# Stormwater in the urban environment (Years 3 and 4)

Lesson plan

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| Victorian Curriculum F–10[[1]](#footnote-1) links:  **Geography**  **Levels 3 and 4**  **Geographical Knowledge**  **Diversity and significance of places and environments**  Types of natural vegetation and the significance of vegetation to the environment, the importance of environments to animals and people, and different views on how they can be protected; the use and management of natural resources and waste, and different views on how to do this sustainably  Similarities and differences in individuals’ and groups’ feelings and perceptions about places, and how they influence views about the protection of these places  **Science**  **Levels 3 and 4**  **Science Understanding**  **Science as a Human Endeavour**  Science knowledge helps people to understand the effects of their actions  **Chemical sciences**  Objects are made of materials that have observable properties |

## Introduction

Stormwater run-off in urban areas can have a significant impact on the ecological health of our rivers, creeks and bays. This lesson plan assists students to understand the journey of stormwater as it flows over the landscape, picking up pollutants along the way, washing them into our rivers and creeks and eventually into Port Phillip Bay.

### Activity 1: Stormwater detectives

Using a Photo hunt and Drainage system audit, students identify ways in which stormwater is managed at school and at home.

### Activity 2: Water’s urban journey

### Students create a visual flow chart to show the journey of water through the stormwater system and consider solutions for avoiding and reducing stormwater pollution.

### Activity 3: Raindrop adventure

Students create a storyboard adventure of a raindrop in Melbourne travelling in the stormwater system.

**Activity 1: Stormwater detectives**

Students identify ways that stormwater is managed at school and at home.

### Duration

One session preparation, double session for Photo hunt, two sessions for follow up

### Equipment

For each group:

Digital camera

Note pad

Pencil

Clipboard or something to lean on to make observational notes

Interactive whiteboard or data projector

### Activity steps

**Photo hunt**

1. Invite students to think about the school on rainy days and create images in their mind of all the things that happen. Use prompt questions such as:
   * Have you noticed parts of the schoolyard where puddles appear after rain?
   * What happens to the rain that falls on the roof?
   * Are there parts of the schoolyard where the water disappears quickly?
   * Brainstorm a list of students’ recollections.
2. Explain that they will be working in pairs and going on a Photo hunt to identify where the rainwater goes in the schoolyard. Students will need a digital camera, note pad, pencil and something to lean on so that they can make observational notes, including about location, to accompany their photos.
3. Prior to the Photo hunt ask pairs to think about the ideas from the brainstorm and identify some of these as a starting point for their Photo hunt, recording them on their pad.
4. Discuss respectful and cooperative behaviour prior to the Photo hunt. Determine length of time for the activity and agree on a way that students can be alerted that the hunt time is over.
5. Following the Photo hunt, students upload their photos to computers or scan in their sketches and use the interactive whiteboard or data projector to share them. Photographers explain why they took each photo, for example, ‘I took the photo of the gutter and downpipe because the water rushes off the roof and down the drainpipe when it rains’.

**Drainage system audit**

1. Explain to students that stormwater is rainwater that runs off surfaces and that cities have a drainage system that carries stormwater from roofs, roads and buildings using gutters, drains and channels. As a class discuss the different ways stormwater is carried from the school. Any drainage methods featured in the Photo hunt can be acknowledged.
2. Use these ideas to develop a list for a Drainage system audit: for example, downpipes, gutters (on buildings and beside hard surfaces such as pathways), drainage pits, drains, water tanks and rain gardens. Students contribute to designing a simple checklist to record how many there are of each audit item and observations about their location.
3. Students conduct the Drainage system audit at school and at home. (Note: Some students may find it difficult to conduct a home Drainage system audit because of the type of dwelling, for instance an apartment.) Using students’ audit information the class discusses similarities, and why there are differences between drainage systems at home and school.

## Activity 2: Water’s urban journey

Students create a visual summary to show the journey of water through the stormwater system.

### Duration

Two sessions

### Equipment

For each pair:

One copy of **Student worksheet: Water’s urban journey**

A large sheet of paper

Scissors

Coloured pencils or textas

Glue

### Activity steps

1. Explain the purpose of flow charts and how they can show a sequence of steps or stages.
2. Ask students to think about the different types of surfaces that were in the photos taken during the Photo hunt. Surfaces may include tin on the roof, concrete path, and mulch in the garden. Invite comments about the way rainwater moves over these surfaces.
3. Prompt questions may include:

* What have you noticed about the way water moves over different surfaces, for instance concrete compared to grass?
* What have you noticed happens to rainwater in garden beds?

1. Organise students into pairs and provide them with **Student worksheet: Water’s urban journey**. Explain that they will be creating a flow chart that shows the process of rainwater travelling through the stormwater system to creeks, rivers and the bay. Each pair will need a large sheet of paper, scissors, coloured pencils or textas, and glue.
2. After students have cut out the prompt words, ask them to discuss and decide on how the words could be best arranged to explain the journey of water through the stormwater system. When students are happy with their arranged words, ask them to paste them onto the sheet and add the joining arrows.
3. Students review their flow chart for the consequences of any events happening such as pollution blocking drains or excess nutrients affecting animals and plants in creeks. Encourage students to think of possibilities for changing or adding to their flow chart with questions such as:

* What happens if there is a blockage in the downpipe?
* What impact does oil pollution from roads have on creeks and rivers?
* How do gardens help with the run-off from hard surfaces such as paths and driveways?

1. Using a different-coloured pencil or icon, students annotate their flow chart with these consequences.
2. Ask students to think about why these events are a problem and how they can be avoided. Ask them to decide on possible actions to reduce or avoid negative outcomes that might occur with stormwater. For instance:

* litter pollution blocking creeks: use products with less packaging or reduce litter by taking it home or using bins provided
* large amounts of run-off from hard surface areas such as concrete: explore alternative materials, such as paving that allows rainwater to soak through to reduce the flow, or redesign areas to include more gardens to absorb rainwater
* large amounts of rain falling on the roof and going down drains: install water tanks or rain gardens.

1. Using a different-coloured pencil or icon, students annotate their flow chart with action ideas to reduce or avoid stormwater pollution.

### Alternative activities

Use a word-processing program, concept mapping software program or labelled illustrations instead of the words to create the flow chart. In MS Word, the table of words can be copied and pasted into an A3 document. By right-clicking and selecting Grouping > Ungroup, the textboxes can be separated and moved around the page. Insert shapes to create arrows.

### Extension activity

Invite a speaker from the local council to talk about what happens with stormwater locally.

Photo hunt – What happens to stormwater after it leaves school/home? Visit a local waterway or wetland to answer the question.

Note: This task could be used for assessment purposes to assess student ability to provide a clear summary of the process of the stormwater system which highlights human influences in the environment, which affect the survival of living things.

**Resources**

Melbourne Water 2016 *Stormwater* <<http://www.melbournewater.com.au/whatwedo/protectrivers/improving-river-health/Pages/Stormwater.aspx>>

## Activity 3: Raindrop adventure

Students use their knowledge from **Activity 1: Water’s urban journey** to create a storyboard about the adventures of a raindrop in Melbourne travelling in the stormwater system.

### Duration

One session

### Activity steps

1. Explain that students will use their flow chart to create a storyboard describing the adventures of a raindrop. As a class, discuss some possible ideas for the raindrop’s adventures using prompt questions such as:

* Where could the raindrop begin its journey when it falls from the sky?
* What might the raindrop see, hear and feel along the way?
* What problems might the raindrop encounter?
* What ideas for solving problems could the raindrop provide?

1. Provide students with **Student worksheet: raindrop storyboard**. Discuss the importance of:

* developing a plan before beginning the storyboard to ensure the sequence is correct
* using descriptive words so that the reader has a better understanding of what it would be like to travel in the stormwater system
* creating imaginative illustrations to entice the reader and enhance the story
* developing a title for the storyboard to capture the reader’s imagination.

1. Students take turns to read each other’s storyboard.

### Extension activity

Use the storyboard to create a written narrative, comic strip or e-story.

## Student worksheet: Water’s urban journey (Post-activity 1)

Working in pairs, use these words to create a flow chart. The blank squares are for any ideas of your own. Cut up the squares. Place them onto a large sheet of paper to show the journey of water through the stormwater system to creeks, rivers and the bay. You will need to leave room between the words so that you can show the direction of the water flow with arrows. When you are happy with your flow chart, paste the words in place and draw the arrows.

**stormwater**

**rain**

**gutters**

**roof**

**gardens**

**paths**

**driveway**

**asphalt**

**plants**

**school oval**

**rivers**

**creeks**

**the bay**

**stone paths**

**channel**

**grates**

**playground**

**downpipes**

**drains**

**concrete gutters**

**pollution**

**roads**

**pipes**

## Student worksheet: Raindrop storyboard (Post-activity 2)

* Title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Author: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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