Whizzy’s New Adventures: Journey Through the Pipes

Guideline for use

About the book

Whizzy’s New Adventures: Journey through the pipes is the next exciting picture book about Whizzy the water drop, following on from the popular and widely used Whizzy’s Incredible Journeys: Pick a Path book. This new book will once again engage children as they are taken on an imaginative learning journey with our endearing, action-bound friend Whizzy.

Whizzy’s New Adventures: Journey through the pipes will educate and entertain by bringing together an action-packed plot, realistic, local settings, characters to enjoy and relate to, detailed informative illustrations, and a mood of personal empowerment through respect for the environment. The text and illustrations will teach children about the concepts of water and wastewater treatment processes, as well as explain sustainable and responsible water practices.

This book is a useful and engaging resource for teachers and water educators to facilitate children’s understanding of water and its importance in the environment. It will help to teach the following key messages:

- Water is precious.
- Water is continually reused.
- We all need to use water wisely.
- Before water can be used at home, it is treated so that it is safe to use.
- Wastewater that goes down the pipes needs to be treated so that it can safely be released back into the environment.
- It is harmful to put certain things into the water system through the toilet or the drain.
- We are all responsible for making sure only appropriate things go down the drains, sinks and toilets.

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We all live ‘down stream’.

Value and respect for water is promoted by understanding the processes of getting clean water to our house and the environment.

Through the characters, rhyming narrative style, action–adventure plot, illustrations and setting, Whizzy’s New Adventures aims to be inclusive and appealing to all children.

This guideline aims to support teachers and water educators by offering suggestions and ideas for using the book to stimulate children’s inquiry and action. Links to the Australian Curriculum are also included.

Using the book

The following would be helpful for teachers and water educators to know prior to reading Whizzy’s New Adventures with children.

General Information:

- Whizzy’s New Adventures is written as two separate but connected adventures, ‘Whizzy’s journey to the tap’ and ‘Whizzy’s journey from the loo’. It is advised that the stories are read in two separate sessions. This aims to prevent misconceptions about these topics and allows time for children to understand the separate water processes.

- Adventure 1 – Whizzy’s journey to the tap
  Aunty Merle teaches her class through a simple and engaging story about Whizzy’s adventurous journey from the cloud to our tap. This helps children understand how clean water is delivered into our homes. Accurate water treatment and transport processes are brought to life through an exciting text and detailed illustrations.

- Adventure 2 – Whizzy’s journey from the loo
  This story tells of Whizzy’s journey down the wastewater drains that take the dirty water away from our house. Accurate wastewater treatment processes are presented in a humorous, yet cautionary tale that will engage children and offer teachers and water educators’ opportunities to discuss issues around personal and community responsibility.

- The A3 format allows for focus lessons with the whole class as well as for lessons with small groups. It is best to rest the book on an easel that has been placed in a position where all students have a clear view of the illustrations and the text.

- Children learn through repetition. Teachers and water educators need to be aware that this may be the first time children are learning about the water concepts that are explored in these stories. Therefore it is important to read each story a few times to establish the children’s knowledge base.

- Children need time to process concepts. Teachers and water educators are encouraged to pause after reading each page and allow the students time to engage with the story and the details within the illustrations.

Background information:

1. Wastewater

Wastewater comprises a mixture of domestic sewage (waste from household toilets, sinks, showers and washing machines), industrial effluent, occasional runoff surface water and groundwater which has infiltrated the sewers. The term ‘sewage’ can be used instead of wastewater and is more widely known but often misunderstood and attributed to toilet sewage only.

2. Path of water from source to tap

Water is collected from a dam, river or bore in a groundwater aquifer and then takes a journey through a series of pipes and treatment processes before ending up in our homes. Water distribution pipes use gravity and pumping stations to provide the pressure needed to send water to users. Pumping stations boost the flow of water in the pipelines up hills and gravity assists the flow of water downhill.

3. Processes of water treatment

Water is drawn from the catchment reservoirs. It passes through a screen to filter out large debris and is transferred, where possible using gravity or otherwise pumped, to water treatment plants. The first step of treatment involves coagulation in the flash mixer to destabilise particles, these smaller particles join into larger particles through the use of a flocculent (normally aluminum sulfate, or alum for short) in a process known as flocculation.

Alum dosing is part of the flocculation and settling process. The larger clumps that result then fall to the bottom so that they can be removed.
**Filtration** is the next step. Water passes through the materials that trap the suspended solids in the water. The most commonly used filters are sand, gravel and charcoal. Suspended solids that cannot pass through the filters are trapped.

The final phase is **disinfection**. Sodium hypochlorite is the most common disinfectant used to kill off any remaining pathogens, such as bacteria and viruses, that were not removed through filtration. This is often called chlorination. After chlorination the water is safe to be transferred to reservoir tanks where it is then stored before being piped to homes and businesses.

The types of treatment provided vary depending on the size of the system, whether they use ground water or surface water, and the quality of the source water.

4. **Processes of wastewater treatment**

**Preliminary treatment** – The first stage of the treatment process uses screens to remove the larger solid inorganic material such as paper and plastics. This is followed by the removal of particles such as grit and silt which are abrasive to plant equipment.

**Primary treatment** – Following preliminary treatment, wastewater is passed through a primary sedimentation tank where solid particles of organic material are removed from the suspension by gravity settling. The resultant settled primary sludge is raked to the centre of the tank where it is concentrated and pumped away for further treatment.

**Secondary treatment** – This next stage is a biological process which breaks down dissolved and suspended organic solids (substances from plants and animals) by using naturally occurring micro-organisms. It is called the activated sludge process.

The settled wastewater enters aeration tanks where air is blown into the liquid to provide oxygen for mixing and to promote the growth of micro-organisms. The ‘active biomass’ uses the oxygen and consumes organic pollutants and nutrients in the wastewater to grow and reproduce.

From the aeration tanks, the mixture of wastewater and micro-organisms passes into a secondary sedimentation tank (also known as a clarifier) where the biomass settles under gravity to the bottom of the tank and is concentrated as sludge.

Some of this sludge is recycled to the inlet of the aeration tank to maintain the biomass, hence the name for the process – ‘activated sludge’. The remainder is pumped to anaerobic digesters for further treatment.

The clarified wastewater is discharged from the secondary clarifier and passes through for tertiary treatment.

**Tertiary treatment** – All wastewater treatment plants use disinfection for tertiary treatment to reduce pathogens (micro-organisms that can pose a risk to human health).

Chlorine is usually dosed into the treated wastewater stream for disinfection. However, some use large ponds in which sunlight and other micro-organisms reduce the pathogens. Additional treatment may be required if the treated wastewater is reused for purposes such as irrigation of food crops or where close human contact may result – for example, where recycled water is supplied through dual reticulation pipes for external use in homes and businesses.

**Sludge treatment** – Sludge collected during the treatment process contains a large amount of biodegradable material making it amenable to treatment by a different set of micro-organisms, called anaerobic bacteria, which do not need oxygen for growth.

This takes place in special, fully enclosed digesters heated to 35 degrees Celsius, where these anaerobic micro-organisms thrive without any oxygen.

Once the micro-organisms have done their work, water is removed from the digested sludge through mechanical means such as centrifuging (rotating at high speed) or by natural solar evaporation in lagoons.

The liquid remaining at the end of the process is usually pumped back into the aeration tanks for further treatment.

The stable, solid material remaining (biosolids) looks, feels and smells like damp earth and makes an ideal conditioner for soil.
5. **Reservoirs**

Reservoirs can be used to store water prior to or after treatment. When water treatment plants are not running continually the reservoirs maintain the supply and help when there are high levels of consumption.

6. **Chlorine**

Chlorine is a disinfectant that is added to public water supplies to kill disease-causing pathogens that the water or its transport pipes might contain.

7. **Fluoridation**

Water fluoridation is the controlled addition of fluoride to a public water supply to reduce tooth decay.

8. **How to dispose properly of items**

Most products should be put in the bin however unused medicines should be taken to a local pharmacy for disposal. Contact the local council for information on how to dispose of hazardous waste.

9. **Indigenous artwork**

Maurice Gibson is an Aboriginal artist who was born in Cairns and raised in Wujal Wujal. Maurice has been painting since he was five years old. He used to sit and watch his grandfather Eddie Bloomfield from Mossman Gorge Community who was a good artist and used to paint landscapes and animals. This inspired Maurice to paint landscapes but today his paintings are primarily of animals from his clan group Nyungkal. The artwork incorporated into the book is Maurice’s representation of Bloomfield Falls at Wujal Wujal.

10. **Links to websites for background information for teachers:**

www.makwater.com.au (select ‘Water Treatment’)

Links to water and wastewater related websites for children:

www.seqwater.com.au (select ‘Education’ then ‘Learning Centre’)

www.healthywaterways.org (select ‘Education’)

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**Curriculum Links**

**Australian Curriculum**

The following table offers guidelines for linkages with the Australian Curriculum and suggested inquiry inspired by reading Whizzy’s new adventures.

<table>
<thead>
<tr>
<th>Australian Curriculum - Science</th>
<th>Preparatory</th>
<th>Year 1-2</th>
<th>Year 3-4</th>
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</thead>
<tbody>
<tr>
<td>Science Understanding</td>
<td>Biological sciences (Foundation)</td>
<td>Earth and space sciences (Year 2)</td>
<td>Chemical Sciences</td>
</tr>
<tr>
<td></td>
<td>Living things have basic needs, including food and water (ACSSU002)</td>
<td>Earth’s resources, including water, are used in a variety of ways (ACSSU032)</td>
<td>Natural and processed materials have a range of physical properties; These properties can influence their use (ACSSU074)</td>
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<td></td>
<td>Discuss the emotion of the animals when Whizzy came out of the wastewater treatment plant clean. Suggest what it might be like for the animals in the water and along the banks if Whizzy and the rest of the water came out dirty or with germs?</td>
<td>Where is water used in the classroom? How has that water been transferred from its source to this point of use? Why is it important that it comes in clean and safe?</td>
<td>What materials are not supposed to go into the wastewater system? What are the properties of these materials that affect the management of waste or can lead to pollution?</td>
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<td></td>
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<td></td>
<td>Consider methods of wastewater management (e.g. septic and how they affect the environment</td>
</tr>
<tr>
<td>Australian Curriculum - Science</td>
<td>Preparatory</td>
<td>Year 1-2</td>
<td>Year 3-4</td>
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<tr>
<td>Science as a Human Endeavour</td>
<td>Science involves exploring and observing the world using the senses (ACSHE013) At the Wastewater Treatment Plant, Operator Bill needs to carefully observe and investigate water as it flows through the cleaning processes. Identify parts of the story and illustrations that demonstrate this.</td>
<td>Science involves asking questions about, and describing changes in, objects and events (ACSHE021) Observe Whizzy at the start of the Wastewater Treatment Plant, and then compare this to how Whizzy looks when released back into the river. Discuss any observations.</td>
<td>Science involves making predictions and describing patterns and relationship. (ACSHE050) What sort of water investigations might need to be carried out at water treatment plants to ensure water is delivered clean and safe? What sort of water investigations might need to be carried out at wastewater treatment plants to ensure water is returned to the environment clean and safe?</td>
</tr>
<tr>
<td>Nature and development of science</td>
<td>n/a</td>
<td>People use science in their daily lives, including when caring for their environment and living things. (ACSHE022) Discuss the role of Operator Bill at the Wastewater Treatment Plant. His role involves monitoring information about how the plant is working to ensure the water released is clean. Carefully review the story and illustrations and identify all the people working in the water and wastewater treatment processes. Is science knowledge used by any of these workers?</td>
<td>Science knowledge helps people to understand the effect of their actions (ACSHE062) Investigate methods of waste management and how they can affect the environment. Explore how science can contribute to a discussion about how water is treated and delivered to our homes.</td>
</tr>
<tr>
<td>Use and influence of science</td>
<td>Respond to questions about familiar objects and events (ACSI014) Consider the statement – Use your brain, should it go down the drain?</td>
<td>Respond to and pose questions, and make predictions about familiar objects and events (ACSI04) Can children be waterwise? Describe ways that a child can be waterwise in the home.</td>
<td>With guidance, identify questions in familiar contexts that can be investigated scientifically and predict what might happen based on prior knowledge (ACSI053) What items can safely go down the wastewater drains? Why? What items should not go down the wastewater drains? Why?</td>
</tr>
<tr>
<td>Science Inquiry Skills</td>
<td>Share observations and ideas (ACSI012) Create a class poster to show items that shouldn’t go down the toilet or the drain. Retell Whizzy’s New Adventures: journey through the pipes to family and friends.</td>
<td>Represent and communicate observations and ideas in a variety of ways such as oral and written language, drawing and role play (ACSI029) If the community in Adventure 2 only put down the drain what was meant to go down, predict what changes could be observed at the Wastewater Treatment Plant. Identify actions at school and home that help the wastewater treatment process flow smoothly.</td>
<td>Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports (ACSI060) Create a diagram, model or role-play to demonstrate the flow of water from ‘cloud to tap’. Create a diagram, model or role-play to demonstrate the flow of wastewater from when it leaves down the drain or toilet to when it is released back into the environment.</td>
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## General Capabilities

The following table identifies four General Capabilities from the Australian Curriculum that are relevant to Whizzy’s new adventures.

<table>
<thead>
<tr>
<th>Australian curriculum linking ideas</th>
<th>Literacy</th>
<th>Critical and creative thinking</th>
<th>Personal and social capability</th>
<th>Ethical understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before reading the story invite children to make predictions about the story from viewing the front cover (e.g. Fiction or non-fiction, expected events?)</td>
<td>Help children to consider these questions:</td>
<td>Explore and understand the systems and processes of water treatment and wastewater treatment.</td>
<td>Help children to consider these questions:</td>
<td></td>
</tr>
<tr>
<td>Explore how key features of the text (i.e characters, plot, setting, rhyming stanzas) have helped create the story.</td>
<td>What have we learnt from Whizzy’s New Adventures: Journey through the pipes?</td>
<td>Discuss the relationship between various characters in the story. Identify times when characters were working together and time when they weren’t.</td>
<td>How did Operator Bill feel about everyone’s rubbish ending up at the Wastewater Treatment Plant?</td>
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<tr>
<td>Discuss the way the author created the story through rhyme. How has it helped the way the story flows?</td>
<td>Is this information important to know?</td>
<td>Reflect on the problem Operator Bill had at the treatment plant. Why was he asking the community for help to fix the problem?</td>
<td>What was Operator Bill asking the community to do? Why?</td>
<td></td>
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<tr>
<td>Identify rhyming words throughout the text.</td>
<td>Will understanding this make a difference to our lives and the lives of others?</td>
<td>Inquire about individual and community attitudes and actions for sustainability in relation to wastewater treatment processes.</td>
<td>Compare different points of view of the characters involved in the scene on page 15-16.</td>
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<tr>
<td>Review pages 18-19 and support children to compare the text with illustrations. Identify information that is provided through the illustrations that is not stated in the text (e.g. rubbish in the pipes has a cumulative effect as it builds up, Whizzy’s reaction to being in the pipes).</td>
<td>Why did the children want to tell the bedtime story?</td>
<td>Children describe ways they can help use water wisely.</td>
<td>What would you have done if you were standing there with your family (p15-16) hearing Operator Bill’s request? What responsibility do we have to help with the treatment of wastewater? Why?</td>
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<tr>
<td>Review other pages in the book where the illustrations provide extra information.</td>
<td>Why did the author write this story?</td>
<td>Reflect on the children’s actions at the end of Adventure 2. Why did they want to tell the bedtime story?</td>
<td>What responsibility do we have to use water wisely? Why?</td>
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<td></td>
<td>Why do you think it was targeted at young children?</td>
<td>In what ways can we all cooperate to make healthy wastewater systems?</td>
<td>Encourage children to listen to the point of view of others in response to these questions.</td>
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<td></td>
<td>How else could this message be communicated?</td>
<td>How does our cooperation for healthy wastewater systems help the ecosystems where the water is released?</td>
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</table>
## Cross-curriculum Priorities

The following table identifies two Cross-curriculum priorities from the Australian Curriculum that are relevant to Whizzy’s new adventures.

<table>
<thead>
<tr>
<th>Australian Curriculum: Aboriginal and Torres Strait Islander histories and cultures</th>
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<tbody>
<tr>
<td><strong>Country/Place</strong></td>
</tr>
<tr>
<td><strong>Culture</strong></td>
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</table>
| **Links** | Through interaction with the text and context of Whizzy’s New Adventures: Journey through the pipes offers opportunities to:  
- Whizzy adventures are told in a story telling style (yarning)  
- Character depictions are of indigenous Australians  
- Background patterns throughout the book have been adapted from an original artwork by aboriginal artist Maurice Gibson. |

<table>
<thead>
<tr>
<th>Australian Curriculum: Sustainability</th>
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<tbody>
<tr>
<td><strong>Systems</strong></td>
</tr>
<tr>
<td><strong>World Views</strong></td>
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</table>
| **Futures** | 01.7 Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.  
01.9 Sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments. |
| **Links** | Engaging with Whizzy’s New Adventures offers children opportunities to:  
- Explore and understand the systems and processes of water treatment and wastewater treatment.  
- Identify ways that we all work together as a community to have healthy water and wastewater treatment systems and to maintain healthy ecosystems.  
- Inquire about individual and community attitudes and actions for sustainability in relation to water and wastewater treatment processes.  
- Discuss personal and community experiences about getting clean water to our house.  
- Develop understanding about removing and treating wastewater to be returned safely to the environment. |
Classroom Activities

English

1. Teachers work with children to create a story map of Adventure One. Use simple diagrams, arrows and symbols to record Whizzy's path from the rain cloud to the tap.

2. Create a book or poster to help tell your parents or friends about what is and isn't allowed to go down the toilet and drains. Re-read page 26-27 for ideas.

3. Children use a Venn diagram to compare Whizzy's two new adventures. Identify similarities and differences in text features such as plot, characters, setting, mood, and writing style.

4. Children choose their favourite scene in the book. They can design and create a postcard that could be sent to their family from a character in that scene. The postcard could explain where the character is, why they are there and what they are experiencing?

5. Turn to page 4 of Whizzy's New Adventures: Journey through the pipes and line by line, re-read the riddle section ‘Let’s have a yarn about a precious old friend….Can you guess who’. Ask children, ‘Other than water, what could each line be referring to?’ Discuss the way this section holds the reader’s attention as they try and work out whom the riddle is referring to.

6. Describe Whizzy's character. How do we know what Whizzy is thinking during the adventure? Reread the story and observe the way that the illustrator has drawn Whizzy on each page. As a class, create a table that lists Whizzy’s emotions and the situation Whizzy was in when having that emotion. Does water really have feelings? Why have the author and illustrator shown Whizzy with these different emotions?

7. Provide children with props and invite them to work in small groups to dramatise Whizzy’s journey from the loo. Younger children could just dramatise their favourite part of the story.

8. Retell the Whizzy’s Journey from the loo from an alternate perspective.

9. Buddy reading – Invite older children (who may also be learning about water and wastewater treatment) to read some of Whizzy’s New Adventures: Journey through the pipes with the younger students. Support them by supplying a few questions to discuss when they are finished. You may then wish to organise for buddies to assist with a follow up lesson such as a science experiment, water walk, creating a postcard or postcards (or from some of the ideas listed in this section).

Science

12. Investigate water sources in your home, school and neighbourhood. Compare these to water sources across other parts of Queensland. Observe how the place where a community sources their water affects how it is cleaned and transported.

13. Children find out about water flow in the local catchment area. Teachers provide posters, pictures and Internet sites about your local water resources to show what Whizzy's adventure would look like in your local area.

14. Invite a water expert or water educator to your classroom. Help children prepare questions that will allow them to discover whether events that occurred to Whizzy during the story could actually take place in your catchment or wastewater treatment system.

15. On page 5 the author wrote the line ‘You can bet there’s a shock on being piped underground’. Investigate the process of water being pumped from one location to another. What does it look like, and sound like?

16. Observe the ways dirty water ‘settles’ in a similar way to the ‘settling tank’ described on page 7. Use a large clear bowl of clean water. Throw in a couple of handfuls of dirt and stir it up. Allow it all to sit and settle and make observations over time of the changes that are happening. Observe the changes in colour of the water and the movement of the dirt.

17. The word ‘waterwise’ is introduced on page 9 and page 12. Discuss what is meant by this term and why we need to be waterwise with our clean treated water. Create a concept map about being waterwise.

18. Discuss that Alum is only one product that could be used in this flocculation phase of the water treatment process.

19. Compare and contrast the different types of treatment on page 4, 5 and 18,19.

20. Create a discussion around the purpose of a pumping station.

21. Investigate further either the process of water treatment or wastewater treatment. Use recycled materials to build a scientific model of the processes to explain to your family and classmates, how the process works.
22. Refer to Part 2 Water: learn it for life! Year 7 Science for the Australian Curriculum. In this second part of the unit you will find a number of activities that focus on the quality of water in our waterways and how that water can be treated for drinking purposes using various separation techniques.

The Arts

23. Develop a catchy jingle to help family and friends understand the message of being Waterwise. Focus on how clean water is precious and that much work has been done to bring it to us clean.

24. Create an advertisement. Develop either an audio segment (that could be played on the school public announcement system) or video record a short student play (to be shown on assembly) that could persuade children to only put down the drain or toilet what is meant to go down. Incorporate the slogan ‘Use your brain, should it go down the drain?’

25. If you were the illustrator for the Whizzy story, how would you illustrate Whizzy? Draw a new Whizzy considering elements of Whizzy’s character and adventures. Then explain to a friend why you chose the features you did.

26. Design a game that helps you and others to learn the process of wastewater treatment. The game should encourage its players to ‘Use your brain; should it go down the drain?’

27. Six o’clock news – Select students to pretend to be Whizzy and some of the other characters such as Operator Bill, Aunty Merle, family members or animals along the river. Use a few key props to help children ‘get into the role’. Then with the rest of the class as the audience, use a microphone to interview the characters about the events of the day. This works best if you, as the interviewer, can dress-up too! You may also wish to invite the audience to ask some questions once you get going.

28. Discussion about the indigenous artwork and how this has been incorporated into the book.

Mathematics

29. Guess the number (and then count) the number of Whizzy’s in the book.

Game

(Original game: What goes where — Melbourne Water. Adapted by City of Gold Coast).

The ‘to flush or not to flush’ relay

Year 1 to 3 (takes 10-15 minutes).

Materials

8 buckets - 2 with a rubbish bin picture on them, 2 with a recycling picture on them and 2 with the ‘toilet seat’ lid (can be done with a real toilet seat which is actually cooler), and then 2 to put the items or cards with pictures of the items in at the start of the game. Suggested items or cards with pictures of items to put in the buckets (two sets, one for each team) include food scraps, toilet paper, wee, poo, toy car, undies, popper (juice box), baby wipe, paper (e.g. photocopying paper), cotton buds, small ball, chip packet, band aid, rags/clothes, apple.

How to play

Students are divided into 2 teams (lines) and have a bucket at the front of the line with the cards or items in them.

At the other end of the ‘space’, are the ‘rubbish bin’, ‘toilet’ and ‘recycling bin’, one set for each team.

To play, the first child takes a card/item out of the bucket and decides if it should go into the rubbish bin, toilet or recycle bin. They run up and put it in the bin they think is correct and then come back and tag the next person and go to the back of the line. The tagged student takes a card/item from the bucket and does the same thing.

When all of the cards/items have been put in the buckets up the other end, sit down and discuss each card/item and which bin they put it in. It provides an opportunity to discuss why you can’t put certain things down the toilet. It can be expanded by including a ‘reuse’ container and a composting container.

Remind students that only wee, poo and toilet paper should be flushed down the toilet.

More information

Email: waterwise@dews.qld.gov.au   Phone: 13 QGOV (13 74 68)