
Welcome to the
ADAPT
Loddon
Mallee
Climate Change Activity Book
A JOURNEY OF ADVENTURE,
FRIENDSHIP AND SURVIVAL

The Loddon Mallee

Griffin the Growling Grass Frog
(*Litoria raniformis*)

Join Griffin the Growling Grass Frog on his mission to discover why the landscape is changing and his wetlands are drying up.

Meet his friends along the way and learn more about climate change and the positive steps we can make to reduce our footprint on the environment!

Join in the fun by completing the activities and help Griffin save his wetlands!

Circle the places you have visited with your family and friends. Join a line between Griffin's footprints as you follow his journey throughout the book!

Key to this book:

NP = National Park

= Griffin's journey

= Fun activity

Abc = Griffin's story

The Journey Begins

Early one morning Griffin the Growling Grass Frog woke to find his wetland home was getting smaller. He didn't know why and was worried that soon his friends and family might not have a place to live.

He decided to take a trip through the Loddon Mallee region of Victoria to see if he could find out why his wetland was shrinking.

The Loddon Mallee - What's

The Loddon Mallee Region is a really special area where people love to live and visit.

The mighty Murray River on the northern border is an amazing river. It provides us with water for our homes, for farming and a home for different flora (plants) and fauna (animals). The Loddon Mallee has many National Parks and State Forests. These important ecosystems provide habitat, or homes, for our native and threatened plant and animal species.

Of course, lots of people like to visit these areas to go camping, fishing, water-skiing, boating, canoeing, bushwalking, bird watching and four-wheel driving. For thousands of years local Aboriginal people have lived in what is now known as the Loddon Mallee Region.

Traditional Owners have a deep connection to Country, including rivers, lakes and other water bodies. There are more than 8,000 Aboriginal places of cultural significance in the Region.

A variety of food is grown in the Loddon Mallee Region including citrus, grapes, olives, almonds, stone fruits, wheat, barley and oats. Can you believe that this region contributes more than $18.35 billion to Victoria's economy?

Travellers love to visit this area because of the beautiful natural attractions, lovely regional cities and friendly atmosphere.

Photo credit: Mildura Regional Development and David Sickerdick

Great About Our Region

What is important to you?

My name is:

I live in (name the town you live in).

My favourite places to visit in this region are:

My favourite things to do include: (list your favourite hobbies, i.e. bike riding, fishing, reading, camping?)

My favourite native animals living in the Loddon Mallee are:

Three things that are most important to me are:

Climate Change

Robina the Red Cross Spider-Orchid (*Caladenia cruciformis*)

Griffin hopped all the way from his wetland near Bendigo, up and over to the Dalyenong Nature Conservation Reserve. He soon discovered he wasn't the only one whose home was in trouble.

On his way, he met Robina the Red Cross Spider-Orchid. Robina explained to Griffin that the weather all over the world was getting hotter and drier and probably causing his wetland to shrink. This was called climate change.

Red Cross Spider Orchids, like Robina are endangered in Victoria. To produce more Orchids, wasps are needed to move pollen from one flower to the next. Climate change means that sometimes the wasps come out when there are no flowers for them to pollinate. The orchid's habitat has also changed. Sheep and cattle have trampled on them or the land where they grow has been cleared of native vegetation or weeds have taken over.

Robina decided to join Griffin on his search and together they travelled along the Calder Highway to learn more about climate change and how it was changing their homes.

"Do you know that over the last 4.6 billion years that Earth has existed, natural forces like the ice age and volcanos have drastically changed our climate many times, but now HUMANS are causing the climate change?" Robina said.

Wacky Weather Word Find

There are 16 climate related words hidden in the centre of the sun. Can you help Griffin find them all? Words can be found forwards, backwards and diagonally!

Atmosphere
Bushfires
Climate Change
Drought
Dry
Fossil Fuels
Global Warming
Hot
Greenhouse Gases
Oceans
Ozone Layer
Rain
Sun
Temperature
Weather
Wind

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

What Is Climate Change?

The diagram below helps Robina explain climate change and the meaning of the Greenhouse Effect.

Weather

is temperature, rainfall, wind, storms, clouds etc. Weather can change hourly, daily, weekly or yearly.

Climate Change

refers to variations in long term climate patterns.
The earth's climate has changed naturally many times before but now human activity is causing the Earth's temperature to heat up. This is called **global warming**. When the Earth's temperature changes by one or two degrees, that change can have big impacts on the health of humans and Earth's plants and animals, too.

Climate

is the changes in weather measured over long periods of time.

Atmosphere

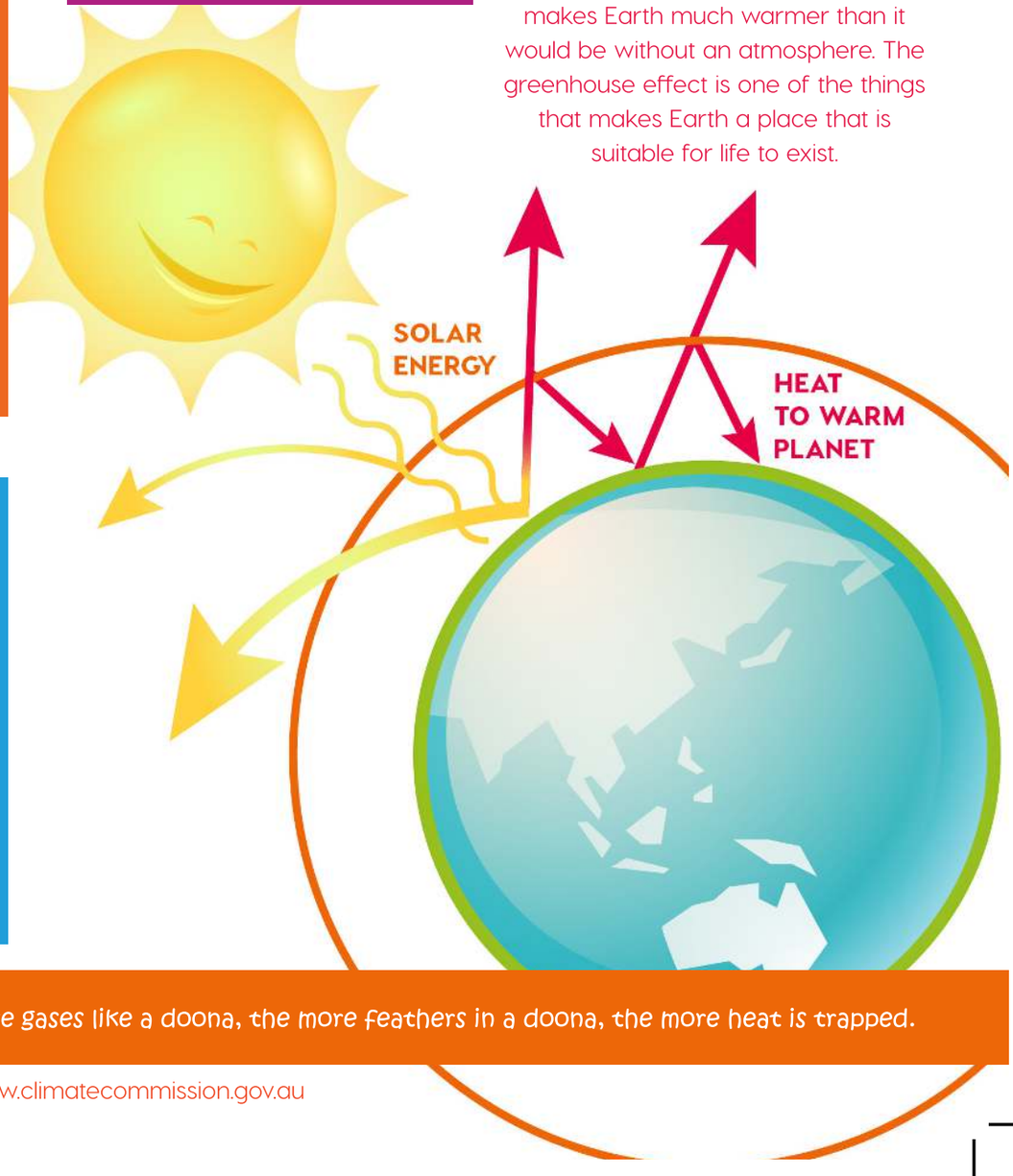
is made up of gases including carbon dioxide, hydrogen, methane, nitrogen and oxygen. The atmosphere acts like a tent or greenhouse, protecting the Earth from high levels of the sun's radiation. This radiation is called ultraviolet or UVB radiation. If the atmosphere wasn't there, the heat from the sun would hit earth and make it far too hot for any life to exist.

Greenhouse gases

are invisible and include water vapour, carbon dioxide, methane and nitrous oxide. These gases surround us and help make up the atmosphere. Greenhouse gases have helped keep the Earth's temperature the same for the past 5000 years. Without greenhouse gases, Earth would be too cold for life to exist.

The Greenhouse Effect

is a process where gases in the Earth's atmosphere trap the Sun's heat. This makes Earth much warmer than it would be without an atmosphere. The greenhouse effect is one of the things that makes Earth a place that is suitable for life to exist.



Think about greenhouse gases like a doona, the more feathers in a doona, the more heat is trapped.

Diagram modified from www.climatecommission.gov.au

Human Causes of Climate Change

Griffin was sad to learn that some human activities were changing the climate much quicker than nature was ready to handle. The burning of fossil fuels to make electricity and run vehicles, cutting down plants and trees and creating more rubbish and pollution, were all adding to something called global warming. He was very worried about how climate change would affect his friends and family - especially the places they lived like wetlands.

Deforestation

Trees and vegetation help take carbon out of the atmosphere so when we clear land without replanting or replacing the vegetation we are losing an important way of balancing the greenhouse gases in our atmosphere.

Agriculture and Farming

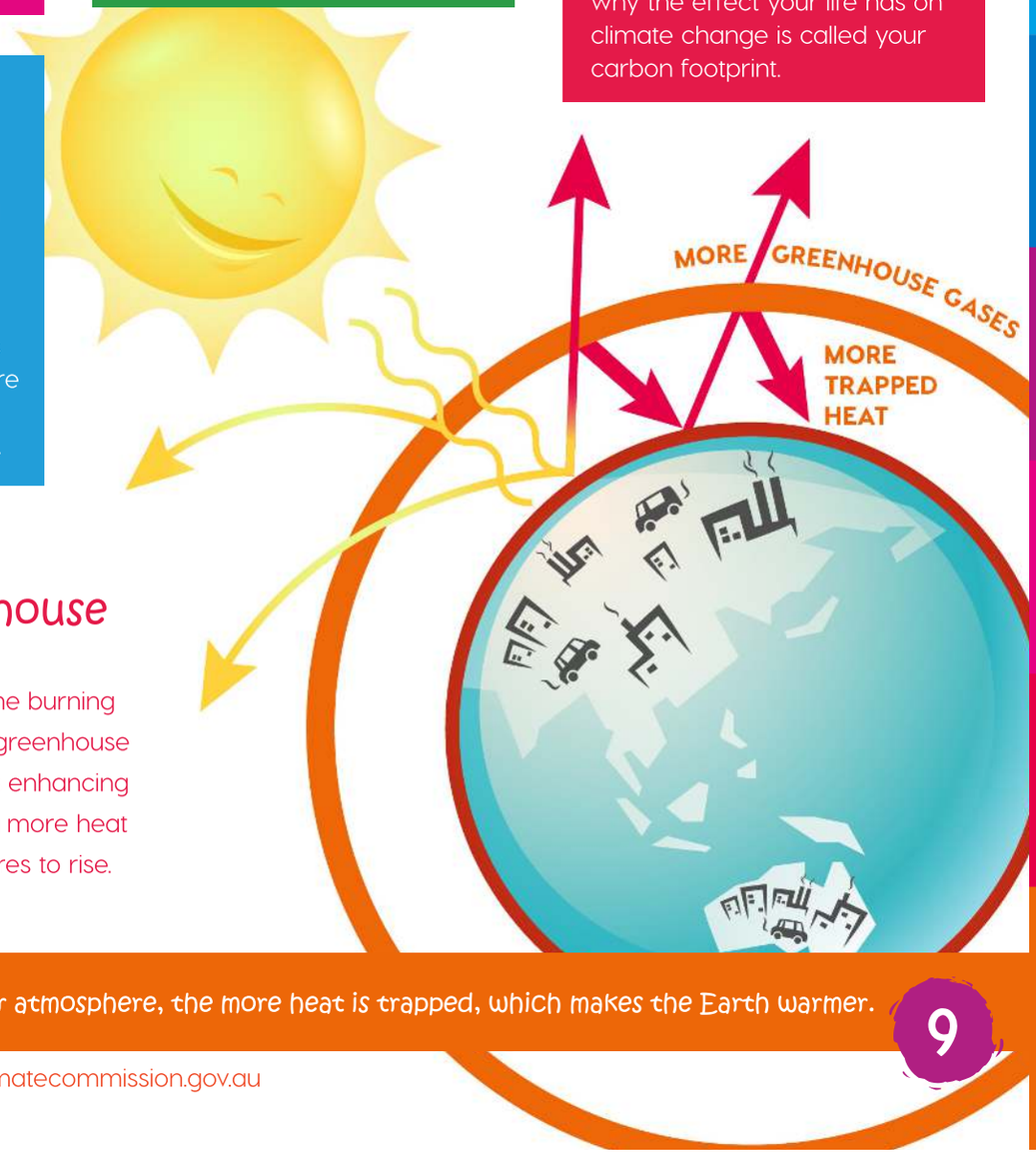
Animals, particularly livestock like sheep and cattle, produce methane, a greenhouse gas. When large numbers of livestock are grazed all at once, like in Australia, the amount of methane produced is a big contributor to global warming.

Carbon footprint

A footprint is a mark you leave by walking. The way you live also leaves a mark. Many things we do in life, such as producing energy, driving cars and raising livestock, generate greenhouse gases that contribute to climate change. Almost all of these gases are carbon compounds. That's why the effect your life has on climate change is called your carbon footprint.

Fossil fuels

When fossil fuels such as coal, gas and petroleum are burned to create energy, the carbon stored in them is released into the atmosphere increasing the level of greenhouse gases. This increase causes the atmosphere to retain too much heat and contributes to **global warming**.



Enhanced Greenhouse Effect

Human activities, particularly the burning of fossil fuels, are adding more greenhouse gases to the atmosphere. This is enhancing the greenhouse effect, trapping more heat and causing global temperatures to rise.

The more greenhouse gases in our atmosphere, the more heat is trapped, which makes the Earth warmer.

Diagram modified from www.climatecommission.gov.au

How Climate Change Impacts Us

Merv the Major Mitchell's Cockatoo (*Lophochroa leadbeateri*).

Major Mitchell's Cockatoos are listed as vulnerable in Victoria. They are declining in number due to loss of suitable nesting hollows caused from land clearing and competition from feral bees and other birds, increased bushfires and the impacts of climate change (dryer winters and long hot summers).

As the day grew hotter, Robina began wilting under the sun's heat. They stumbled into Wyperfeld National Park and found shelter in the shade of an old Callitris pine tree.

Suddenly they heard a loud "SCRRREEEEEEECCCHHHH" and down flew a magnificent pink and white bird from the tree hollow above them. He introduced himself as Merv, the Major Mitchell's Cockatoo.

After hearing about Griffin and Robina's journey, Merv told them how worried he was about his home and family too. "Bushfires have burnt a lot of the trees and plants in the place I call home. The Major Mitchell's cockatoos around here are having fewer chicks because hotter and drier weather means there is less of our favourite seed, for us to eat" said a worried Merv.

Merv was very concerned for the future of the Major Mitchell's Cockatoos and other native Australian birds so he decided to join Griffin and Robina on their journey.

Photo credit of Callitris Pine: Parks Victoria.

Help Merv colour in the climate change picture with your favourite colours.

Mix and Match –

Look at the links between climate change and impacts. In the circle write down who you think has been impacted.

Climate Change

The last decade has officially been the warmest on record. Unfortunately, the changing climate is making our weather more unpredictable and extreme. The impacts of changes include the terrible bushfires across much of Australia in 2019 and 2020 and areas of severe drought. These events are having devastating consequences not only to our native plants and animals but on our Aussie farmers and economy. Changes in climate is also impacting our communities in other ways such as affecting people's health and wellbeing.

More hot days and warm spells

Less rainfall in autumn, winter and spring

Heavier rain – more often

Temperatures to continue to rise year round

Climate Change Impacts

IMPACT
Heatwaves

_____?

IMPACT
Increase chance of bushfires

_____?

IMPACT
Plants struggle to grow

_____?

IMPACT
More flooding

_____?

IMPACT
Most pests like blue green algae that damage waterways and can make people and livestock sick

_____?

What Can We Do?

After hearing about how climate change was already affecting his new friends and their homes, Griffin was sure there must be SOMETHING they could all do!

They continued along the Calder Highway and saw large bright objects in a paddock. They approached for a closer look and were surprised when one of the objects started talking. "Welcome to our solar farm, friends! Please make yourself at home. My name is Sophia and I'm a solar panel."

Solar panels catch and absorb energy from the sun and turn it into electricity that powers homes and businesses. It's a form of green, energy. Another word for that is renewable energy.

This is a much better way of making electricity than burning coal because it doesn't create pollution or greenhouse gases.

By using solar panels and other forms of green energy, humans can make their carbon footprint smaller and reduce the effects of climate change."

Griffin was excited when Sophia told him there were lots of simple and positive changes that everyone can do to help slow climate change and help save his home.

Sophia the Solar panel

MITIGATION - aims to manage the main cause of climate change by reducing greenhouse gases into the atmosphere. It may involve converting to renewable energy supply or making older equipment more energy efficient.

ADAPTATION - aims to manage the effects of climate change impacts that are unavoidable. Actions may include community education, planting native vegetation and conserving water.

Photo credit: Chantelle Wyld.

Positive Choices

Tick the box next to the mitigation and adaptation actions that you are already doing at home or at school. Draw a smiley face next to the action you would like to start doing.

The Five R's!

- ☐ **Refuse** – don't buy what you don't need and refuse plastic shopping bags
- **Reduce** – the use of energy and non-recyclable materials (like plastic)
- **Re-use** – find new uses for old objects
- **Repair** – don't throw away items that can be fixed
- **Recycle** – all materials possible – paper, plastics, glass, aluminium cans etc.

Transport

☐ Try to reduce the use of vehicles which produce greenhouse gas emissions. Ask your parents if you can walk or cycle to school or the local shops. If you can, use public transport.

Food

☐ Eat foods that have been locally grown to reduce transport emissions. Shop at local farmer's markets to support local growers or grow your own fruit, vegetables and herbs. Eating more fruit and vegetables in your diet is not only healthy, but good for the environment.

Plant native vegetation

☐ Planting native trees and shrubs help to soak up carbon dioxide from the atmosphere, provide food and habitat for native wildlife and can provide a source of shade!

Minimise energy use

☐ You can turn off the lights when no one is in the room.
Ask your parents if they can:
- Switch to energy saving globes
- Unplug unused appliances
- Check the energy rating of new appliances
- Switch to renewable (green) energy

Water

☐ Turn off the tap while brushing your teeth and reduce shower time to 4 – 5 minutes per day.

Composting and worm farms

☐ Household rubbish is made up of 40% food scraps that end up in landfill and they release greenhouse gasses. Putting food scraps in compost bins and worm farms means less waste in landfill and great fertiliser for our gardens.

Education

☐ Help to educate your friends, family and the community on simple ways they can reduce their carbon footprint and reduce global warming.

Renewable Energy

The four friends headed to Mildura where they met a car named Evie. Evie was different to every car they'd ever seen before. They soon discovered she was an electric vehicle, also known as an EV!

"EVs have motors that are powered by electricity instead of liquid fuels like petrol. I'm much better for the environment because I can be plugged in and charged using renewable energy. This means I'm not producing any greenhouse gases, which are bad for the environment.

"Hop in and let's go for a drive alongside the Murray River and I'll tell you all about the renewable energy in our great state of Victoria."

Evie the electric vehicle

They hopped into Evie and headed south, stopping at some of the Region's amazing parks and forests - Hattah-Kulkyne National Park, Nyah-Vinifera Park, Gunbower National Park and Gunbower State Forest.

The friends admired the pretty flowers, beautiful animals, native plants and Murray River. They talked about how it would be awful if climate change ruined the environment.

Evie explained that in the Loddon Mallee region, renewable energy is being produced from the sun, wind and organic waste. This energy is sent to homes, factories and communities to help run their lights, refrigerators and hot water.

Solar Energy

The sun is full of solar energy that reaches the Earth through sunlight!

Humans have used solar energy for warmth, cooking and drying clothes for thousands of years. Thanks to technology, humans can now capture the sun's energy to produce electricity.

The cells that turn light from the sun into electricity are called photovoltaic (PV) cells. PV cells are put together to make solar or PV panels.

Solar panels can be fitted to the roof of your house or be in large solar farms that are connected to the grid so that the clean energy can be used by everyone.

Wind Energy

Wind power is a renewable energy because as long as the sun shines on the Earth we will have wind.

Energy is created in large windmills, called turbines. The wind blows causing the turbine blades to turn. This turning motion is transferred to a generator to produce electricity.

The wind turns the blades of the turbines that drives a generator that makes the electricity. This electricity is then fed to the grid to power businesses and homes.

Other Renewable Energy

While wind and solar are the main generators of renewable energy in our region, there are many renewable energy technologies like pumped hydro, green hydrogen and batteries. The Loddon Mallee is also home to many bioenergy technologies that create not only clean energy but also useful things like water, biochar and nutrients from animal and or plant waste.

Wind Power

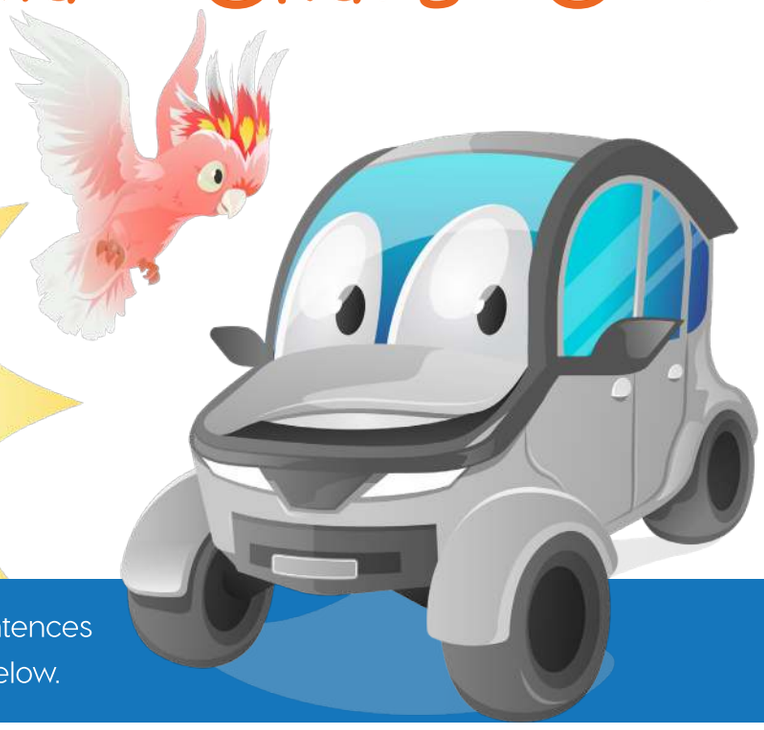
Emissions Target

Victoria has a long-term target of net zero emissions by 2050. This means that man-made greenhouse gas emissions must be avoided through mitigation measures such as renewable energy production to replace the burning of fossil fuels or offsetting carbon emissions through actions like tree-planting.

Colour in these renewable energy options that will help Victoria to reach their emissions target and reduce climate change impacts.

Solar Power

Crack The Climate Change Code



Help Evie crack the code by using the numbers underneath the letters to fill in the mystery climate change key WORD!

Fill in the missing LETTERS from the sentences by using the word options outlined below.

ELECTRICITY ENERGY RENEWABLE SOLAR WIND

The sun helps to generate ___ ___ ___ ___ ___ energy
5

___ ___ ___ ___ energy is created by the wind turning the blades of turbines
3

that drives a generator that makes energy

Biomass ___ ___ ___ ___ ___ ___ is made from plants, animal matter and
1 4

organic waste.

Electric vehicles are powered by ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
6

instead of liquid fuels like petrol.

Another word for green energy = ___ ___ ___ ___ ___ ___ ___ ___ ___ energy.
2

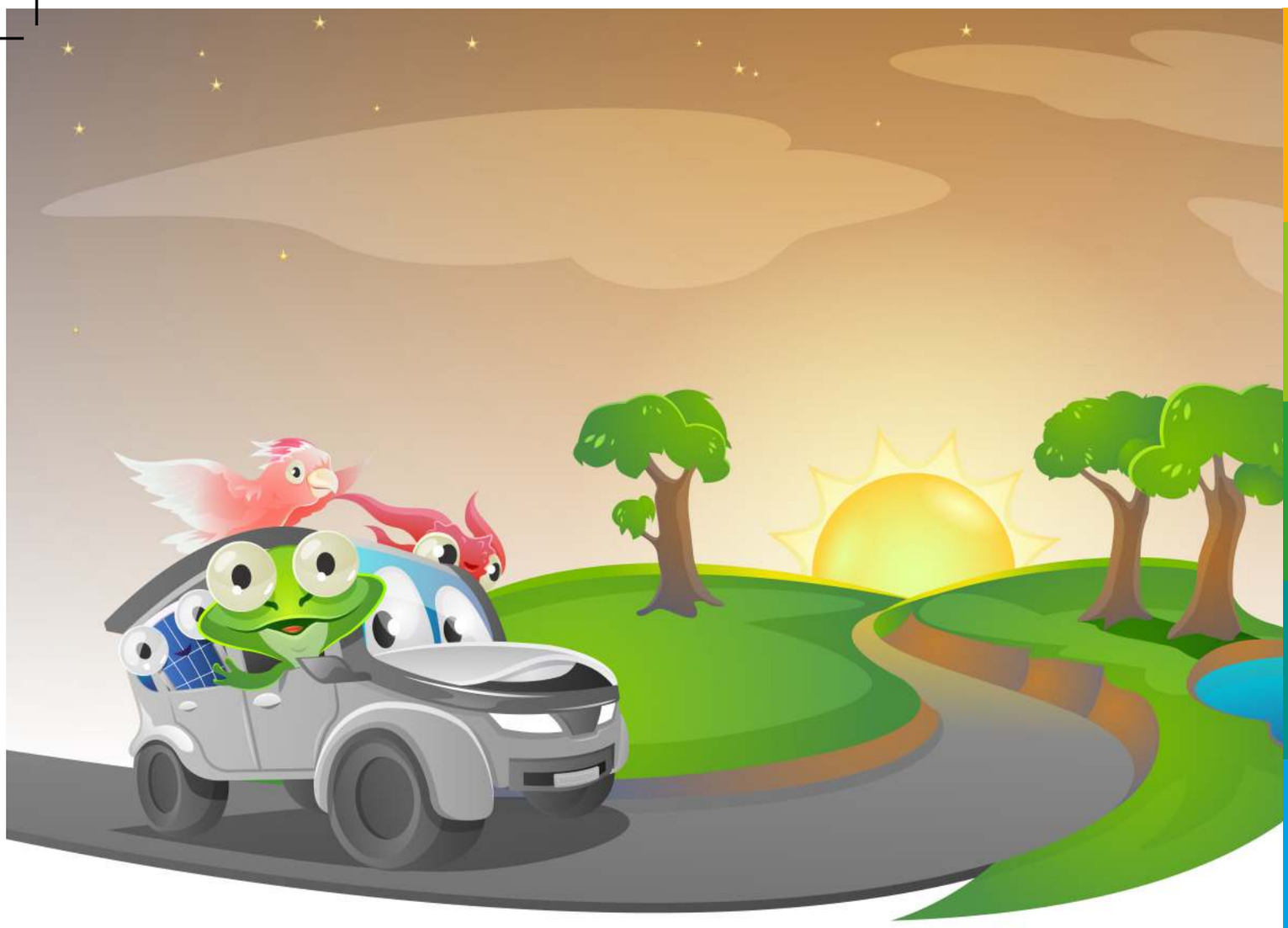
We can all work together and make more positive choices.
This will reduce our carbon footprint and help protect our precious

___	___	V	___	___	___	___	M	___	___	___	
1	2		3	4	5	2		1	2	6	

Wetland Wondering

As they began travelling home, Griffin thought about how much he had learnt about climate change in his travels. He hoped that humans WOULD make changes in their day-to-day life to help the environment. If humans did make changes, the world's climate may not keep changing at such a fast rate and his wetland would once again provide the habitat he and his family needed to survive.

In the space below, draw a picture of Griffin and his family enjoying the habitat (natural environment) of their wetland home. Think about what features of the wetland that would be most important to Griffin's family and friends (i.e. water, native plants, food...).



As the sun began to set, the friends agreed the future looked brighter. ALL Australians must work together if we're going to lower the impacts from climate change. The friends agreed that by helping educate their local communities about what they could do to reduce the climate change caused by humans, we can ALL make a difference.

Climate Change Snakes and Ladders

Before you start:

- Carefully fold out the snakes and ladders board game from the pocket on page 23.
- Cut out the dice (also in the pocket on page 23) and follow the instructions to fold into a dice.
- Cut out the character counters (below the dice).

Now you are ready to play.

How to play:

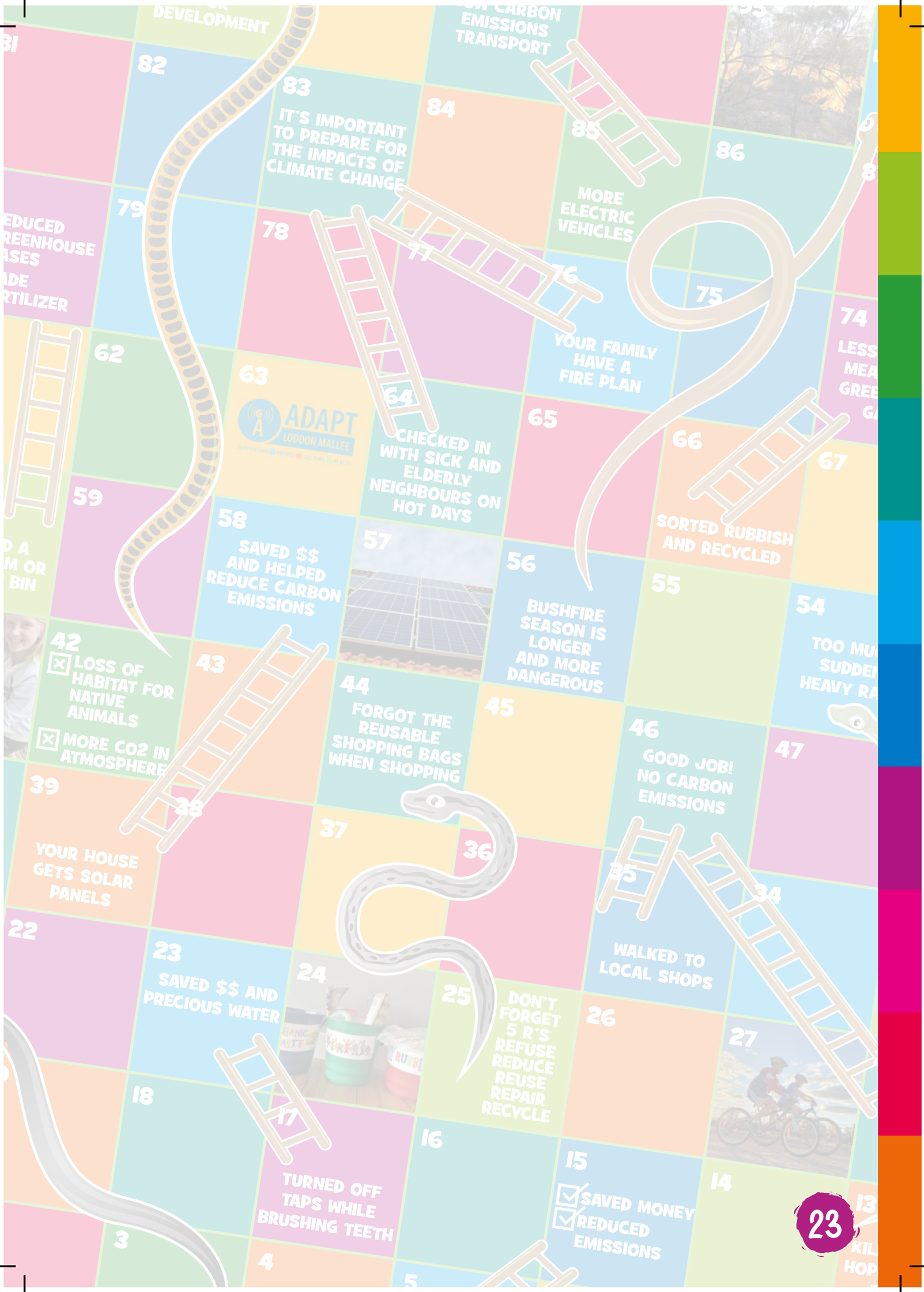
Each player puts their counter on the space that says 'start here'.

Take it in turns to roll the dice. Move your counter forward the number of spaces shown on the dice.

If your counter lands at the bottom of a ladder, you can move up to the top of the ladder.

If your counter lands on the head of a snake, you must slide down to the bottom of the snake.

The first player to get to the space that says 'home' is the winner.


DEVELOPMENT
82
83
IT'S IMPORTANT TO PREPARE FOR THE IMPACTS OF CLIMATE CHANGE
84
CARBON EMISSIONS TRANSPORT
85
86
MORE ELECTRIC VEHICLES
79
78
77
76
75
74
YOUR FAMILY HAVE A FIRE PLAN
62
63
ADAPT LODDON MALLEE
64
CHECKED IN WITH SICK AND ELDERLY NEIGHBOURS ON HOT DAYS
65
66
67
SORTED RUBBISH AND RECYCLED
59
58
SAVED $$ AND HELPED REDUCE CARBON EMISSIONS
57
56
BUSHFIRE SEASON IS LONGER AND MORE DANGEROUS
55
54
42
LOSS OF HABITAT FOR NATIVE ANIMALS
MORE CO2 IN ATMOSPHERE
43
44
FORGOT THE REUSABLE SHOPPING BAGS WHEN SHOPPING
45
46
GOOD JOB! NO CARBON EMISSIONS
47
39
YOUR HOUSE GETS SOLAR PANELS
38
37
36
35
34
22
23
SAVED $$ AND PRECIOUS WATER
24
25
DON'T FORGET 5 R'S REFUSE REDUCE REUSE REPAIR RECYCLE
26
WALKED TO LOCAL SHOPS
27
18
17
16
15
SAVED MONEY
REDUCED EMISSIONS
14
TURNED OFF TAPS WHILE BRUSHING TEETH
3
4
5

Griffin and his friends would like to thank you for coming along on their journey. They hope you can share what you've learned from the ADAPT Loddon Mallee Climate Change Activity Book with your friends and family to help make a positive change to our environment.

ADAPT Loddon Mallee can help support schools, communities and individuals to make positive and sustainable lifestyle and workplace choices.
Together we can lower our emissions and combat climate change and its impacts.

For more information visit www.adaptloddonmallee.com.au

ENVIRO EDU
Learn Local....Act Global!

ADAPT LODDON MALLEE
SUPPORTING PEOPLE SECTORS PLACES

VICTORIA State Government | Environment, Land, Water and Planning

We acknowledge the First Peoples of the Loddon Mallee and their/our longstanding, rich and resilient cultures, rights and responsibilities to Country, and genuinely pay respect to their/our knowledge holders, leaders, Elders past, present and future.

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