

Year 7 science and geography¹

How does water cycle through our catchment

Australian Curriculum links:

Year 7 Science

Some of Earth's resources are renewable, including water that cycles through the environment, but others are non-renewable (ACSSU116)

Year 7 Geography

The way that flows of water connects places as it moves through the environment and the way this affects places (ACHGK038)

Sustainability cross-curriculum priority

In this activity, students explore the water cycle in their local catchment and create a concept map showing how the natural and human elements are related.

Equipment

For the class

- a map of your local area showing the catchment/s
- [the water cycle poster](#) (for coastal areas) or [Inland water cycle poster](#)
- [Total water cycle management poster](#)
- concept map labels to display

For each group

- some scrap paper to cut or tear into small pieces to make labels for the concept map
- one A3 sheet of paper
- pencils, eraser
- scissors, glue or sticky tape

Activity steps

The natural water cycle

1. Students share what they already know about the water cycle on different scales e.g. the planet, Australia, Queensland, their local catchment. They devise a list of focus questions for this topic. These questions will depend on students' prior knowledge but could include:
 - Where does rain come from?
 - What are the pathways that the water cycle can take?
 - How does water cycle through my catchment?

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2. Display [the water cycle poster](#) or [Inland water cycle poster](#) and review the various pathways that water takes as it cycles through the Queensland landscape. You may need to focus on less obvious aspects of the water cycle. For instance, the movement of water through plants from the roots and then out of the leaves (transpiration). While students don't need to know exactly how this occurs, it can be useful to demonstrate the process by tying plastic bags on the ends of shrub branches overnight to observe the puddle of water that forms in the bottom of the bag.

Optional: If you have access to David Attenborough's 'The private life of plants' video, there is a classic six minute segment that explains how water moves through trees. He demonstrates how much water is naturally pumped through large trees using a fire-fighting hose. Alternatively, you may find useful video clips on YouTube.

3. Display the local map, identify the area of your local catchment and mark your local water sources and water-related infrastructure. Ask the students to identify how water flows through their catchment. Use questions such as:

- Where does the water in your local creek or river come from?
- Where does this creek or river flow to? Does it flow into another creek or river? Does this river flow into the ocean or towards the centre of Australia?
- How much of the water enters the catchment as rain?

Discuss where the rain that falls in your catchment comes from: how clouds condense from water vapour formed by evaporation from water bodies and from transpiration in plants.

Apply these abstract ideas to your local environment as much as possible. Discuss the fact that the water cycle takes place on a scale that is much larger than just one catchment. The rain that falls on your catchment may have evaporated from Western Australia or the Indian Ocean, for instance.

Some water enters the catchment as groundwater, which has previously entered the aquifer as rain that fell in a recharge area somewhere else.

4. Ask students to draw a diagram of the water cycle in your local catchment. Focus on the natural aspects of the water cycle without human impacts.

The water cycle with human impacts

5. Using a think-pair-share strategy, ask the students to list the human impacts on the local water cycle including water supply infrastructure e.g. dams, bores, water treatment plants, sewage treatment plants, water recycling plants, houses, industries, businesses and stormwater drains.

In a think-pair-share activity, students spend some time individually thinking about and recording their ideas. They then share their ideas with a partner and decide on the list for their pair. Two pairs of students form teams of four to develop a team list.

Discuss the impact that new water sources such as water recycling projects and desalination plants might have on the water cycle and the sustainable management of water resources. The positives and negatives of rainwater tanks and greywater reuse can also be highlighted.

6. Display the 'Total water cycle management' poster for additional ideas. Students add these ideas to their diagram (step 4). Focus on the impacts that a town or city would

have on the flow of water through the water cycle. What are the effects of prolonged drought on the flow of water through this system?

Concept mapping

7. Explain that concept mapping is an effective way of organising and visually representing the relationships between ideas. Students work in groups of three to create a concept map showing the different parts of the water cycle with human impacts for your local area, including various parts of the area's infrastructure.

Alternatively, students can **create a flow chart** to show the water cycle pathways.

8. Explain that a concept map has labels (ideas) and arrows with linking terms.

Negotiate a starting list of concepts for the labels. Labels could include:

| | |
|--------------------------------|--|
| precipitation | waterway |
| dam | ocean |
| water treatment plant | wastewater treatment plant |
| homes, business and industries | water recycling plant |
| stormwater drains | golf courses, agriculture drinking water |

9. Show students how to start a simplified concept map by gradually adding labels, arrows and linking terms and explaining your reasoning as you go. Figure 1 is an example of completed concept map for a coastal town or city. Choose terms relevant to your area.
10. Students cut or tear pieces of paper for the labels and write one idea per piece. Place the labels on the A3 sheet of paper and pencil in the arrows and possible linking terms. Move the labels around until the group is happy with the arrangement then glue or stick them in place.
11. Group present their concept map to the class while other students evaluate it and make suggestions for improvement.

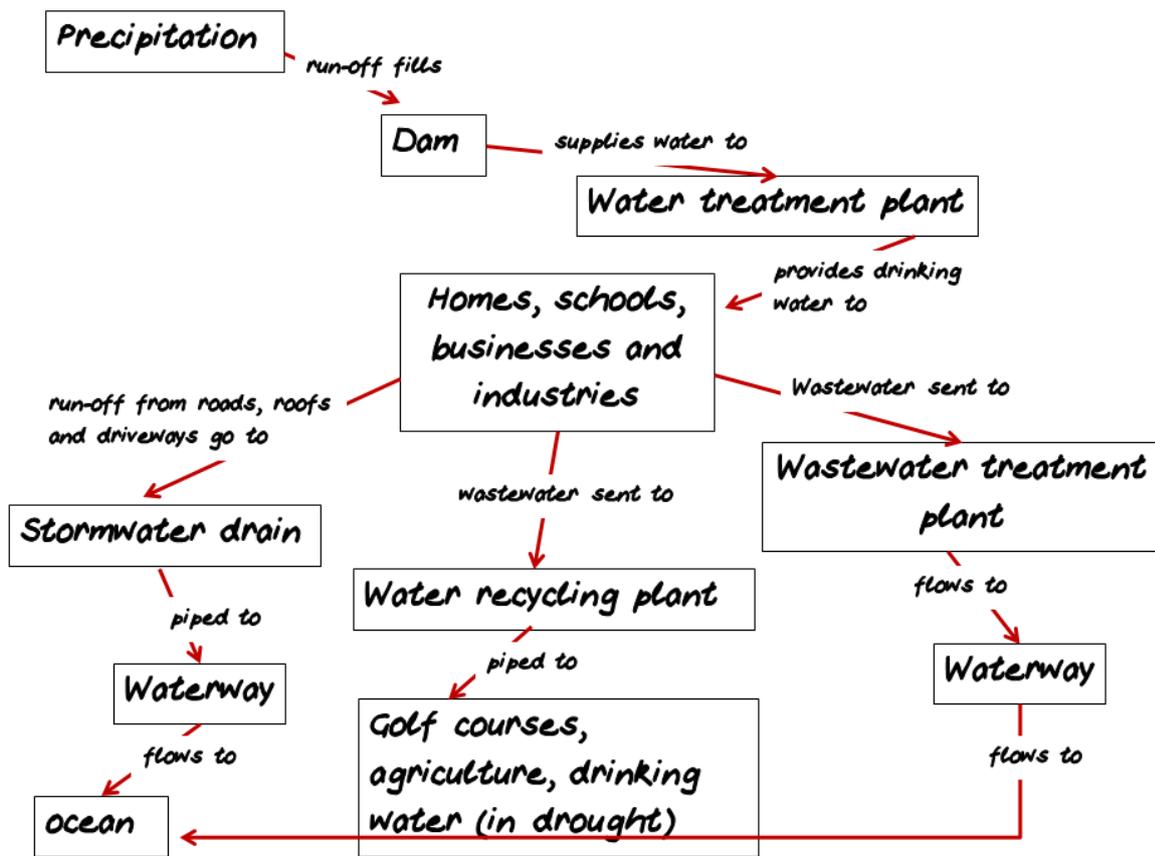


Figure 1 An example of a concept map for a coastal town or city