


TEACHER GUIDE

BEFORE THE PERFORMANCE

1. Go to NTCplayworks.com.
2. Select your state and program.
3. Watch the NTC 'Meet the Actors' video with your students.
4. Distribute the student workbooks and read the inside cover, explaining the 'Words to Know' and plot of the story. Discuss what they know and want to know.
5. Review the student workbook to identify and prepare the appropriate activities for your class level.



AFTER THE PERFORMANCE

1. Go to heyteachers.org  and enter the code you received from the actors.
2. Evaluate the program for your chance to win **\$200** for your class.
3. Have your students complete their workbook activities.
4. Share any of the classroom materials in this Teacher Guide.
5. Go to NTCplayworks.com.
6. Select your state and program.
7. Make use of the games and activities for your class at NTCplayworks.com.

How to Use this Program

Thank you for taking the time to educate your students and their families about water conservation. We want you to know that participating in the program, and using its supplementary materials, is easy and supports the following areas of the Australian Curriculum as outlined below.

The student playbook, as well as this teacher guide, has activities that emphasize the Four Cs of 21st Century Education Skills – Collaboration, Communication, Creativity and Critical Thinking. Along with suggested grade levels and purpose of activity, this allows you to tailor the learning to meet the needs and abilities of your entire class.

LEARNING AREAS: English, Science, HASS, The Arts

GENERAL CAPABILITIES: Literacy, Critical and Creative Thinking, Personal and Social Capability, Ethical Understanding

CROSS-CURRICULUM PRIORITIES: Sustainability

CONTENT DESCRIPTIONS:

Earth's resources are used in a variety of ways (ACSSU032)

Science knowledge helps people to understand the effect of their actions (ACSHE051)

Living things depend on each other and the environment to survive (ACSSU073)

Science knowledge helps people to understand the effect of their actions (ACSHE062)

Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083)

The use and management of natural resources and waste, and the different views on how to do this sustainably (ACHASSK090)



You've Seen The Show!

Now evaluate the program and have a chance to win \$200 for your classroom!

1. Log on to: www.HeyTeachers.org
2. Enter the code from the hand-out you received from the actors
3. Fill out the evaluation.

Words to Know

Aquifer	An aquifer is an underground layer of rock, gravel and sand. Water flowing through an aquifer can carry pollutants.
Conservation	Using natural resources carefully
Drought	A prolonged period of very low rainfall
Fresh Water	Water we can use for cooking, cleaning and drinking
Garbage	Discarded waste, usually from the home
Glacier	Large, thick mass of ice that moves slowly across the land or ocean
Groundwater	Water that is found under the surface of the Earth
H₂O	The scientific name for water
Litre	A unit for measuring water
Pollution	Things that can contaminate or foul our environment
Salt Water	Water with a high salt content, usually found in the ocean
Sewer	A series of underground pipes that carry wastewater
Storm Water	Polluted water from streets and buildings that runs into storm drains
Wastewater	Water that contains waste matter
Wetlands	An ecosystem where a body of water interacts with land


The National Theatre for Children

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Water Fun Facts



97% of the Earth's water is salt water in the ocean. 2% is stored as fresh water in glaciers. This leaves only 1% of all the water on earth as water for people to use.

If all the world's water were put into a 4 litre jug, the fresh water available for us to use would equal only about one tablespoon.

How Much Water Are You?

- **Your body is mostly water!**
- **About 60% of our body weight is water.**
- **We can live without food for more than a month, but only about a week without water.**
- **Breathing in and out uses more than half a litre of water every day.**

By the time a person feels thirsty, his or her body has lost over 1% of their total water amount. Drink water before you get thirsty.

Each day the sun evaporates one trillion tons of water off of lakes, rivers and oceans.

Some of the same water that existed on the earth millions of years ago is still present today.

25,700 litres of water is required to grow a day's food for a family of four.

Hot water freezes faster than cold water.

Water is the only substance on Earth naturally found in the three true element forms; solid, liquid and gas.

Water expands by 9% when it freezes. Frozen water, ice, is lighter than water, which is why ice floats on water.

Where Does Our Water Come From?



Most of the water we use in our cities comes from reservoirs, rivers and streams that are filled with rainfall. This is called surface water because it's found above ground. A lot of our water also comes from underground too. Groundwater is basically rain that has trickled down through rock layers forming underground pools after many years. Some of our groundwater is up to 2 million years old!

Desalination is becoming an important source of water for us as well. Desalination means taking the salt out of water to make it drinkable. About half of the water that people in Perth and Adelaide use is desalinated.

Australia is the driest continent on Earth and as our population grows it is vital we save and keep clean our precious water reserves.

How Does Water Get to Our Homes?

Water arrives at your tap after a long and expensive journey from its source. Whether it comes from a river or from a groundwater well, water must be treated and purified before it is delivered to homes and businesses. After it is treated, water travels through a series of pipes to individual homes and other buildings. In each state there are many local water suppliers. After water is used in your home, it goes through another system of pipes to a wastewater treatment plant. The water is treated to meet statewide standards and then released or discharged into rivers and streams at approved locations. Some wastewater is recycled and used in agriculture and for sporting ovals, golf courses and parks.



Our Water Future

Experts predict Australia's population will reach 33 million by 2050 and about 55 million by 2100. We're going to need a lot more water!

Government and industry are working on ways to make sure we have enough water for everyone in the future. Desalination looks like it will be a big part of the solution, especially as new technology is now making it much more energy efficient.

Each Australian currently uses about 341 000 litres of water a year – that's 8 swimming pools! Teaching children to become protectors of water at a young age is essential to planning our water future.

Critical Thinking Activity

The Water Cycle

Objective

Make a miniature environment to see the water cycle at work.

Purpose of Activity

Apply Skills, Create

Class Time

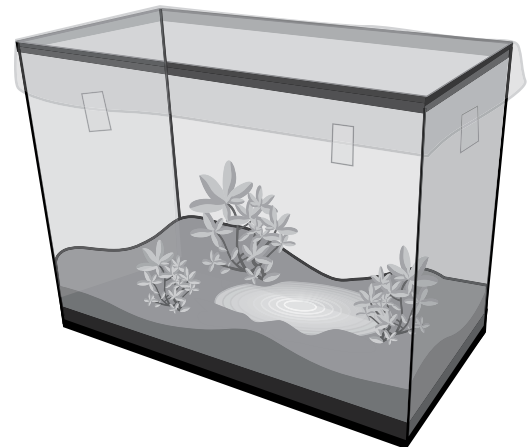
45 minutes over 3 days

Procedure

1. Arrange the soil in the container to make mountains, plateaus, hills and a lake basin. Place the small plastic bowl in the lake basin. Fill the bowl with water. Add any plastic animals, trees or boats to the environment. Cover the container tightly with plastic wrap and secure it by means of tape or the band. Place the container near a sunny window.
2. Discuss what is expected to happen in the container.
3. Depending on the amount of sun, the project may take 1-3 days. In order to speed the process, a bag of ice may be placed on one end of the covered container, while a heat lamp is focused on the other.
4. Watch for condensation on the plastic "sky" of the container. When enough moisture collects, it will fall onto the landforms as precipitation.
5. Encourage the students to draw the water cycle using arrows to show the flow.

Materials

- Soil
- Water
- Small plastic bowl
- Large, clear plastic container or an old aquarium
- Plastic wrap
- Plastic trees, animals, boat, etc. (optional)
- Tape or large rubber band
- Bag of ice (optional)
- Heat lamp (optional)



Critical Thinking Questions

Where is water collecting?

- *It is collecting on the inside of the plastic cover.*

Why is it collecting there?

- *The water is evaporating to the underside of the plastic covering.*

What happens to the water after it evaporates?

- *Precipitation occurs and the water drops back down.*

Role of Plants in Water Filtration

Objective

This experiment is a very simplified way to show whether plants will take up certain kinds of materials from water moving relatively quickly through their root systems.

Purpose of Activity

Review, Identify Details, Communicate, Create

Class Time

45 minutes

Preparation

Set up the potted plants, each into its own bowl. Slowly pour 200mls of clean water through the pot. Adjust the soil so that water will percolate through relatively slowly.

Procedure

1. Place the potted plants into their empty bowls. Pour clean water slowly through one of the pots and watch it percolate through to the bottom of the pot. The water should look as clean as what was poured.
2. Add a gram or so of soil to 200mls of water and stir. Pour slowly into the second flower pot. The “dirty” water should look much cleaner once poured.
3. Add about 30mls of vegetable oil to 200mls of water, stir (they won’t mix completely) and pour into a third pot. See if the vegetable oil percolates through.
4. Add some powdered drink mix to 200mls of water and pour through a fourth pot. See if the water retains the colour.
5. Add some powdered cleanser to 200mls of water and pour through a fifth pot. Is the cleanser retained in the soil?
6. Add some liquid soap to 200mls water. Does the soap percolate through the soil?
7. Using the “contaminated” plants, pour some clean water at the same rate through each one. Is more of the “pollutant” rinsed away from the soil by the clean water?

Materials

- Six potted plants in 15-20cm diameter pots with holes in the bottom. Soil needs to be moderately dry.
- Six clear containers, such as bowls, which will support the plants and allow drainage to be viewed.
- Soil
- Unsweetened powdered drink mix, bright colour.
- Vegetable oil
- One or two different household cleaners. One should be liquid and the other powder.

Critical Thinking Questions

In what ways can plants and soil benefit drinking water quality?

- *They filter out some pollutants*

Can plants and soil remove any type of impurity from water?

- *No*

What is the role of rainwater moving through contaminated soil?

- *It washes the pollutants through the root system as well as deep underground*

Storm Drain and Pollutants

Objective

Students will learn what an average storm drain collects during a rainfall event.

Purpose of Activity

Review, Identify Details, Communicate, Create

Class Time

45 minutes

Preparation

Fill the aquarium halfway with water and place it on an accessible area where it can be easily viewed by the students. Cut a hole in the bottom of the box and place the box on top of the aquarium. The box represents the storm drain and the aquarium represents the waterway that the storm water mixes into after entering the storm drain. Leave the sides of the aquarium uncovered so that the students can view its contents.

Procedure

1. Introduce this activity with a discussion of storm drains and storm drain systems and their purposes.
2. Discuss where the water and objects that float down into a storm drain go. Have students list all of the things that they can think of that might enter a storm drain during a rain storm.
3. Assign a group of students to each pollutant. Discuss each pollutant, including its use or origin and how it could enter the storm drain.
4. Have each group of students place their pollutant into the storm drain. Use the watering can to create rain to wash the pollutant into the waterway. While washing each pollutant into the waterway, review the pollutant and its use or origin.
5. After adding all of the pollutants, examine the contents of the waterway. Discuss how the waterway has changed and how viewing this change makes the students feel.

Materials

Waterway

- Aquarium
- Rectangular box
- Water
- Watering can
- Spray bottle

Pollutants

- Green food colouring (pesticides/fertiliser)
- Vegetable oil (motor oil)
- Soil/sand/pebbles (erosion)
- Grass clippings (or shredded paper) and twigs
- Cafeteria waste and rubbish

Critical Thinking Questions

What types of the pollution are natural?

- Grass clippings, twigs, some food

What types of pollution are added by people living in the local communities?

- Pesticides/fertiliser, motor oil, paint, petrol, etc.

What could be done to stop pollutants from entering storm drains?

- Recycling, careful use of materials, finding alternatives, etc.

Your place for lifelong learning

Stockland understands the importance of creating sustainable and vibrant communities that limit our impact on natural resources.

Stockland has partnered with The National Theatre for Children to deliver free educational programs into schools within our communities. Together, we will teach, entertain and inspire future generations to thrive, today and well into the future.

To learn more visit stockland.com.au

