

Overview

Victoria State Emergency Service (SES) has developed an educational investigative game (www.vicses.com.au/floodsafe-game) which encourages the identification and learning about hazardous objects which can be found in floodwater and cause harm.

This lesson plan can be conducted before or after the game has been played and assists in consolidating students' learning and understanding.

It is suggested that any observations, student work or comments recorded during this lesson be displayed in your classroom, under the heading '**Hidden dangers in floodwater**', for others to see and learn from.

Outline	Materials	Time	Conclusion
To use computers to identify flood affected areas in Victoria and reinforce the dangers of swimming, walking and playing in floodwater.	<ul style="list-style-type: none"> Pencils/textas Writing paper Support material #1: Flood examples Support material #2: Types of floods Support material #3: Fact sheet on injuries and diseases Access to computers and the website www.vicwaterdata.net Support material #4: www.vicwaterdata instructions Worksheet #1: www.vicwaterdata investigation Support material #5: FloodSafe awareness poster 	Approx 60 minutes	Students will use computers to identify flood affected areas of Victoria, and participate in discussions about safety in floodwater.

Introduction:

10 minutes

- 1 Show students **Support material #1** of flood affected areas. Ask the students if they know what has happened in these pictures. Discuss flooding with the students. What is flooding? How does flooding happen? Where does it happen? Student's responses can be recorded on cards or a large sheet of paper and displayed.
- 2 Discuss the following different types of flooding (see **Support material #2** for further information):
 - **Riverine flooding** – when rivers burst their banks and the water covers any surrounding low lying ground.
 - **Flash flooding** – usually along creeks and drains which have a small catchment area. The water rises very rapidly in a very short time. (Sometimes within only minutes!)

- **Storm Surge** – severe low pressure systems over the sea can cause very large waves and higher ocean levels. These can cause flooding of low lying land along the coastline including estuaries, bays and lagoons.
 - **Dams** – dam walls can fail and cause bad flooding downstream. The water can be very fast moving and contain a lot of debris.
- 3 Using images from **Support material #2** ask students to try to identify which type of flooding has occurred in the different pictures. Ask the students to think about what type of flooding could occur near them.

Activity

30 minutes

- 4 Read out the following information:

Victoria has a long history of flooding and is home to many flood-prone communities. Floods cost Victorians an average of \$465 million every year, and can cause significant damage to homes, businesses and community infrastructure.

An estimated 150,000 homes and businesses in Victoria have a one per cent chance of flooding each year, it is very important that all Victorians are prepared for the possibility of flooding.

Source: <http://www.ses.vic.gov.au/prepare/floodsafe>

- 5 Discuss the effects flooding has on people, including the injuries and fatalities that sometimes may occur during floods (see **Support material #3** for further information).
- 6 On computers, ask students to visit www.vicwaterdata.net to locate where they live and discover if they live in a flood affected area. (For additional assistance using this website, see **Support material #4**.)
- 7 Distribute copies of **Worksheet #1** and ask students to locate their suburb/address to see if they live in flood affected areas or try to find areas in Victoria that will be affected by flood. Students can also look up family or friends who live in other areas of Victoria and explore the type of flooding that occurs, how often, etc.

Extension activity

As an extension, students can explore Wetlands, what they are, are there any located in their suburb or close by suburbs, or those of family and friends, and if so, what Flora and Fauna inhabit the area.

Conclusion

15–20 minutes

- 8 Students share their findings with the class.
- 9 Display **Support material #5**, look at the main message at the bottom of the poster; '**Never swim, walk or play in floodwater. You don't know what you are getting into**'. Discuss the content of the poster, what is contained in the floodwater and what it could do to you, and what they think the second sentence in the message means.
- 10 In conclusion, ask everyone to share one thing they have learnt about floodwater and why they should not swim, walk or play in it.



Flood examples



Source: <http://www.abc.net.au/news/stories/2011/01/16/3113796.htm?site=westernvic>



Source: <http://www.abc.net.au/news/2011-01-16/historic-floodwaters-swamp-victorian-towns/1907276>

Riverine flooding

Flood examples



Source: <http://www.barraba.com.au/manilla-river-rises-in-barraba-73.cfm>



Source: http://commons.wikimedia.org/wiki/File:Werribee_River_in_flood_over_cottrell_street_in_Werribee.jpg

Riverine flooding

Flood examples



Source: http://www.3aw.com.au/listener_images_of_victorian_floods?selectedImage=35



Source: http://www.3aw.com.au/listener_images_of_victorian_floods?selectedImage=35

Flash flooding

Flood examples



Source: http://commons.wikimedia.org/wiki/File:Driving_through_flash_flood.jpg



Source: <http://www.abc.net.au/news/image/1907294-3x2-340x227.jpg>

Flash flooding

Flood examples



Source: http://web.mst.edu/~rogersda/teton_dam/

Dam failure



Source: <http://www.acus.org/content/hurricane-sandy-storm-surge>

Storm surge

Types of floods



Source: <http://www.barraba.com.au/manilla-river-rises-in-barraba-73.cfm>

Riverine flooding

In riverine flooding, relatively high water levels overtop the natural or artificial banks of a stream or river. The nature of riverine flooding can vary significantly in terms of cause, timing and depth between different locations. Coastal rivers with short, steep headwaters often have floods that rise and recede quickly. Inland floods with low gradients have floods that move slowly down the river, sometimes lasting for several months.

Types of floods



Source: http://commons.wikimedia.org/wiki/File:Driving_through_flash_flood.jpg

Flash flooding

Flash flooding occurs when soil absorption, runoff or drainage cannot adequately disperse intense rainfall, and is usually caused by slow moving thunderstorms. Flash floods are generally defined as developing in six hours or less from rainfall to the onset of flooding.

Types of floods



Source: http://web.mst.edu/~rogersda/teton_dam/

Dam failure

Although dam failures are rare, their effects can be significant. In Victoria dam safety is monitored, and warning arrangements are in place to warn downstream residents of potential dam failure threats. Should dam failure occur, significant downstream flooding can involve potentially swift flowing water and high amounts of debris.

Types of floods



Source: <http://www.acus.org/content/hurricane-sandy-storm-surge>

Storm surge

Storm surge occurs when sea levels are elevated above the usual tidal limit due to the action of intense low pressure systems over the open ocean. The low pressure causes sea level to rise as there is less air pressing down on the sea. Combined with gale force onshore winds, this can lead to flooding of low-lying coastal land.

Injuries and diseases

Injury

Disease

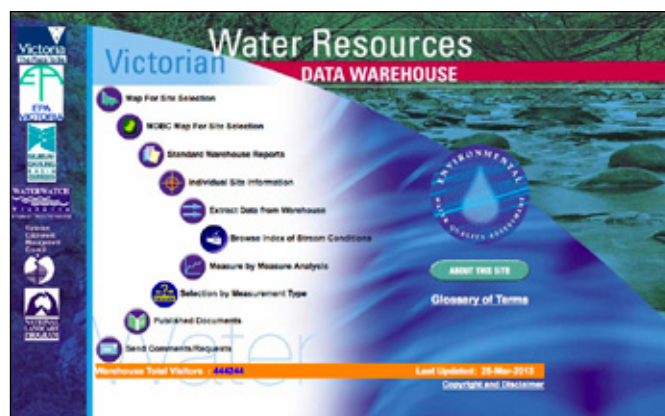
Infectious Diseases Cause: Ingestion or exposure to floodwater	<ul style="list-style-type: none"> E. Coli – Can cause diarrhoea, while others cause urinary tract infections, respiratory illness and pneumonia. Hepatitis – Can cause malaise, muscle and joint aches, fever, nausea or vomiting, diarrhoea, and headache. Typhoid – Fever, headache, general discomfort, diarrhoea.
Diarrheal Diseases Cause: Ingestion or exposure to floodwater	<ul style="list-style-type: none"> Eating or drinking anything contaminated by floodwater can cause diarrheal disease. Wash hands. Do not play in floodwater.
Wound Infections Cause: Sharp objects hidden in contaminated floodwater	<ul style="list-style-type: none"> Open wounds and rashes exposed to floodwater can become infected. Cover open wounds with a waterproof bandage. Keep open wounds as clean as possible by washing.
Chemical Hazards Cause: Contamination of floodwater by chemicals	<ul style="list-style-type: none"> Be aware of potential chemical hazards during floods. Floodwater may have moved hazardous chemical containers of solvents or other industrial chemicals from their normal storage places.
Drowning Cause: Entrapment in water or vehicles. Unable to swim	<ul style="list-style-type: none"> Floodwater poses drowning risks for everyone, regardless of their ability to swim. Swiftly moving shallow water can be deadly, and even shallow standing water can be dangerous for small children. Vehicles do not provide adequate protection from floodwater. They can be swept away or may stall in moving water.
Animal and Insect Bites Cause: Floodwater contains live snakes and insects	<ul style="list-style-type: none"> Floodwater can displace animals, insects, and reptiles. To protect yourself and your family, be alert and avoid contact.
Electrical Hazards Cause: Water becomes electrified.	<ul style="list-style-type: none"> Avoid downed power lines. Electrocution from unprotected wires or wet electrical equipment.
Wounds Cause: Sharp objects hidden in floodwater	<ul style="list-style-type: none"> Floodwater may contain sharp objects, such as glass or metal fragments, that can cause injury and lead to infection.

FloodSafe Support Material #4

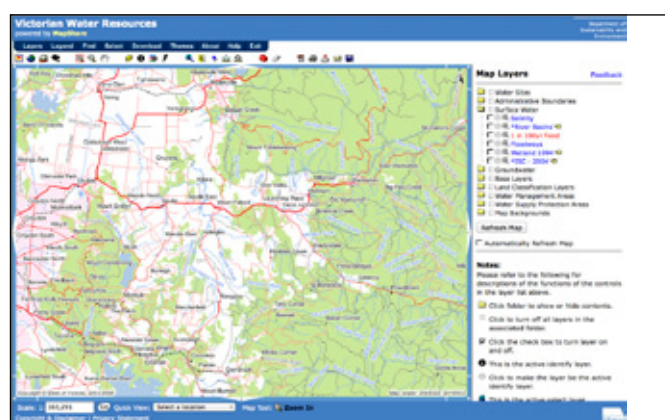
www.vicwaterdata.net



1. Visit www.vicwaterdata.net.
2. Select 'Map for Site Selection'.
3. Looking at the Map of Victoria, please locate where you live. This can either be done by clicking onto a specific area or holding the mouse down and creating a box around an area. The map will automatically zoom into the selected area. (You may need to repeat these steps on a number of occasions to get as close to a specific spot as required.)
4. Once zoomed in, to the right-hand side, under the main heading 'Map layers', select the folder Surface Water, then tick the box '1 in 100 yr flood' and select 'Refresh Map'. (If the program doesn't allow you to tick the box, this means that you haven't zoomed in close enough.)



- 1 in 100 yr flood event is probability of a flood of a given size or larger occurring in any one year.
- The blue overlays which will be seen if in a flood affected area, demonstrates what it would look like theoretically if a flood was to occur in that particular area.
- This data is based on information collected by Local Catchment Authorities in Victoria who have undertaken flood studies, which they then use to flood model various areas.



5. The map will then display, if you live in an area that might be flooded (or not), and the area that a flood could potentially cover.
6. Extension: Explore the data relating to Wetlands, which is also located under the heading 'Surface Water'. This will provide information regarding Wetlands in different areas. You could also investigate what Flora and Fauna live in each Wetland.

Index Name	Description
Index Name	EXTENT_100YR_ARE
File	1 in 100 year flood extent
Index ID	ANZ000000000000
Control Program	Water Resources Policy (WRP, 1997)
Metadata	Department of Environment and Primary Industries
Notes:	<p>Region data representing modelled statistical flood extent with an Average Recurrence Interval (ARI) of 100 years. For hydrological flood extent, refer to 'Hydrology, Event' layer.</p> <p>Also known as the 1 in 100 year flood layer, it is used, among other things, in the creation of Land Subject to Inundation areas as used in Planning Scheme Zones. The 1 in 100 year ARI is not restricted.</p> <p>This data is part of a group of layers depicting a range of statistical ARI extents. Current layers include 1, 10, 20, 30, 50, 100, 200, 500, 1000 year intervals, each in a separate dataset.</p> <p>The layer called EXTENT_100YR represents areas of probable maximum flood and is also part of this group.</p> <p>The data is statistically derived using hydrological models, historic flood extents and heights.</p>
Search Words:	WATER RIVERS, FLOODING FLOOD, WATER HYDROLOGY, WATER SURFACE, PLANNING ENVIRONMENT Planning
Control (Input) Date:	Generate 1 100,000 with data inside flood (ownership) boundaries at 0.000 or better
Control (Input) Date:	06-Nov-2012
Index Status:	Completed
Progress:	31 Progress
Index Constraints:	General
Index Substances:	



1. Visit www.vicwaterdata.net and explore the 1 in 100 yr flood data.
2. Complete the below table with your explorations of 1 in 100 yr flood data.

	Area searched (either address or suburb)	Located in a flood affected area (If yes, could explore the type of flooding, how often it occurs, etc)
1		
2		
3		
4		



1. Visit www.vicwaterdata.net and explore the Wetlands data.
2. Complete the below table with your explorations of Wetlands data.

	Area searched (either address or suburb)	Located in a Wetlands area (If yes, could explore the Flora and Fauna.)
1		
2		
3		
4		

FloodSafe awareness poster



Playing in floodwater exposes your kids to more than just the risk of drowning.

Playing in floodwater may look like fun but under the surface it contains contaminants, toxins and harbours infectious diseases.



What's in floodwater

- Toxic chemicals
- Animal faeces
- Decaying animals
- Garbage and waste
- Fallen powerlines
- Broken glass
- Twisted metal
- Tree branches

Floodwater health risks

- E.coli infection
- Rotavirus (diarrhea)
- Typhoid
- Leptospirosis
- Hepatitis A
- Infected wounds
- Dermatitis



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