

# Stage 4 Science program outline

We offer three excursions that focus on the different types of water in our urban water cycle: drinking water, wastewater and water recycling.

## Excursion options

| Excursion options  | Sites  | Excursion times                          | Duration                                 | Student numbers |
|--|--|--|--|-----------------|
| <b>Wastewater</b><br>See how we manage wastewater and protect the environment.   | Penrith Water Recycling Plant  | 9.30 am – 11.30 am<br>12.30 pm – 2.30 pm | 2 hours                                  | 10* – 120       |
| <b>Drinking water</b><br>See how we manage water supply and protect public health.   | Orchard Hills Water Filtration Plant   | 9.30 am – 11.30 am<br>12.30 pm – 2.30 pm | 2 hours                                  | 10* – 120       |
| <b>Urban water cycle</b><br>See how we protect public health, protect the environment and manage water for a sustainable future. | Dual site<br>1. Orchard Hills Water Filtration Plant<br>2. Penrith Water Recycling Plant | 9.00 am – 2.00 pm<br>9.30 am – 2.30 pm   | 5 hours including break and travel time. | 10* – 120       |

\* Groups with less than 20 students will be combined with other schools doing the same program.

### Who will provide worksheets?

We'll provide printed, syllabus linked worksheets for students and a teacher answer sheet. Students will need to bring a pen to complete the worksheet.

### Where can we have a meal break?

You can request lunch venue options, including local parks, from the bookings coordinator. No food can be consumed on site.

Time for your own off-site lunch break is included in the program (half an hour) for dual site programs when you travel between the two sites.

### What can school students and teachers wear?

Everyone, including teachers and group leaders, **must** wear sturdy, fully enclosed, flat soled shoes such as joggers, closed school shoes or boots. There should be no skin showing on feet. No open shoes such as sandals, thongs or ballet flats.

School students are permitted to wear school or sports day uniforms.

### What happens if it's raining or too hot?

If it's very hot, raining or has been raining for a long period of time before your tour, it may not be safe to go outside or complete the whole tour. Your Education Officer will negotiate alterations to the program to make sure you still get the most out of your visit.

## Content covered

**Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world.**

- recount how evidence from a scientific discovery has changed understanding and contributed to solving a real-world problem, eg hygiene, sewage treatment.

**Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques.**

- relate a range of techniques used to separate the components of some common mixtures to the physical principles involved in each process, including filtration, decantation
- investigate the application of a physical separation technique used in everyday situations or industrial processes, eg water filtering, sorting waste materials,
- research how people in different occupations use understanding and skills from across the disciplines of Science in carrying out separation techniques

**Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management.**

- identify that water is an important resource that cycles through the environment
- explain the water cycle in terms of the physical processes involved
- demonstrate how scientific knowledge of the water cycle has influenced the development of household, industrial and agricultural water management practices

## Excursion itineraries

### Wastewater Excursion at Penrith Water Recycling Plant

| Time     | Activity            | Content   |
|----------|---------------------|---|
| 9.00 am  | Arrival             | <ul style="list-style-type: none"> <li>• Arrive at site, orientation and safety.</li> </ul>   |
| 9.10 am  | Managing water      | <ul style="list-style-type: none"> <li>• Outline the roles and responsibilities of Sydney Water.</li> <li>• Use an Augmented reality sandbox to investigate the natural water cycle.</li> <li>• Use an interactive catchment model to explore Sydney's urban environment, the urban water cycle and managing impacts on the environment.</li> </ul> |
| 9.40 am  | Wipes out of pipes  | <ul style="list-style-type: none"> <li>• Discuss what can and can't go down the drain and the impacts of our actions.</li> <li>• Use scientific mixers to investigate how readily 'flushable' wipes, tissues, toilet paper and facial wipes break down.</li> </ul>  |
| 9.55 am  | Tour                | <ul style="list-style-type: none"> <li>• Walking tour of an operational site.</li> </ul>  |
| 10.35 am | Flow chart activity | <ul style="list-style-type: none"> <li>• Students use pictures to create a flow chart of the treatment process that notes:               <ul style="list-style-type: none"> <li>○ treatment processes</li> <li>○ substances being removed at each stage of the process.</li> </ul> </li> </ul>  |
| 10.50 am | Conclusion          | <ul style="list-style-type: none"> <li>• Students discuss their role in the urban water cycle.</li> </ul>   |
| 11.00 am | Departure           | <ul style="list-style-type: none"> <li>• Safely depart site.</li> </ul>   |

## Drinking water excursion at Orchard Hills Water Filtration Plant

| Time     | Activity        | Content   |
|----------|-----------------|---|
| 9.00 am  | Arrival         | <ul style="list-style-type: none"> <li>Arrive at Orchard Hills, orientation and safety.</li> </ul>  |
| 9.10 am  | Values of water | <ul style="list-style-type: none"> <li>Outline the roles and responsibilities of Sydney Water</li> <li>Role of governments, non-government organisations, individuals and communities in sustainable water management.</li> </ul> |
| 9.20 am  | Tour            | <ul style="list-style-type: none"> <li>Walking tour of an operational site.</li> </ul>  |
| 10.05 am | Water lab       | <ul style="list-style-type: none"> <li>Your drinking water is high quality and safe. Students will test this with lab experiments and technology used by Sydney Water everyday.</li> </ul>  |
| 10.50 am | Conclusion      | <ul style="list-style-type: none"> <li>Students discuss their role in managing drinking water.</li> </ul>   |
| 11.00 am | Departure       | <ul style="list-style-type: none"> <li>Safely depart site.</li> </ul>   |

## Urban water cycle- Dual site Orchard Hills and Penrith.

This excursion can also be run in reverse.

| Time     | Activity            | Content  |
|----------|---------------------|--|
| 9.00 am  | Arrival             | <ul style="list-style-type: none"> <li>Arrive at Orchard Hills, orientation and safety.</li> </ul>   |
| 9.15 am  | Introduction        | <ul style="list-style-type: none"> <li>Outline the roles and responsibilities of Sydney Water.</li> </ul>  |
| 9.30 am  | Tour                | <ul style="list-style-type: none"> <li>Walking tour of an operational site.</li> </ul>   |
| 10.15 am | Water lab           | <ul style="list-style-type: none"> <li>Your drinking water is high quality and safe. Students will test this with lab experiments and technology used by Sydney Water everyday</li> </ul>  |
| 11.15 am | Travel and break    | <ul style="list-style-type: none"> <li>Travel from one site to the next (approximately 30 minutes). Students must bring their own lunch.</li> </ul>  |
| 12.15 pm | Tour                | <ul style="list-style-type: none"> <li>Walking tour of an operational site.</li> </ul>   |
| 1.00 pm  | Flow chart activity | <ul style="list-style-type: none"> <li>Students use pictures to create a flow chart of the treatment process identifying substances being removed at each stage of the process.</li> </ul>   |
| 1.15 pm  | Managing water      | <ul style="list-style-type: none"> <li>Use an augmented reality sandbox and an interactive catchment model to explore Sydney's urban environment, the urban water cycle and managing impacts on the environment.</li> </ul>                                    |
| 1.35 pm  | Wipes out of pipes  | <ul style="list-style-type: none"> <li>Discuss what can and can't go down the drain and the impacts of our actions.</li> <li>Use scientific mixers to investigate how readily 'flushable' wipes, tissues, toilet paper and facial wipes break down.</li> </ul> |
| 1.50 pm  | Conclusion          | <ul style="list-style-type: none"> <li>Students discuss their role in the urban water cycle.</li> </ul>  |
| 2.00 pm  | Departure           | <ul style="list-style-type: none"> <li>Safely depart site.</li> </ul>  |