# Bushfire mitigation

* Geography Stage 3
* 4 weeks – 90 minutes per week

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## Key inquiry question

How can the impact of bushfires on people and places be reduced?

## Content focus

Students:

* explore how the environment influences the human characteristics of places
* examine ways people influence the characteristics of places, including the management of spaces
* explore the impact bushfires have on Australian people, places and environments and propose ways people can reduce the impact of bushfires in the future.

## Outcomes

A student:

* explains interactions and connections between people, places and environments **GE3-2**
* compares and contrasts influences on the management of places and environments **GE3-3**
* acquires, processes and communicates geographical information using geographical tools for inquiry **GE3-4**

## Overview

The geographical inquiry process will investigate a contemporary Australian bushfire event. Through investigation of the case study, students will examine the location and extent of the bushfire, the impact on vegetation, animals and people and the role of government agencies in bushfire management. Shaped as a second inquiry, students will create a bushfire survival plan for an imaginary visit to a bushfire-prone area.

Note – be sensitive to the possibility that students, their family or friends, may have experienced bushfire events, some with tragic consequences.

## Assessment

Many of the activities require students to demonstrate their learning. These activities can be used to assess student progress at various stages throughout the inquiry process.

## Inquiry 1

**Student centred inquiry into the impact of a recent Australian bushfire disaster**

Students investigate the impact of a contemporary bushfire disaster.

Note – be sensitive to the possibility that students, their family or friends, may have experienced bushfire events, some with tragic consequences.

### Bushfire hazard

Students:

* investigate the impact of ONE contemporary bushfire hazard in Australia, for example (ACHGK030)
  + identification of the location and extent of the disaster
  + description of the impact of the disaster on natural vegetation and the damage caused to communities
  + examination of how people can prevent and minimise the effects of a bushfire.

### Humans shape places

Students:

* investigate how people influence places, for example (ACHGK029)
  + description of who organises and manages places, for example local and state governments
  + identification of ways people influence places and contribute to sustainability, for example roads and services, fire management strategies

### Factors that change environments

Students:

* investigate the ways people change the natural environment in Australia and another country, for example (ACHGK026, ACHGK027)
  + examination of how people, including Aboriginal and Torres Strait Islander Peoples, have influenced each country’s environmental characteristics, for example land clearing, use of fire

### Acquiring geographical information

Choose a recent bushfire event for this geographical inquiry. This could include the Black Summer (2019-2020) bushfire disaster or a region relevant to school context, for example North Coast, Mid North Coast, Hunter, Hawkesbury, Wollondilly, Blue Mountains, Illawarra, South Coast, Riverina and Snowy Mountains regions.

Clearly articulate the aim or purpose of the geographical investigation, for example, what were the impacts of the chosen bushfire disaster on the local communities?

Generate geographical questions to investigate and plan the inquiry, contextualised to the specific case study.

* Where is the place located? Use the [Australian Disaster Resilience Knowledge Hub disaster map](https://knowledge.aidr.org.au/disasters/) to locate the chosen bushfire disaster.
* What are the natural features of the place that made it fire prone? (for example, vegetation, slope, aspect, weather, climate)
* What are the human features of the place that contributed to the disaster? (for example, settlement patterns, roads and services)
* How do Aboriginal people use fire to manage the landscape? [‘Keeping the Fire Alive’ video](https://www.projectfirestorm.com.au/mission/level-2/how-can-a-burnt-landscape-be-brought-back-to-life/rebuilding-using-fire) from [NSW Rural Fire Service Project Firestorm](https://www.projectfirestorm.com.au/) explains cultural burning and ancient practices to support this investigation.
* What was the impact of the disaster on the vegetation, animals and human features of the area?
* What actions did people who live and work in the area take?
* What agencies managed the response to the disaster and what was their role?
* What bushfire disaster management strategies changed in response to the disaster?

### Acquiring data and information

Decide what sort of information is needed to support the geographical inquiry and where the information can be sourced, for example media.

Identify the geographical tools required to access information such referencing a variety of maps, undertaking virtual fieldwork, accessing data, and using spatial technologies and visual representations.

Support students to develop a system for recording information collected during the research process.

Examples of data and information sources:

* [use SIX maps](https://maps.six.nsw.gov.au/) or [Google Maps](https://www.google.com/maps) to locate the place. Locate a fire map of the area to examine the extent and spread of the bushfire, for example search ‘Port Macquarie fire map’
* use satellite imagery, Google Street View photographs and topographic maps to develop descriptions of the main geographical features
* access climate maps and weather statistics for the place and date of the disaster from the Bureau of Meteorology (BOM) [Climate summaries archive](http://www.bom.gov.au/climate/current/statement_archives.shtml)
* research the typical elements using the BOM bushfire weather page.
* Use multimedia sources, for example news footage, news stories, media photograph galleries, to research information on the impacts of the disaster and the actions taken by people living and working in the area.
* [Project firestorm](https://education.nsw.gov.au/teaching-and-learning/curriculum/key-learning-areas/primary/stage-3-resources/project-firestorm-unit) is a STEM unit of work developed by Stage 3 teachers at St Ives North Public School. This integrated study addresses an authentic problem for the school surrounded by bush land, directly adjoining the Ku-ring-gai National Park. The unit is the final learning sequence in a Stage 3 geography study focusing on Factors that Shape Places: How can the impact of bushfires on people and places be reduced?
* [Project firestorm RFS](https://www.projectfirestorm.com.au/) is an online and interactive version of the original Project Firestorm unit.

### Processing geographical information

* Use the [State Vegetation Type Map](https://www.environment.nsw.gov.au/vegetation/state-vegetation-type-map.htm) to locate the fire-affected region. Label the vegetation types, human features and plot the fire-affected area. Include the map orientation. Describe spatial relationships between settlement patterns, topography, and fire-affected areas. (For example, ridge-top housing areas.) Use [SIX maps](https://maps.six.nsw.gov.au/) to support this activity.
* Construct a comparison table of traditional Aboriginal use of fire for land management and present use of fire.
* Draw connections between climate maps, statistics and fact sheets and describe high-risk bushfire weather conditions.
* Use a Venn diagram to list the impacts of the bushfire, describing changes to the area pre- and post-bushfire.
* Use flow charts to explain how individuals, community groups and emergency response agencies respond to bushfires.
* Use consequence charts to describe patterns and relationships of weather, topography, land use and the impact on bushfire events.

### Communicating geographical information

**Communicate**

Create a multimedia text that reports on the contemporary bushfire case study. The report should be framed using the inquiry questions as section headings.

**Respond**

Discuss the ‘lessons learnt’ and relate to personal contexts. If you were living or holidaying in a similar area to the case study bushfire, what pre-bushfire seasons preparations would you make? What would you do in the event of a fire?

This discussion will lead into Inquiry 2 – Bushfire Survival Plan.

### Resources

* [In pictures: NSW bushfires](http://www.abc.net.au/news/2013-10-17/nsw-bushfires-in-pictures/5030166) ABC News, 25 October 2013
* [Project firestorm RFS](https://www.projectfirestorm.com.au/)
* [SIX maps](https://maps.six.nsw.gov.au/)
* [Project firestorm STEM](https://education.nsw.gov.au/teaching-and-learning/curriculum/key-learning-areas/stem/early-stage-1-to-stage-3/stage-3/bushfires#Project1)
* [Australian Disaster Resilience Knowledge Hub disaster map](https://knowledge.aidr.org.au/disasters/)
* [A timeline of the Coonabarabran Fires](https://www.abc.net.au/local/stories/2013/02/13/3689707.htm) ABC Western Plains, 11 March 2013
* [Climate Summaries Archive](http://www.bom.gov.au/climate/current/statement_archives.shtml) Bureau of Meteorology
* [Bushfire Weather, NSW Fire and Rescue](http://www.fire.nsw.gov.au/) Bureau of Meteorology
* [NSW Rural Fire Service](http://www.rfs.nsw.gov.au/)

## Inquiry 2 – Being fire ready

Students imagine they are planning a holiday or visit to a bushfire-prone area during the January school holidays. They develop a bushfire survival plan for their family.

Note – be sensitive to the possibility that students, their family or friends may have experienced bushfire events, some with tragic consequences.

Use [Six Maps](https://maps.six.nsw.gov.au/) to identify the geographical location of the holiday.

### Bushfire hazard

Students:

* investigate the impact of ONE contemporary bushfire hazard in Australia, for example: (ACHGK030)
  + identify the location and extent of the disaster
  + describe the impact of the disaster on natural vegetation and the damage caused to communities
  + examine how people can prevent and minimise the effects of a bushfire

### Acquiring geographical information

Set the scene by using a range of texts such as:

* Fire by Jackie French and Bruce Whatley
* The Bushfire Book: How to be Aware and Prepare by Polly Marsden
* The House on the Mountain by Ella Holcombe
* Through the Smoke by Phil Cummings
* Spark by Adam Wallace
* Bushfire: A Story of Bravery and Survival by Sally Murphy
* [The GeoSIX and the bushfire](http://www.geogspace.net.au/files/Core/Exemplars/Yr5/12.1.1%20The%20GeoSix%20and%20the%20bushfire.pdf)

Question:

* What is a bushfire survival plan?
* What is contained in a bushfire survival plan?
* Why is a bushfire survival plan needed?

### Acquiring data and information

Reflect on the impacts of and ‘lessons learnt’ from the bushfire event investigates in Inquiry 1. Examine the components of a [NSW bushfire survival plan](http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0017/2933/BushFireSurvivalPlan.pdf). This may include:

* reviewing the Fire Danger Ratings and The Bushfire Alert Levels
* discussing what to do in the event of a bushfire
* considering the top five actions to make your home safer
* developing a home emergency survival kit
* complete a [bush fire household assessment](https://assessmyrisk.rfs.nsw.gov.au/)
* [bush fire survival kit](https://www.abc.net.au/emergency/plan-for-emergency-survival-kit/12412048)

### Processing geographical information

* Construct a summary table of the risks of bushfire per vegetation type for example, bushfire risk in different [geographical environments](http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0017/2933/BushFireSurvivalPlan.pdf). and recorded [weather patterns in Australia](https://www.bbc.com/news/world-australia-50951043) over the last hundred years.
* Construct a flowchart that explains the meaning of and provides examples for the four steps of bushfire preparation – 1. Discuss, 2. Prepare, 3. Know, 4. Keep.
* Ensure students have developed their understanding of the factors that affect bushfire safety and actions that minimise the danger of bushfire
  + understanding of causes and management of bushfires.
  + understanding people’s responsibilities for the prevention of bushfires.
  + understanding actions in the event of a bushfire.

### Communicating geographical information

**Communicate**

* Support students to complete the NSW Rural Fire Service bushfire survival plan.
* Students present and share their survival plans.

**Respond**

As a class, identify civic action that they could undertake with regard to the impact of bushfires on people, animals and the environment. For example, education, support and [awareness for individuals and their communities](https://www.bushfirerecovery.gov.au/recovery-support/families-individuals).

### Resources

* [Bushfire Survival Plan](http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0017/2933/BushFireSurvivalPlan.pdf) NSW Rural Fire Service
* [Plan for an emergency: Bushfire](https://www.abc.net.au/emergency/plan-for-emergency-bushfire/12412042) ABC Emergency
* [Australia Fires: Visual guide to the Bushfire Crisis](https://www.bbc.com/news/world-australia-50951043) BBC World News;
* [What to do in a bushfire](http://www.bom.gov.au/weather-services/bushfire/about-bushfire-weather.shtml) (link to each state and territory) Bureau of Meteorology
* [The GeoSIX and the Bushfire](http://www.geogspace.net.au/files/Core/Exemplars/Yr5/12.1.1%20The%20GeoSix%20and%20the%20bushfire.pdf) GeogSpace

### Learning connections

Science and Technology K–6 Syllabus: Earth and Space (bushfire warning systems)

Literacy – suggested texts such as Fire by Jackie French and Bruce Whatley, My Country by Dorothea Mackellar.

## Inquiry 3 – Taking action

This is an optional inquiry.

### Overview

Students undertake an inquiry to create a ‘Fire safety plan’ and demonstrate how they would take action in their home and local area in response to a bushfire disaster.

They will communicate their findings to the questions:

* What are the individual and community precautions and preparations we could undertake to be ready for a potential bushfire if we lived in a bushfire area?
* How could we take action in response to a bushfire?

### Bushfire hazard

Students:

* investigate the impact of ONE contemporary bushfire hazard in Australia, for example: (ACHGK030)
  + identification of the location and extent of the disaster
  + description of the impact of the disaster on natural vegetation and the damage caused to communities

### Humans shape places

Students:

* investigate how people influence places, for example: (ACHGK029)
  + description of who organises and manages places eg local and state governments

### Acquiring geographical information

Using your knowledge and understanding from Inquiry 1, evaluate the effectiveness of a fire safety measure in minimising the impact of the bushfire disaster on local flora, fauna and the community.

Possible fire safety measures to evaluate:

* communication technology, for example “Fires near me” app, mobile phone coverage, text message warning system, interactive [Bushfire Survival Plan RFS](http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0017/2933/BushFireSurvivalPlan.pdf), local radio and TV, [RFS website](https://www.rfs.nsw.gov.au/), Bushfire information line, social media
* fire safety alert levels, for example ‘Watch and act’
* fire safety ratings, for example ‘Catastrophic’
* preparedness of community, for example knowledge of fire ready actions of ‘Discuss, Prepare, Know and Keep’.

Example guiding questions for the inquiry:

* What was the fire safety measure applied during your chosen bushfire situation?
* Who was responsible for developing the safety measure?
* How was the measure communicated?
* Can you see any possible advantages or disadvantages for this form of communication?
* Overall, how effective was the fire safety control measure? For example, loss of human life, property, flora and fauna, extent of fire damage and protection of infrastructure.
* How could communities benefit from the use of consistent fire safety measures across Australia? For example, using the same rating system and fire alert levels.

### Acquiring data and information

Suggested geographical inquiry tools may include:

* [Royal Commission into National Natural Disaster Arrangements Report](https://naturaldisaster.royalcommission.gov.au/) findings
* [Australian Disaster Resilience Knowledge Hub](https://knowledge.aidr.org.au/search?keywords=&collection=1316&categories=Fire%20-%20Bushfire&from=&to=&region=&type=&page=1&results=10) records and statistics of Australia’s bushfire history
* [NSW Rural Fire Service](https://www.rfs.nsw.gov.au/)

### Processing geographical information

* Construct a cause-and-effect table to explain the ‘lessons learnt’ after the fire event, describing changes that have been or could be implemented to improve the effectiveness of your chosen fire safety measure. For example, lack of mobile phone coverage making communication to residents pre-fire extremely difficult.
* Compare and contrast your fire safety measure with an alternative measure you predict would have been more effective.

### Communicating geographical information

**Communicate**

Each group has been assigned to represent a specific fire safety measure at The Royal Commission into Natural National Disaster Arrangements. Reports could include an outline of the emergency situation, the fire safety measure response and the implications.

Use the guiding inquiry questions to shape your report.

**Respond**

As a class, rank the effectiveness of the fire safety measures covered in the inquiry task and provide justifications for each.

### Resources

* [Australia Fires: Visual guide to the Bushfire Crisis](https://www.bbc.com/news/world-australia-50951043) BBC World News;
* [NSW Rural Fire Service](https://www.rfs.nsw.gov.au/)
* [Australian Disaster Resilience Knowledge Hub](https://knowledge.aidr.org.au/search?keywords=&collection=1316&categories=Fire%20-%20Bushfire&from=&to=&region=&type=&page=1&results=10)
* [Royal Commission into National Natural Disaster Arrangements Report](https://naturaldisaster.royalcommission.gov.au/)

## Geographical concepts

**Place** – the significance of places and what they are like, for example characteristics of places.

**Space** – the significance of location and spatial distribution, and ways people organise and manage spaces that we live in, for example; how people organise and manage spaces in their local environment.

**Environment** – the significance of the environment in human life, and the important interrelationships between humans and the environment, for example how climate and environment influence settlement patterns, interconnections between people and environments; differing ways people can use environments sustainably.

**Interconnection** –: no object of geographical study can be viewed in isolation, for example how environments influence where people live; ways people influence the characteristics of their environments.

**Scale** – the way that geographical phenomena and problems can be examined at different spatial levels, for example environmental and human characteristics of places on local and regional scales; the effect of events on people and places locally and regionally.

**Sustainability** – the capacity of the environment to continue to support our lives and the lives of other living creatures into the future, for example extent of environmental change; environmental management practices; sustainability initiatives.

**Change** – explaining geographical phenomena by investigating how they have developed over time, for example changes to environmental and human characteristics of places.

## Geographical inquiry skills

Acquiring geographical information

* develop geographical questions to investigate and plan an inquiry (ACHGS033, ACHGS040)
* collect and record relevant geographical data and information, using ethical protocols, from primary data and secondary information sources, for example, by observing, by interviewing, conducting surveys, or using maps, visual representations, statistical sources and reports, the media or the internet (ACHGS034, ACHGS041)

Processing geographical information

* evaluate sources for their usefulness (ACHGS035, ACHGS042)
* represent data in different forms, for example plans, graphs, tables, sketches and diagrams (ACHGS035, ACHGS042)
* represent different types of geographical information by constructing maps that conform to cartographic conventions using spatial technologies as appropriate (ACHGS036, ACHGS043)
* interpret geographical data and information, using digital and spatial technologies as appropriate, and identify spatial distributions, patterns and trends, and infer relationships to draw conclusions (ACHGS037, ACHGS044)

Communicating geographical information

* present findings and ideas in a range of communication forms as appropriate (ACHGS038, ACHGS045)
* reflect on their learning to propose individual and collective action in response to a contemporary geographical challenge and describe the expected effects of their proposal on different groups of people (ACHGS039, ACHGS046)

## Geographical tools

Maps:

* large-scale maps, small-scale maps, topographic maps, flowline maps
* maps to identify location, direction, distance, map-references, spatial distributions and patterns

Fieldwork:

* observing, measuring, collecting and recording data, conducting surveys or interviews
* fieldwork instruments such as measuring devices, maps, photographs, compasses, GPS

Graphs and statistics:

* pictographs, data tables, column graphs, line graphs, climate graphs
* multiple graphs on a geographical theme
* statistics to find patterns

Spatial technologies:

* virtual maps, satellite images, global positioning systems (GPS)

Visual representations:

* photographs, aerial photographs, illustrations, flow diagrams, annotated diagrams, multimedia, web tools