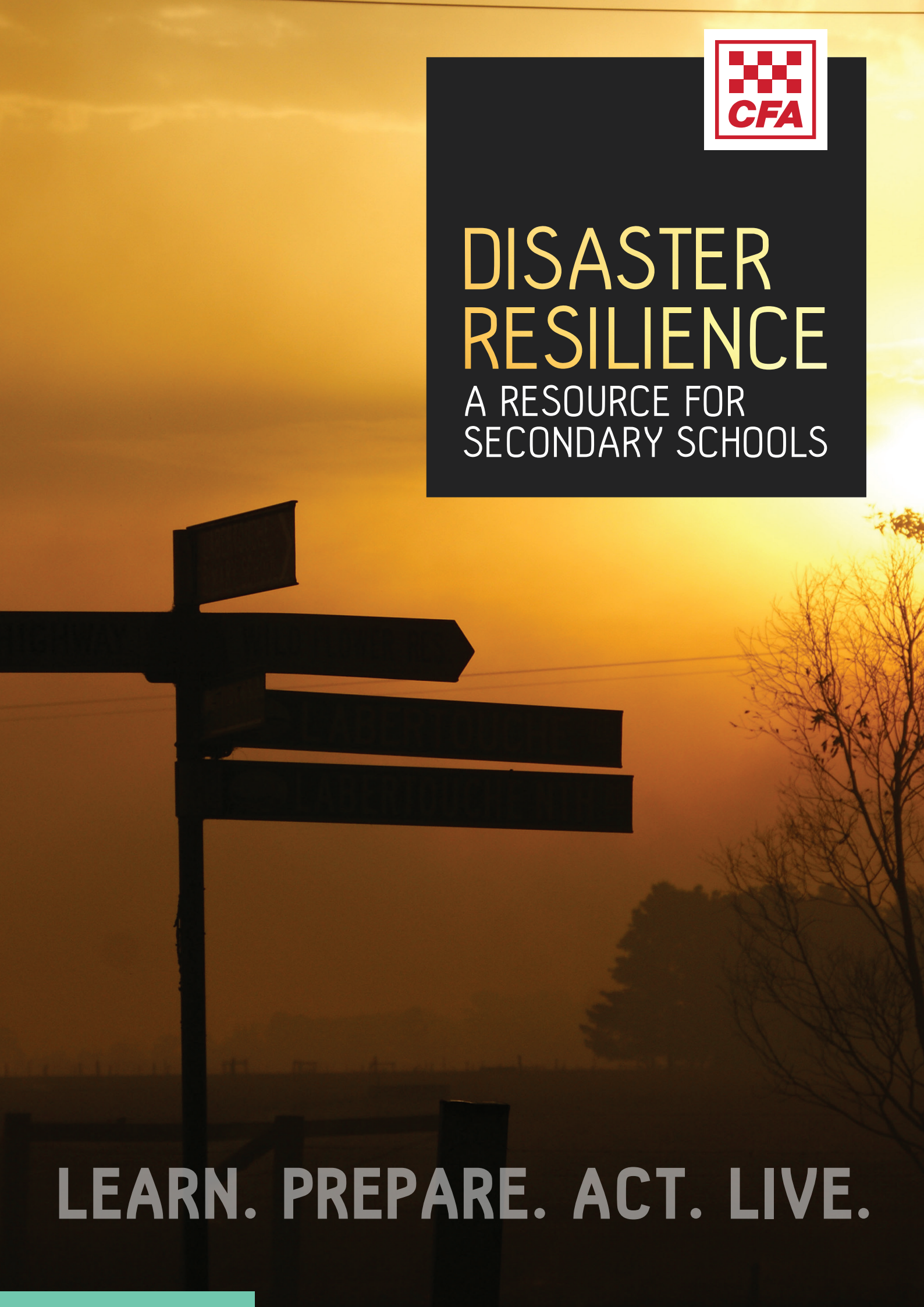

DISASTER RESILIENCE

A RESOURCE FOR SECONDARY SCHOOLS

LEARN. PREPARE. ACT. LIVE.

TEACHERS GUIDE

In recent times, Australians have experienced many catastrophic natural disasters. Each year communities face the prospect of blistering summer heat waves and a long, dangerous fire season. We witness tropical cyclones, extreme drought and massive floods. Severe storms threaten almost everywhere. Without appropriate mitigation and preparedness measures, these natural hazards have the potential to cause significant loss of life and destruction of property. They can become natural disasters.

Many communities, including school communities, are situated in extremely hazard-prone environments. Each day, students leave their homes and travel through high-risk areas to reach their schools. It's surprising then, that many school communities are unaware of the risk to which their own staff and students are exposed.

The National Strategy for Disaster Resilience is based on the notion of 'shared responsibility'. It calls upon all sectors of society – governments, business, households and individuals – to play a part in preventing, preparing for, responding to and recovering from, natural disasters. Community leadership and education are crucial to building resilience to disaster. Teachers and supportive school leaders can help students understand their local hazards and risks and teach them how to work with others to prepare and respond safely. The latest information and safety advice is free and easily accessible – actively participating in shared responsibility means we should seek out and use this information. Each student has the right to learn how to protect themselves from the natural hazards of his or her local community and this process can begin in the classroom. This very point was highlighted in the 2009 Victorian Bushfires Royal Commission Report:

To fail to educate our children about the history of bushfire, its impact on the environment and how to survive bushfire, is to fail to appreciate that each generation must then learn these lessons anew - often the hard way. A concerted education program - the need for which has been noted since as early as 1939 - remains the most effective approach to instilling the necessary knowledge in Australian families.

ABOUT THIS RESOURCE

This resource introduces the concept of disaster resilience. Schools and teachers can approach the study of resilience in an integrated way. Natural hazards and disasters represent a challenge to the sustainability of our environment and way of life, particularly in light of climate change, geographical factors such as population, settlement patterns and land use can help explain many aspects of our vulnerability. Through historical inquiry, students can learn from past disasters. The disaster challenge is especially relevant to teaching and learning in Civics and Citizenship. Citizens who participate in civic life help build stronger, more connected and more resilient communities.

This study can be expanded with further research and investigation and the community action assignment. Links to further information on specific hazards and safety can be found in the reference section. It is strongly recommended that all students complete their own household emergency plans and other household preparedness activities before undertaking a community project.

By the end of this unit of study, students will:

- appreciate the need to learn from past disasters, to better prepare for and respond to future ones
- know more about the natural hazards that threaten their own community
- know more about the disaster risks that exist in their community
- understand the notion of shared responsibility and appreciate the role individuals, households, governments, businesses and other organisations are expected to play before, during and after natural disasters
- understand how strong, connected communities foster disaster resilience.

CURRICULUM CONNECTIONS

This unit aligns specifically with the following areas of Victorian Curriculum F-10. Teachers in other states or territories will find connections to their own curriculum.

Levels	Learning areas	Capabilities	Cross-Curriculum Priorities
5 and 6	**Geography** [Students] learn that some climates produce hazards such as bushfires and floods that threaten the safety of places and gain an understanding of the application of the principles of prevention, mitigation and preparedness as ways of reducing the effects of these hazards. Key question: How can the impact of bushfires or floods on people and places be reduced? Interpret maps and other geographical data and information using digital and spatial technologies as appropriate, to develop identifications and conclusions that use geographical terminology **Science** Scientific understandings, discoveries and inventions are used to inform personal and community decisions and to solve problems that directly affect peoples lives	**Ethical Capability** Examine how problems may contain more than one ethical issue • Investigate a problem such as responding to a natural disaster and identifying the ethical issues involved immediately and into the future	**Sustainability** Learning about Sustainability allows students to develop the knowledge, skill, values and world views necessary to contribute to more sustainable patterns of living... Australia's future prosperity will be impacted by pat, present and future decisions, particularly in relation to the environmental, social and economic challenges... The concept of sustainability is fundamental for students to understand the ways environmental, social and economic systems interact to support and maintain human life
7 and 8	**Geography** Causes of a geomorphological hazards and impacts on places and human responses to minimise harmful effects on places in the future. Factors that influence the decisions people make about where to live and their perceptions of the liveability of places	**Health and Physical Education** Investigate and select strategies to promote health, safety and wellbeing	
9 and 10	**Science** • Investigate how ecosystems change as a result of environmental change, for example, bushfires, drought and flooding	**Civics and Citizenship** Discuss how and why groups, including religious groups, participate in civic life • Identifying and explaining the types of participation that Australia has in the Asia region and internationally, for example exchange programs, peacekeeping, election monitoring, health programs, disaster management	

Sourced from http://victoriancurriculum.vcaa.vic.edu.au May 2017.

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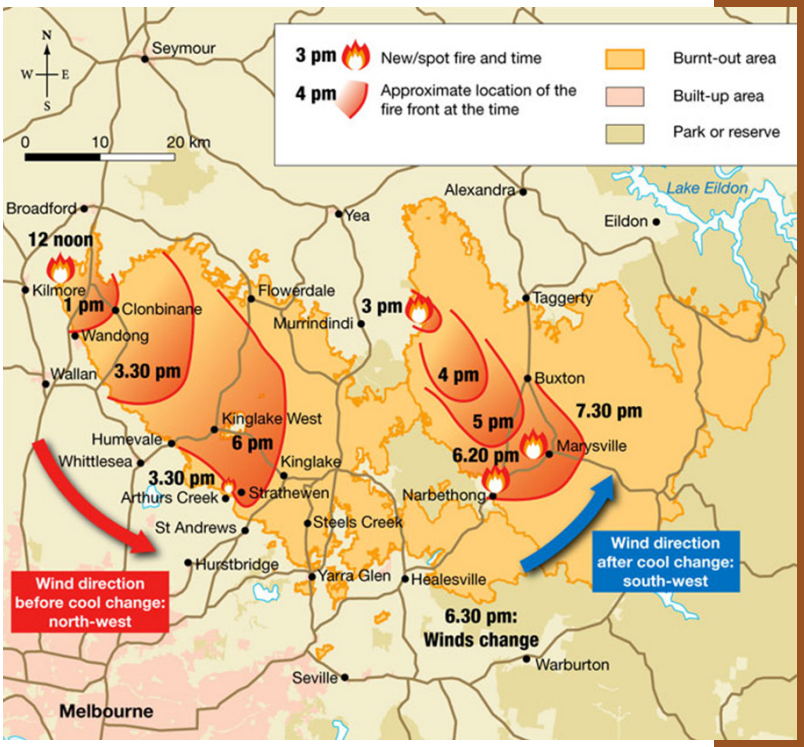
PAST DISASTERS

Our environment can be dangerous. Australia is prone to drought, heat waves, bushfires and grassfires. Severe storms, cyclones and floods are common. Earthquakes occur every day and some can trigger frightening tsunamis. These natural hazards have the potential to cause widespread damage, destruction, injury and loss of life.

Our region has experienced some of the world's most devastating natural disasters. History shows that disasters will happen and that we should always be prepared. We can learn from past disasters: the study of the past can help us to better prepare, survive and recover from future disasters.

Bushfire Disaster Victoria 2009



Map of impacted area *Source: Jacaranda Atlas 7th Edition*

This map is for illustrative purposes only and as such may not be completely accurate.

Bushfire in Strathewen heading up toward Kinglake on Saturday 7 February, 2009. This fire started in Kilmore East and killed 119 people and destroyed 1200 homes. *Photo by Doug McKinnon Source: Museum Victoria*

February 7th, 2009.
Tim Huggins is returning to his home in the Kinglake Ranges when he spots smoke drifting in from a fire to the north.

Living in the bush as he does, Huggins is always wary of bushfires. The State has seen bad days before, but never one like this. The previous week was bad enough: three days when the thermometer topped 43 degrees Celsius. But today's forecast is an incredible 45 degrees Celsius, with deadly winds predicted to reach 120 kilometres per hour. And then the fire erupts in far-off Kilmore.

Huggins is worried. He is a five-times national champion at Tae Kwon Do, a sport that has given him an instinctive sense of danger. Right now, those instincts are kicking in: he knows that when the predicted southerly change comes in, it will drive the fire up into Kinglake, where his wife, Linda, and their two children are waiting.

Huggins races up the mountain, foot to the floor, and arrives home around the time of the wind change. The atmosphere blackens, the winds become hysterical and fire comes roaring through the tree-tops, and surrounds their home. Tim and Linda stay outside for as long as they can stand it, swatting at flames, then retreat indoors. They fight for hours, smashing the fire as it breaks into their house, battling smoke, embers and radiant heat, protecting their children.

The family survive. Their planning, preparations and experience have saved them. Many others in their community are not as lucky – or as prepared. Tim goes to check on their neighbours and finds that the entire family has perished. They are four of 173 people who will die in these terrible hours.

More than 15 major fires raged across the Victoria that day. 2000 homes were destroyed leaving entire communities devastated.

Lessons Learned

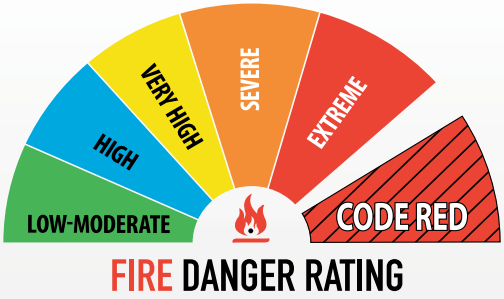
Many royal commissions and inquiries have investigated Australia's major bushfire disasters including the Canberra Fires in 2003, Black Friday in1939 and Ash Wednesday in1983. They have sought to understand what caused these disasters and what can be learned so that we can prevent future bushfires from having such tragic consequences. They discovered that the community's lack of knowledge about bushfire safety contributed to each of the disasters.

The 2009 Victorian Bushfires Royal Commission found:

The response to the fires on 7 February was characterised by many people trying their best in extraordinarily difficult circumstances. There were many examples of people who met the challenge admirably. Nevertheless, some poor decisions were made by people in positions of responsibility and by individuals seeking to protect their own safety.

Dangerous bushfires will continue to threaten lives and property. People living in bushfire-prone areas must learn about the risk and to take greater responsibility for their own safety. The 2009 Black Saturday Royal Commission made 67 recommendations. These included better warnings and information for residents, more research, stricter building codes and better education programs.

You can read the summary of the 2009 Victorian Bushfires Royal Commission final report and the 67 recommendations at http://www.royalcommission.vic.gov.au/Commission-Reports/Final-Report/Summary



A new Fire Danger Rating system was introduced after Black Saturday to better inform the public about predicted dangerous fire conditions.

Watch Lessons from the past: http://youtu.be/7eL6b7ZtxsY

Indian Ocean Earthquake and Tsunami 2004

Affected countries of the 2004 tsunami.
Source: Wikimedia Commons

A photograph of the 2004 tsunami in Ao Nang, Krabi Province, Thailand *Source: Wikimedia Commons*

Sunday morning. Boxing Day, 2004.
In coastal communities all around the Indian Ocean, people are going about their daily business. Fishermen are setting out to sea, merchants are opening their doors, children are poking among rock pools on the foreshore, tourists are slapping on the sunscreen. Some are puzzled by the water receding from the coast, and go down for a closer look.

Then waves appear. Monstrous waves, thirty metres high in places. A tsunami.

The waves have been triggered by a massive earthquake – at between 9.1 to 9.3 on the Richter scale, the third highest ever recorded – off the coast of Sumatra.

The waves smash into the communities, obliterating everything in their path: ships, buildings, trains, and people – hundreds of thousands of people. Nearby Aceh is the first to be hit, twenty minutes after the initial quake. The sea rushes up to three kilometres inland, killing some 167,000 people in minutes. Within another two hours, both Sri Lanka and Thailand have been devastated, with losses of 35,000 and 8,000 people respectively. The waves push on remorselessly, hitting the Maldives in three hours and crossing the ocean to strike Somalia seven hours later.

Lessons Learned

Some communities are more vulnerable to the impact of natural disasters because they are more exposed. People may live in poorly constructed housing in areas of high risk. They may not have the money to move to safer locations when threatened or they may not receive adequate education, information or warnings.

In 2004, the US government's Pacific Tsunami Warning Centre (PWTC) attempted to warn people in the region about the Boxing Day Tsunami. They were hamstrung by a lack of process surrounding contacts in the various countries. The State Department did issue a warning statement, which saved some lives, but for many this warning came too late.

Since 2004, countries such as India, Australia and Indonesia have set up warning centres and the USA and Japan have reached agreement on warning countries who do not currently have their own warning systems. The Joint Australian Tsunami Warning Centre (JATWC) is operated by Geoscience Australia and detects and warns Australian communities about any potential tsunamis. New deep-ocean sensors make detection and prediction more quickly and with greater accuracy.

Gerard Fryer, a geophysicist at the PTWC said, ***"What 9/11 did to airport security, 12/26 did to tsunami warning,"***

The early warning systems are working. In 2009, a tsunami in Tonga, American Samoa and Samoa killed 170. The death toll would have been far greater if it were not for warnings over radio and TV, as well as sirens, telling coastal inhabitants to flee to higher ground.

A comprehensive warning system is only part of the answer. Education has a huge role to play in the safety of individuals during natural disasters such as tsunamis. Knowing the danger signs such as rapidly receding water or earthquakes could save many lives. This was perfectly illustrated by Tilly Smith, a ten year-old British girl who remembered a school lesson on tsunamis and correctly reading the warning signs, contributed to the saving of many lives.

For further information about tsunamis, access the ATAG (Australian Tsunami Advisory Group) tsunami guide here: http://www.emknowledge.gov.au/connect/tsunami-the-ultimate-guide/#/

Watch the UNISDR (United Nations Office for Disaster Risk Reduction) video about Tilley Smith and the 2004 Indian Ocean earthquake and tsunami:

https://www.youtube.com/watch?v=V0s2i7Cc7wA

Answer the below questions:

01 How did Tilley know the early signs of a tsunami?

02 What actions did she and her family take to survive the tsunami?

03 How did her parents save others?

04 What natural disasters have happened where you live?

05 List three top tips that you would share with visitors to your area that could help them survive a disaster.

Cyclone Tracy 1974

A scene of destruction after Cyclone Tracy passed over Darwin on Christmas Eve 1974.
Source: news.com.au

Damaged houses after the passage of Cyclone Tracy.
Source: Wikimedia Commons

The residents of Darwin are well-known for their relaxed attitude to life, and Christmas Eve 1974, is no exception. There is warning of a cyclone, but there had been warnings before, the most recent only ten days earlier. None of them amounted to much.

Kids go to bed early, many of the adults attend parties and barbeques. Then the wind and the rain pick up, the air pressure plummets. By 10 pm, people begin to be seriously concerned. By 3am they are smack in the middle of what would come to be known as Cyclone Tracy, one of the most intense cyclones ever to be recorded in Australia.

Residents spend the night huddled in terror, scrambling for whatever shelter they can find as the wind screams, the rain hammers and buildings disintegrate around them.

When they crawl out the next morning, they find the city virtually destroyed. Seventy one people have died, often in the most horrific circumstances: crushed in rubble, cut apart by flying debris, drowned in the harbor. Over 80 percent of the homes are destroyed.

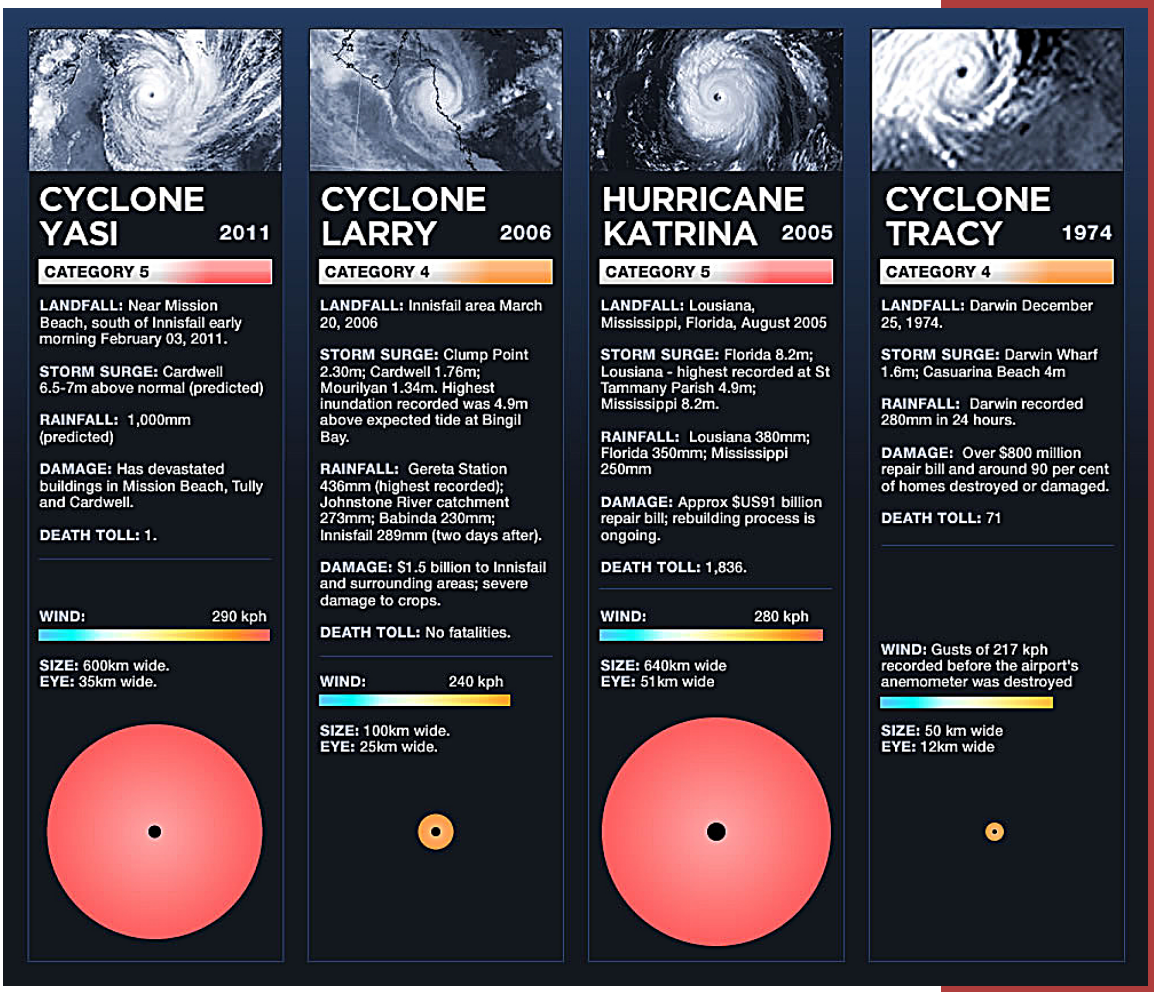
Lessons Learned

Cyclone Tracy showed just how unprepared and vulnerable an entire city was.

In all, 650 people were injured and only 400 of the city's 11,200 homes remained.

Thirty thousand people were evacuated in the days after – almost the entire population. Strict new building codes were introduced. Houses had to be pinned to their foundations and many were constructed in concrete. Better cyclone tracking and warning systems were also introduced.

Video about Cyclone Tracy 1974: http://youtu.be/1qGNMmhtD4k



A comparison of four major cyclones. Source: www.abc.net.au

Historical Inquiry

ACTIVITY 1

Choose from the 2009 Black Saturday, Indian Ocean Earthquake and Tsunami or Cyclone Tracy case studies above or conduct your own research into an Australian or Asian natural disaster.

A Describe the impact on the human population and the built and natural environment?

B What was learned from the disaster? What changes were made to prevent it from happening again?

ACTIVITY 2

Watch CFA's *Lessons From the Past* video: http://youtu.be/7eL6b7ZtxsY

A Write an essay to this prompt: 'History does not need to repeat itself. We can learn from history and avoid past mistakes.'

ACTIVITY 3

From the case studies above, choose a natural disaster – bushfire, tsunami or cyclone – that will affect a fictional town of which you are a citizen. Split the class into three groups – data gatherers, disaster managers and citizens. Discuss in groups what measures you need to take your chosen disaster strikes.

Some prompts:

- data gatherers will need to gather and disperse information – how will you get information? What channels (TV, radio, internet) will you use to get information out?
- disaster managers will need to control the agencies during the disaster and during the cleanup – what agencies will be needed and how will you communicate with them?
- citizens will need to keep themselves, their families and pets safe – how will they do this? Where will they access information?

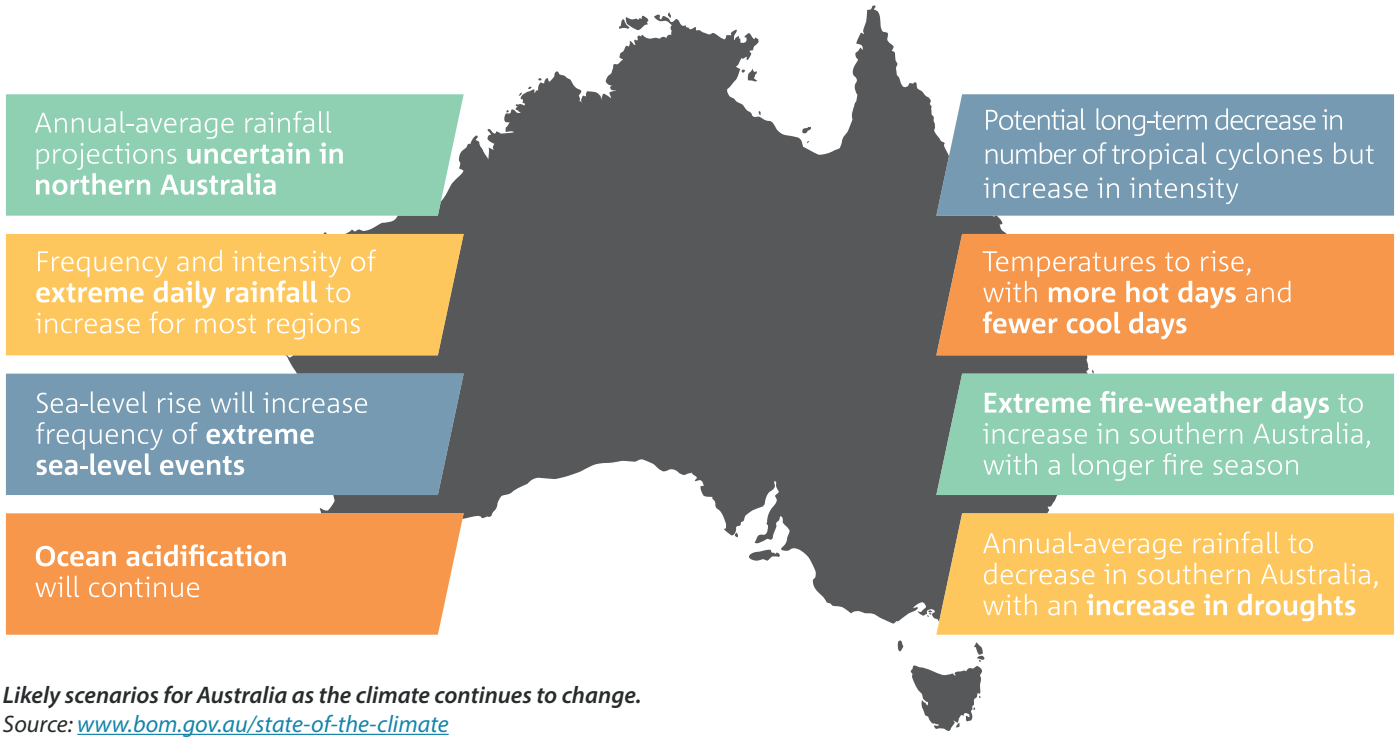
Once this brainstorming is complete, each group should present how they will react before, during and after the disaster. How well do the groups interact? What could be done better?

CLIMATE CHANGE

Australia has long been a continent of extremes. Poet Dorothea Mackellar described 'her beauty and her terror'; a land 'of droughts and flooding rains.' But in the hundred years since Mackellar wrote those words, things have changed dramatically. The droughts have become longer and harsher, the floods and cyclones more frequent and intense.

The environment is changing before our very eyes. Recent years have seen an astonishing increase in the number of heat waves and record temperatures across our country. Eight of the most blistering summers on record have occurred in the last fifteen years. The trend is continuing: Victoria experienced its hottest continuous days from 14 – 17 January, 2014. Adelaide sweltered through an unheard-of 11 days over 42 degrees Celcius. Queensland endured its hottest single day. Sydney had its warmest September ever, and suffered devastating bushfires as a consequence.

"Climate change is already increasing the intensity and frequency of extreme weather events in Australia"
– Climate Council 2014. Source: www.climatecouncil.org.au/angry-summer



Likely scenarios for Australia as the climate continues to change.
Source: www.bom.gov.au/state-of-the-climate

All indications are that the situation will get worse.

Modelling by the CSIRO forecasts that the number of fire-prone days for coastal cities like Melbourne and Sydney will almost double by 2050.

Inland cities such as Canberra and Albury-Wodonga will be even harder hit, facing up to thirty-five **Code Red** days a year.

This increase will inevitably add to the peril faced by those who make their homes on the edge of our capital cities and rural towns. The growth of settlement on the urban fringes has meant that almost four million Australians are now living within striking distance of dangerous bushfires; what their grandparents referred to as "The Red Steer".

DISASTER CHALLENGE

We must adapt to a changing climate and the more frequent and severe hazard events that will accompany it. They present a challenge every one of us must prepare for and work together to survive.

Governments and authorities cannot solve this challenge alone. Our volunteer and professional emergency services cannot protect every life and every property during times of major disaster. Authorities can issue warnings and advice, but they cannot force people to act on them. Building codes designed to protect structures cannot guarantee that the people inside them will be safe. We cannot burn enough vegetation every year to prevent bushfires. Individuals, families and communities must learn about the hazards in their environment and understand the risk.

When we consider our own risk of disaster, we start by asking ourselves, what is the likelihood of a disaster happening? And if it does happen, what would be the impact and consequences for my community, my family and myself? Some underestimate their risk. They think it won't happen or that if it does, they won't be affected. Some overestimate the risk and believe nothing they do will make a difference. Both of these attitudes can lead to tragedy. All citizens have a responsibility to learn and understand their own risk. When we understand our local hazards and discuss the danger they pose with our family and friends, we can be motivated to take action and feel more safe and confident.

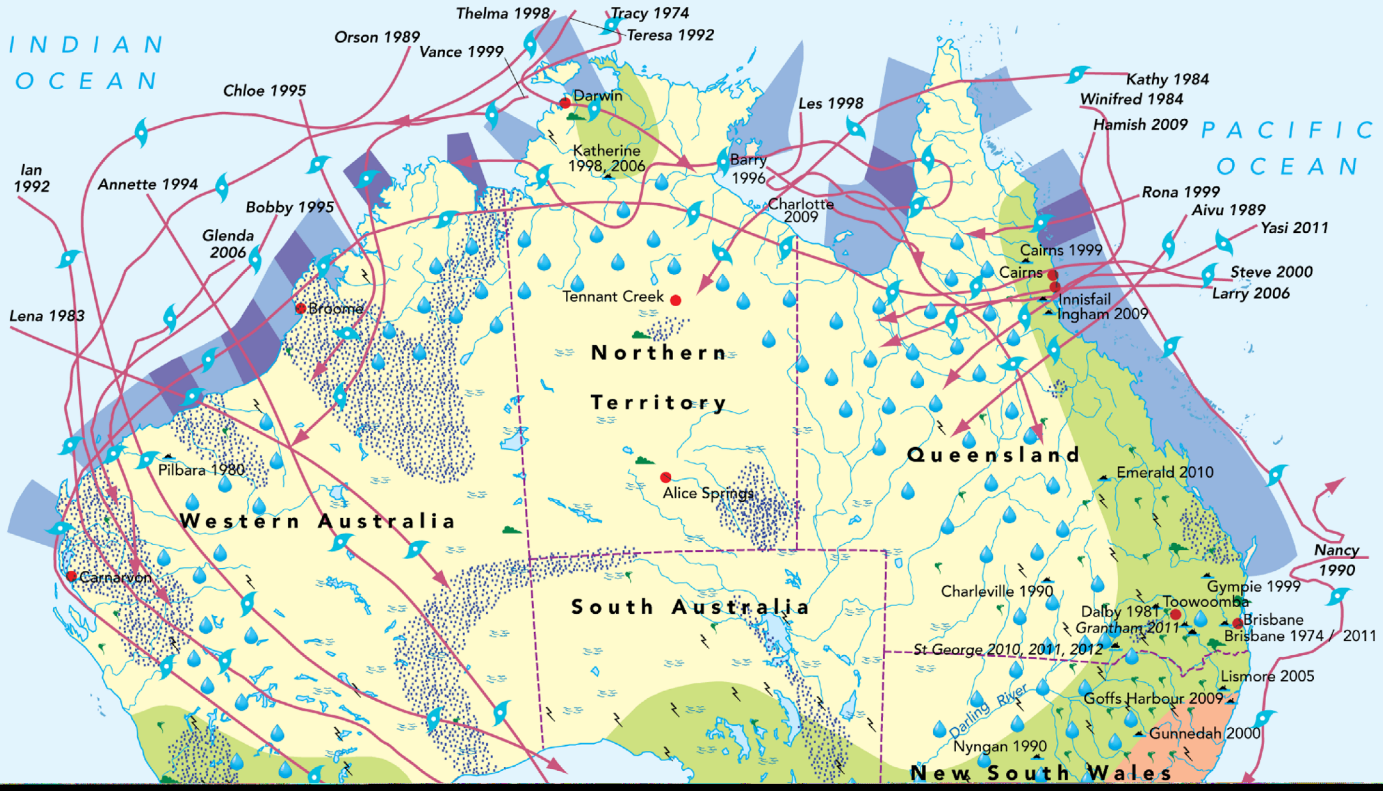
WHAT IS RISK?

When we talk about risk, in regards to disaster, we are primarily referring to the chance of someone getting hurt. Looking at it another way, risk is caused by a hazard combined with how vulnerable someone might be to that hazard. In a bushfire situation a child might be at great risk from the hazard (fire) because their age makes them more vulnerable. Other factors such as where you live (for instance, a bushfire-prone alpine area) will make you more vulnerable to the fire and thus at greater risk.

Try out the disaster mapper at:
disastermapper.ema.edu.au/

We can start by getting our bearings. We need to learn about our local environment – the climate, weather, geography – and the natural hazards that are part of it. Next we should look at the things that expose us to the hazards and make us vulnerable. Then we need to work to reduce the risk. We may be able to take simple actions around the home to better protect it such as carefully managing the vegetation around the home. We can practise what we are going to do to stay safe when disaster threatens.

AUSTRALIAN NATURAL HAZARDS AND DISASTERS



Questions and activities

ACTIVITY 1

Make a list of the community groups within your area.

ACTIVITY 2

Contact the leaders of your community group and interview them about their role before, during or after a natural disaster. How might they help?

ACTIVITY 3

Present a detailed profile of your chosen group and it's role in helping the community to become disaster resilient. Present this to an audience.
You could even invite members of the group to present with you.

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Editor:
David J Williams

Writers:
David J Williams, Adrian Hyland and Neil Grant.

Contributors:
Briony Towers and Kevin Ronan

Graphic Design:
Lene Thuseth

CFA project team:
Gwynne Brennan, Karen Enbom, Matthew Henry and Erin Bulmer.

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