Water Cycle game

Recommended for students in Grades 3 – Year 8, this activity can be used to reinforce or reintroduce understanding of the water cycle. Students participate in a water cycle simulation to find out the complexity of water droplet movement. A large clear room or outdoor area is recommended.

Curriculum connections

A change of state between solid and liquid can be caused by adding or removing heat (VCSSU059)

Science knowledge helps people to understand the effects of their actions (VCSSU056)

Solids, liquids and gases behave in different ways and have observable properties that help to classify them (VCSSU076)

Changes to materials can be reversible, including melting, freezing, evaporating, or irreversible, including burning and rusting (VCSSU077)

Water is an important resource that cycles through the environment (VCSSU101)

Classification of environmental resources and the forms that water takes as a resource (VCGGK105)

Ways that flows of water connect places as they move through the environment and the ways this affects places (VCGGK106)

Background notes for teachers

The water cycle describes how water moves between the atmosphere, hydrosphere and lithosphere (air, water and ground). Water is the only substance that exists naturally in all three states (solid, liquid and gas). Water is made up of molecules with two hydrogen and one oxygen atoms – it is sometimes referred to as the Mickey Mouse molecule; Mickey's head is the oxygen atom and his 2 ears are the hydrogen atoms. Water precipitates (falls as rain, sleet, snow or hail) and accumulates in rivers, lakes, oceans, soil or underground. In plants, the movement of water from the roots into the stem and through the leaves is called transpiration. When heated by the sun, water vapour gas evaporates or floats up to the sky as tiny water droplets. The cooler temperatures in the upper atmosphere cause the vapour to return to a liquid state, resulting in grouping with other water droplets to form a cloud. Once the cloud becomes heavy with water, the water falls as rain, hail, sleet or snow. A raindrop can take 2 -7 minutes to fall to the ground.

Rather than a process that happens in just lakes and oceans, the water cycle occurs around and inside us. Our actions impact on the water cycle. By limiting our water use, we can contribute to higher reservoirs and water for other uses. We can also collect lightly used water for reuse in gardens. Our proper use of toilets and sinks (only flushing the 3 Ps (Pee, Poo and (toilet) Paper) and disposing of fats and oils appropriately) contributes to an efficient wastewater system.

Visit Your Town to find out:

- where your drinking water comes from, and
- how wastewater is treated, before it is released for the environment or further treated for use in the recycled water system.

Materials

- Water cycle game sheets, printed (below)
- 10 x 6-sided dice
- Student worksheets, printed for each student or pair of students (below)
- Clipboards/books and pencils
- Blutack, or other ways to display game sheets in your activity area
- Whiteboard and pens, blackboard and chalk
- Bell/whistle to start and stop game

The Activity

Prior to the activity, set up 10 activity stations around your teaching space, displaying a game sheet and a die at each station. Each student or pair of students will need a pen and clipboard/book with worksheet.

Introduce the activity by asking students (seated in a group near the whiteboard) to help you draw a picture of the water cycle, eliciting relevant vocabulary (evaporation, accumulation, precipitation, transpiration and condensation) or describing the movement of water through air, water bodies and the earth. On completion, note that the water cycle makes the process seem very ordered. Ask some students to walk around the group in one direction.

Explain that in this activity students will take on the role of a tiny droplet (or molecule) of water moving through the water cycle. Introduce the 10 stations: soil, plant, river, clouds, water treatment plant, person, animal, groundwater, water reclamation plant and house. Students choose where they will begin. Roll the die and follow the instructions to find out your next destination. Record the journey on the student worksheet, including if there has been a change of state, before moving to the next station. Inform students that this is a walking simulation. If necessary, form a line at the station to take turns rolling the die. Distribute materials and start with a whistle or bell. Keep track of student progress through the worksheet and engagement to determine when to stop the game.

After the game ask students to return to sitting as a group. Ask, how many different places did you get to? Did you move a little or a lot? (Ask students to explain their answer). Ask for 6 students to re-enact their movements (using their worksheet) and compare to the ordered path demonstrated before the activity. Challenge students to create their own new station with 6 possible pathways.

This activity has been adapted from The Water Cycle Game on the Goulburn Valley Water website.

Coliban WATER

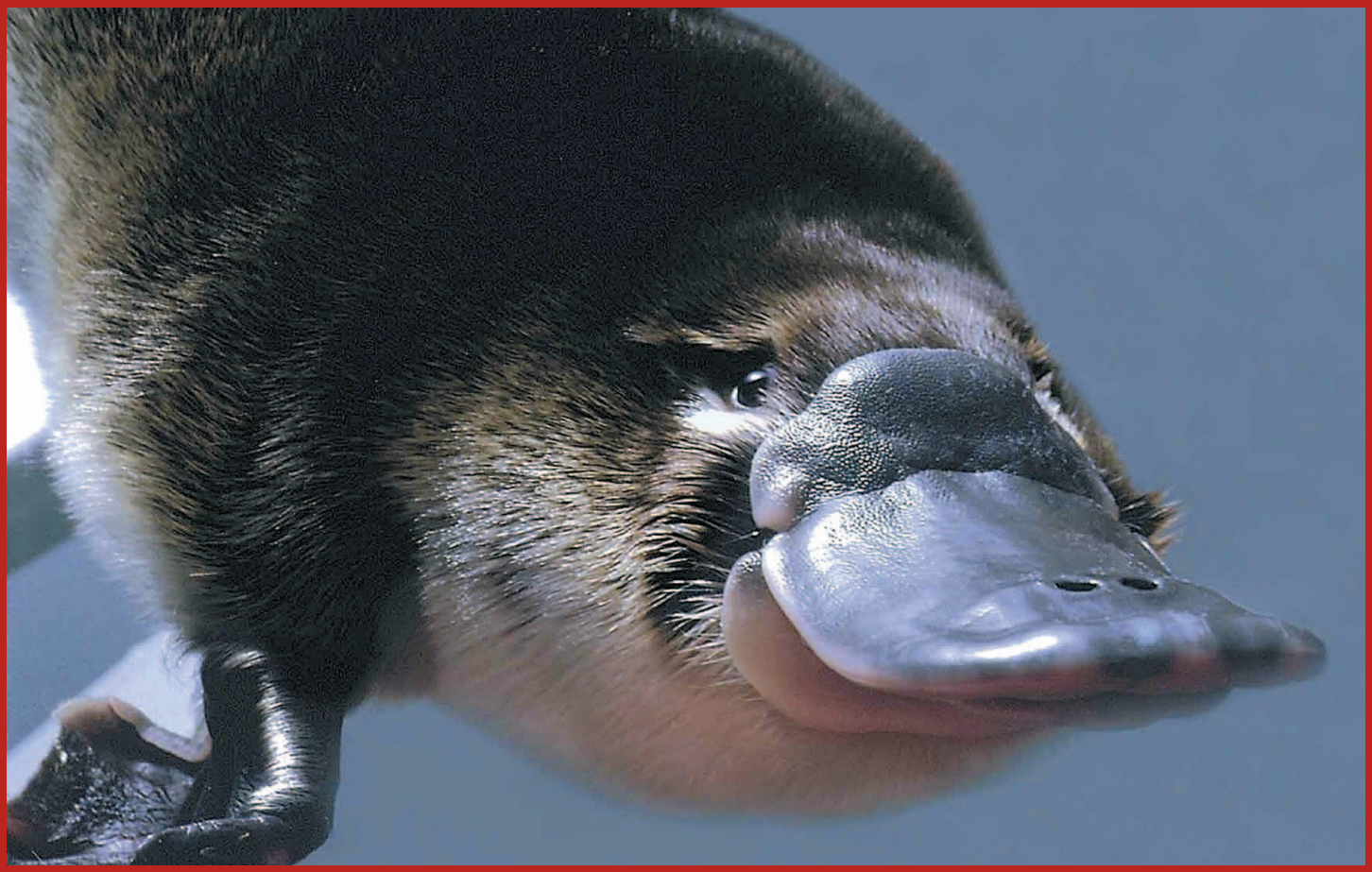
Education

Name/s: _____

Water Cycle - tracking water drops

	Roll the die and record your destination. If you roll 'stay', record the location you are staying at.	Are you changing state? solid, liquid, gas, ie. liquid > gas
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		

Animal



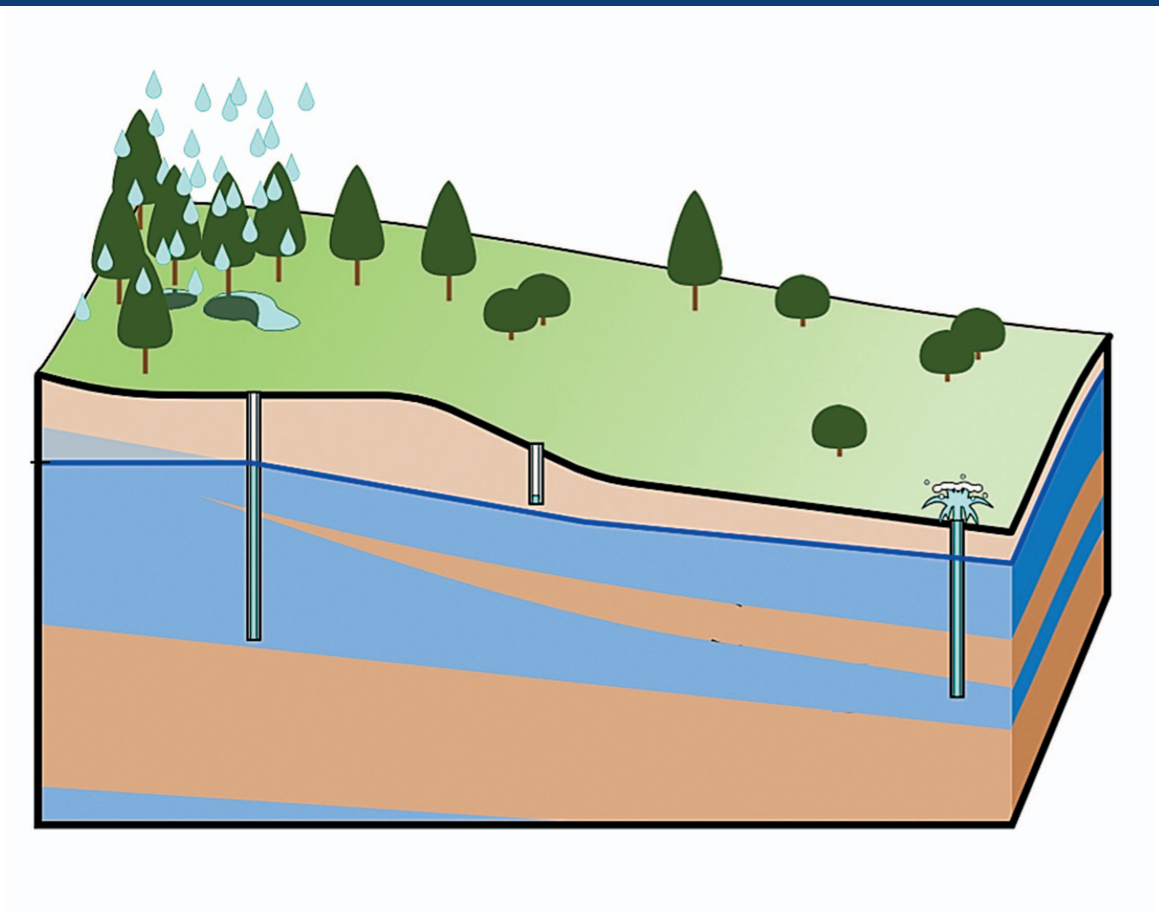
1	2	3	4	5	6
Soil	**Soil**	**Clouds**	**Clouds**	**River**	**Stay**
Water lands on the soil as faeces and urine	Water lands on the soil as faeces and urine	Water is respired or evaporated from the body	Water is respired or evaporated from the body	Water lands in the river as faeces and urine	Water remains in the animal's body

Clouds

1	2	3	4	5	6
Soil	**Soil**	**River**	**River**	**Groundwater**	**Clouds**
Water condenses and rain falls on soil	Water condenses and rain falls on soil	Water condenses and rain collects in a river	Water condenses and rain collects in a river	Water condenses and rain seeps underground	Water stays in the cloud

Coliban WATER

Groundwater



1	2	3	4	5	6
WTP	**WTP**	**River**	**Plant**	**Stay**	**Stay**
Water is pumped to a water treatment plant	Water is pumped to a water treatment plant	Water filters into the river	Water is pumped and used to irrigate plants	Water stays underground	Water stays underground

Coliban WATER

PHONE **1300 363 200** | ONLINE **coliban.com.au** | FOLLOW **@colibanwater**

House

1	2	3	4	5	6
Plant	**Plant**	**WRP**	**WRP**	**WRP**	**Person**
Water is used in the garden	Water is used in the garden	Water is used to flush a toilet and flows to a Water Reclamation Plant	Water goes down the plughole in the sink and flows to a Water Reclamation Plant	Water goes down the plughole in the sink and flows to a Water Reclamation Plant	A person drinks water

Coliban WATER

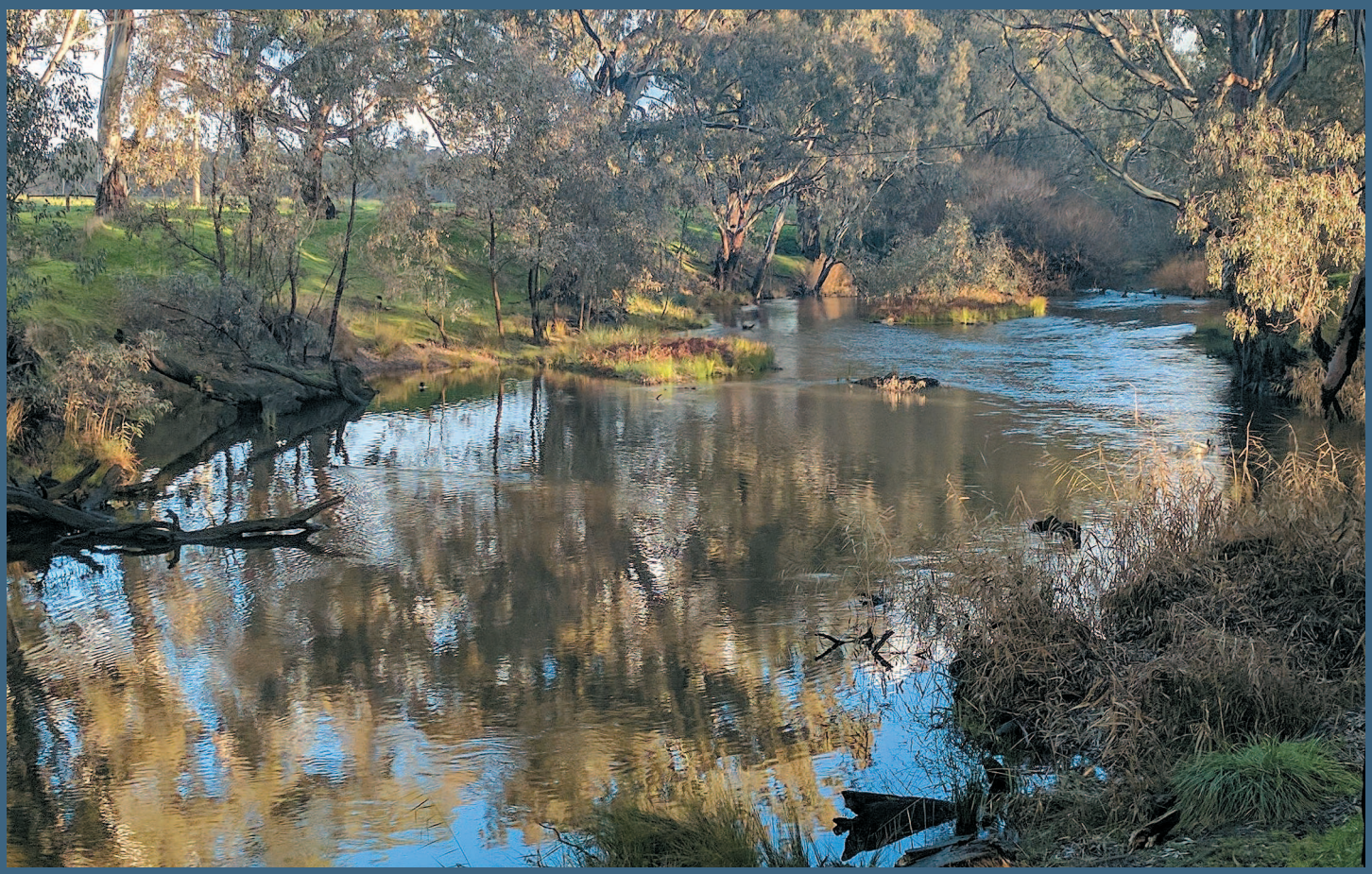
Person

1	2	3	4	5	6
WRP	**WRP**	**WRP**	**Clouds**	**Stay**	**Stay**
Urine is flushed down the toilet and flows to a Water Reclamation Plant	Urine is flushed down the toilet and flows to a Water Reclamation Plant	Urine is flushed down the toilet and flows to a Water Reclamation Plant	Water is respired or evaporated from the body	Water remains in the body	Water remains in the body

Plant

1	2	3	4	5	6
Clouds	**Clouds**	**Clouds**	**Animal**	**Person**	**Stay**
The sun comes out, water evaporates to the clouds	The sun comes out, water evaporates to the clouds	The sun comes out, water evaporates to the clouds	An animal eats the plant	A person eats the plant	The water remains in the plant

River



1

Plant

A farmer irrigates their crops with river water

2

Groundwater

Water moves down through the ground

3

Clouds

The sun comes out, water evaporates to the clouds

4

WTP

Water is pumped into the water treatment plant

5

Animal

An animal drinks the water

6

Stay

Water remains in the river

Coliban WATER

Soil

1	2	3	4	5	6
Plant	**River**	**Groundwater**	**Clouds**	**Clouds**	**Stay**
The water is absorbed by plant roots	The water runs off into the river	The water moves down through the soil	The sun comes out, water evaporates to the clouds	The sun comes out, water evaporates to the clouds	The water remains in the soil

Coliban WATER

PHONE **1300 363 200** | ONLINE **coliban.com.au** | FOLLOW **@colibanwater**

WTP

Water Treatment Plant

1	2	3	4	5	6
House	**House**	**House**	**House**	**Stay**	**Stay**
The treated water travels through pipes to a house	The treated water travels through pipes to a house	The treated water travels through pipes to a house	The treated water travels through pipes to a house	The water is in storage	The water is still being treated

Coliban WATER

PHONE **1300 363 200** | ONLINE **coliban.com.au** | FOLLOW **@colibanwater**

WRP

Water Reclamation Plant

1	2	3	4	5	6
Clouds	**Clouds**	**Plant**	**Plant**	**Stay**	**Stay**
The sun comes out, water evaporates to the clouds	The sun comes out, water evaporates to the clouds	The treated water is used to irrigate paddocks	The treated water is used to irrigate paddocks	The water remains in the wastewater lagoons	The water remains in the wastewater lagoons

Coliban WATER

PHONE **1300 363 200** | ONLINE **coliban.com.au** | FOLLOW **@colibanwater**