



To introduce students to the causes and effects of flooding in Western Australia.

Flooding occurs in the Australian environment as part of the natural *water or hydrologic cycle*, replenishing ground water, lakes and rivers. Flooding can occur anywhere in Western Australia at any time of the year. It occurs when an area of land that is normally dry is inundated with water. In the north of Western Australia, flooding occurs mostly during the *wet season* (November to April) from tropical cyclones and monsoonal lows. In the southwest, flooding mostly occurs during winter storms (May to September). During summer, a cyclone in the northwest that has been downgraded to an 'ex-tropical cyclone' can bring extensive rain and flooding to the southwest.

The most common form of flooding in Australia is the flooding of the rivers following heavy rainfall. Flooding commonly occurs during and after a tropical cyclone, where low lying coastal areas may flood due to storm surge from the ocean and heavy rain. Storm surge can occur during a cyclone or severe storm, when strong winds 'pile up' the ocean and push it onshore into areas normally safe from tides or flooding. Storm surge is especially dangerous to low lying coastal communities. Globally, powerful storm surge has killed many people in the world, wiping out villages, destroying buildings and washing away roads and infrastructure.

Thunderstorms can produce very intense rainfall that can cause flooding of streams and small rivers. Larger storm systems, bringing prolonged or heavy rainfall can cause flooding over much larger areas of land. In coastal areas, tsunami can also cause flooding. Other flood risks include flash flooding and dam burst. Flash flooding occurs within six hours of heavy rain, often the result of intense local rain causing rapid rises in water levels. Flash flooding can affect cities and towns by flooding roads, buildings and natural environments. It can be difficult to predict accurately and gives little time for warning and effective preventive action.

Objective: *At the end of the lesson the students will have increased knowledge about what a flood is, what types of flooding there are, where, how and why flooding occurs.*

Flood Facts – Causes and effects of flooding in Western Australia

- View the video footage, *Flood!* Students discuss and make a class list of different types of flood and how they can happen: flash flood, large-scale flood, storm surge, and tsunami. Students complete a flood chart (*Flood Facts 2F.2*). Students consider how flood could affect them. (*Flood Facts 2F.3*)
- Students prepare ten questions to ask of someone who has experienced flooding. The questions need to include what happened *before, during and after* the flood. Students conduct their interview and afterwards complete the activity sheet, *Staying Safer in Flood*. Would students do the same or act differently? (*Flood Facts 2F.4*). Extension Activity: Students explore an historic flood that occurred in their community (or another part of Western Australia). What did the community learn from their experience? Students research newspaper clippings and use internet to find information.
- What can local governments do to minimise the future risk of flood? Students are set the task of being 'town engineers' for the day and to determine the best place to build a new housing development. (*Flood Facts 2F.5*)
- Discuss the possibilities of a river flooding, even when there has been no rain.





Types of Flood - After viewing the video footage, list the types of flood that occur in Western Australia. Think about **WHERE** this type of flooding has occurred in Western Australia. **WHEN** did it happen? To help you, you may need to research the internet or use newspaper clippings that you or your teacher has collected.

Different TYPES of FLOODING:	WHERE did it happen?	WHEN did it happen?

Keeping flood records – Hydrology is the science of water. What type of records do you think hydrologists record when flooding occurs?

How would these records help with future flooding events?





Flood Facts – What could happen? After viewing the video footage, think about what could happen before, during and after a flood.

The students in your group:
How can FLOOD happen?
What dangerous things could happen at school?
What damage could occur at school?
List any dangers that could occur on the way home.
What dangerous things could happen at home?
What damage could occur at home?
What could happen to us or our families?
What areas of your community do you think would be most affected by flooding?





Flood Facts

2F.4



Staying Safer in Flood - Use the answers from your interview questions. After further research, add what you would do to stay SAFER yourself, if you were in the same situation.

BEFORE the flood _____ did these things:

To stay SAFER, I would

DURING the flood _____ did these things:

To stay SAFER, I would

AFTER the flood _____ did these things:

To stay SAFER, I would





Town Engineer for a Day! – Students work in groups to determine the best place for a new housing development in their town/community.

In this activity, students test a variety of soil types to see how much water the soil will absorb.

Tools:

- water
- measuring cups
- funnels
- coffee filters
- potting mix
- clay
- sand

The Method:

1. You are a group of town engineers and you have been given the task of planning a new housing development in your town/community. Some people in the community are not happy about the development and feel that the soil will not be able to withstand heavy rainfall. They think the new homes will be subject to localised flooding.
2. Your task is to decide where the best place is to build the development. You are going to do this by testing different soil types and investigating how much water they will absorb.
3. One proposed area has a soil rich in clay (Area 1), one area is very sandy (Area 2) and the other has an earthy rich soil (Area 3).
4. First test the dry soil. Measure one cup of soil for each soil type.
5. Place the first soil type in to a funnel lined with a coffee filter. Pour a measured amount of water through it. (You will need to use the same amount of water each time). Let the water drain through the soil in the funnel and collect the water in another measuring cup. Record how much water flows through the funnel.
6. Repeat the test with each soil type.
7. Repeat the test again, this time testing the soil in its saturated state.
8. Record your results and discuss which soil held the most water when dry and which soil held the most water when saturated.
9. Which type of soil, do you think, is likely to create a bigger flooding issue?
10. Students write a report explaining which area would be best suited for the housing development.





Answers:

Types of Flood - Below are sample answers. Students can use the Bureau of Meteorology website (www.bom.gov.au) to find information.

Different TYPES of FLOODING:	WHERE did it happen?	WHEN did it happen?
Broad scale flooding after a tropical cyclone	Moora Flood – as a result of ex-tropical cyclone Elaine	March 1999
River flooding after heavy rainfall	Gascoyne River –its most severe flood on record	December 2010
Flash flooding	Perth Storm – flash flooding in the city	22 March 2010
Storm surge after a tropical cyclone	Storm surge peaked west of Onslow at 5m after TC Vance	22 March 1999

Flood – What could happen? - After viewing the video footage, think about what could happen before, during and after a flood. Here are some ideas:

How can FLOOD happen? – broad scale flooding after a tropical cyclone, river flooding after heavy rainfall, flash flooding after heavy rainfall, storm surge after a tropical cyclone, poor drainage, etc.
What dangerous things could happen at school? – this would be specific to your school grounds. E.g. low lying parts of the school where water will run off to, poor drainage in an area that often floods, blocked drains, etc.
What damage could occur at school? – specific to your location. E.g. the library could flood, roads/pathways blocked.
List any dangers that could occur on the way home. -blocked drains, fast moving water, flooded road, traffic lights failed due to power cuts.
What dangerous things could happen at home? – blocked gutters, low lying areas of house or yard where water will run to may get flooded, water pouring into the house, garage and/or patio.
What damage could occur at home? – wet carpets need to be replaced, plaster board walls need to be replaced, damage to your belongings and household items such as TV, books, photos, clothes, etc. our car may be submerged.
What could happen to us or our families? – we might need to leave our home; we might be stranded at home with no food/supplies, etc.





Staying Safer in Flood – Here are some example answers. Use the DFES website and the DFES brochure, *Flood Smart* (www.dfes.wa.gov.au) for more ideas.

BEFORE	DURING	AFTER
<ul style="list-style-type: none">• Prepare an Emergency Kit• Have a Family/Household Plan• Secure hazardous items	<ul style="list-style-type: none">• Move furniture/valuables to a high place• Listen to warnings• Don't play or drive in flood waters	<ul style="list-style-type: none">• Help out friends and neighbours• Seek SES assistance 132 500• Seek support if needed

