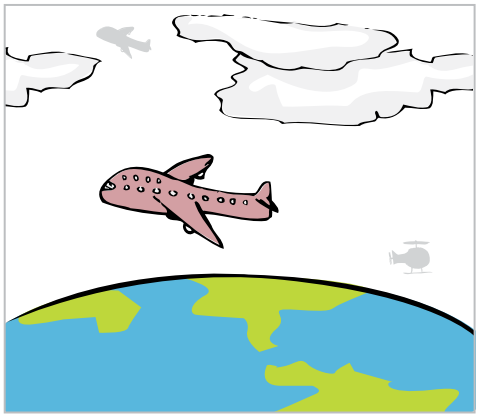


Building being heated by traditional coal power

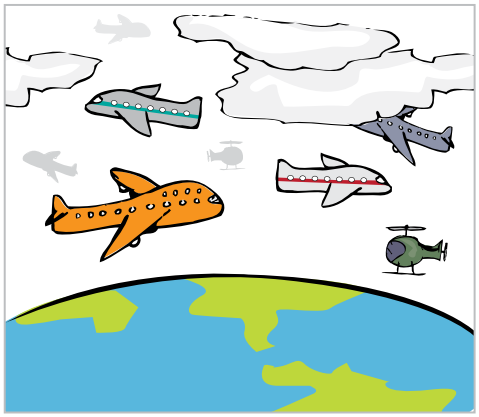
Office with lights on



House with no trees



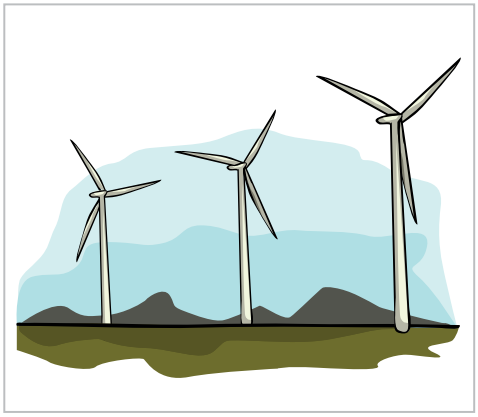
Few planes in the air



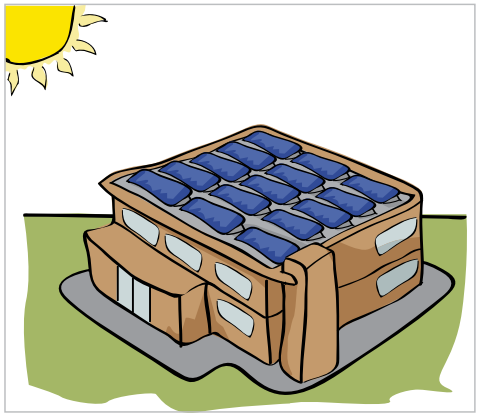
A lot of planes in the air

WORKSHEET

13 National action



Wind Farm

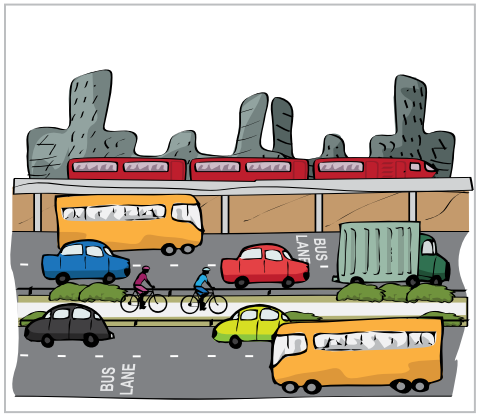


Solar Panels heat a building

Office that uses minimal lights and energy saving bulbs

House with Garden & trees

Busy freeways with no bike lanes or public transit areas



Freeway with bike lanes, buses and trains

WORKSHEET

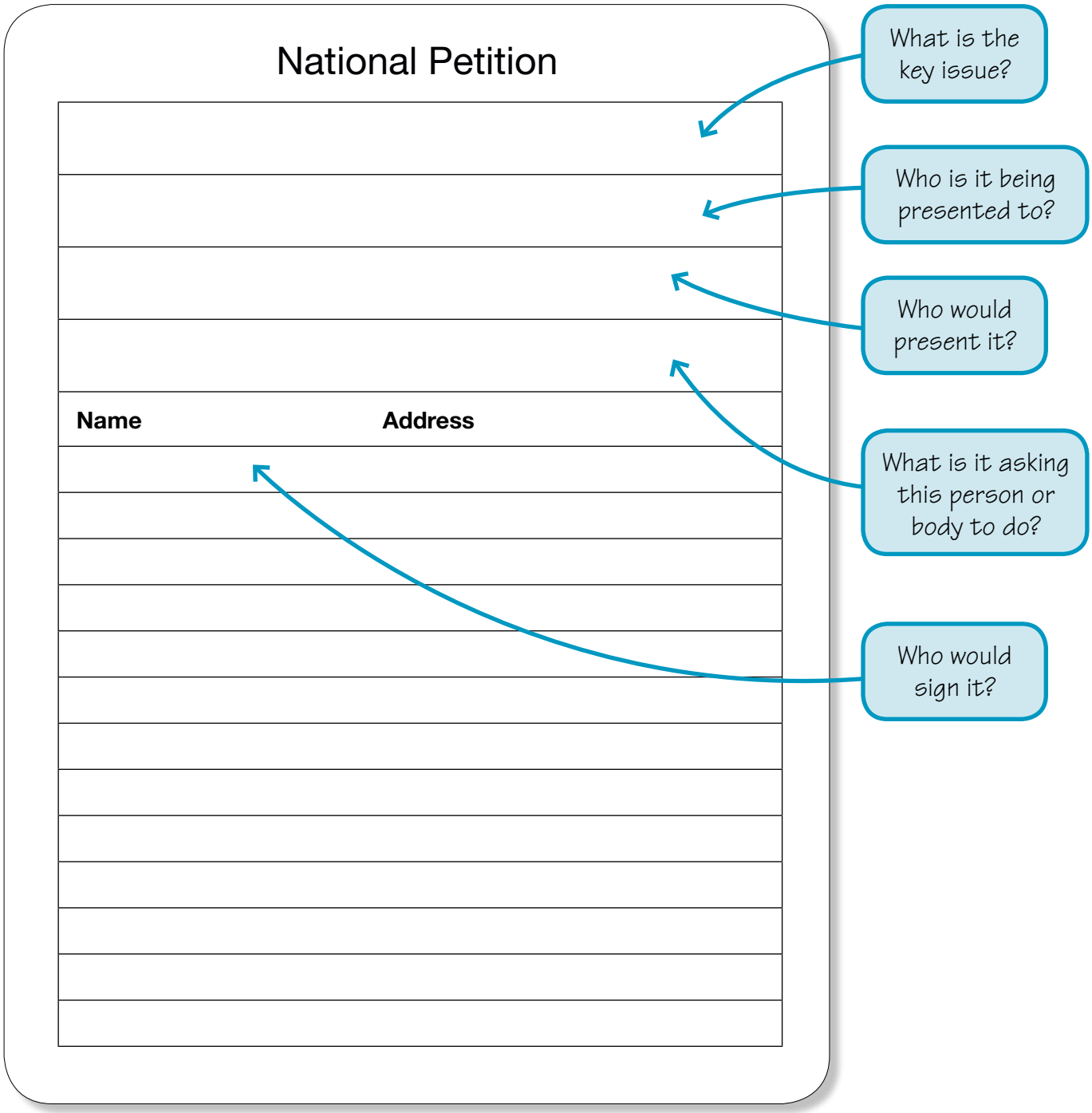
14 Petition for action

What is a petition?

A petition is a collection of signatures of people who are asking for a change, often to a law.

Here is a guide to making a petition. Fill in the sections and then forward your petition to people you think can make a difference. Remember it is very important to be clear as to what action you are asking for e.g. ask the government to reduce carbon emissions or ask a transport authority to improve public transport.

You will think of many other changes that you would like to happen.



WORKSHEET

15

International action – Earth Hour Lantern Project

Earth Hour invites all young people of the world to show your support for the Earth by creating a lantern with words and images to show you care for the environment. You can carry or display your lantern during Earth Hour.

Lanterns are a symbol of good luck and long life, exactly what we want for the environment and the world!

Worksheets 16–18 show you how to make your lantern and what you can do with it.

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WORKSHEET

16

International action – Earth Hour Lantern Project

Supplies:

- **Paper with printed template (download from www.earthhour.org)**
- **Scissors**
- **Markers or Crayons (things for decorating and writing)**

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Instructions:

1. Cut the strip labeled “Cut 1” off along the dotted lines and set it aside to be the lantern handle.

2. Write or draw longwise across the paper your reason for choosing Earth on the blank side of the paper in nice clear writing. This will be the outside of the lantern. Make sure you put your name, age and country at the bottom of the page. We suggest starting your message with the words “I choose Earth because…” then fill in the rest with your words or pictures!

3. Next, fold the piece of paper in half lengthwise, along the line labeled “Fold”. Make sure you line up the edges. Your writing should be folded on the inside now and the planet picture printed on the paper should be on the outside where you can see it.

4. Take the scissors, starting at the folded edge, cut through both layers of paper at the same time up the dotted line labeled “Cut 2”. You should stop cutting when the dotted line stops and you reach the solid line.

5. Carefully continue cutting all the other lines labeled “Cut 2” until you have cut all the lines.

6. Once all the strips are cut, you should gently unfold the piece of paper and refold it the other direction lengthwise so the lines from the printed paper will be hidden on the inside and your message will be on the outside. Make sure to press the crease of the fold flat again along all the strips.

7. Now you are ready to put your lantern together! Go to the next set of instructions for assembly of your lantern.

8. In the lead up to Earth Hour display your lantern in your home or classroom where others can see your message of support for our planet! Then on Earth Hour if you attend a local event you can carry your lantern with you to show media and the world your voice is important to in the call to action on climate change.

WORKSHEET

17

International action – Earth Hour Lantern Project

MAKE YOUR OWN EARTH HOUR LANTERN

CUT 1

Ⓐ

FOLD LINE

Ⓐ TAPE A TO B

CUT 2

CUT 2

CUT 2

CUT 2

CUT 2

CUT 2

CUT 2

CUT 2

CUT 2

CUT 2

EARTH HOUR LANTERN PROJECT

STOP CUTTING AT THIS LINE

www.earthhour.org

Ⓑ

Ⓑ

WORKSHEET

18

International action – Earth Hour Lantern Project

Assembly instructions for the Earth Hour Lantern!

1. To assemble the lantern, simply roll the paper into a tube shape and tape the top edges together. On the printed paper match side A to side B and tape. Your lantern should look like the picture next to the words MAKE YOUR OWN EARTH HOUR LANTERN on the handle strip you cut off in the beginning.
2. Finally, using the handle strip make a handle by taping the ends of the strip of paper just inside the lantern to form and arch over the top.
3. Hang your lantern up so everyone can see your message of “good luck” for our environment and “long life” for our planet.

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