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</table>
| Evaluate | What do you want the students to know? What representations will provide evidence that they understand the concepts?  
- Identify and describe uses of water  
- Water can take many forms, such as liquid, solid and gas.  
- Life on earth is dependent on water  
- Recognize actions that can be taken to conserve water  
- Investigate home and school uses of water  
- Understand The Water Cycle |
| Elaborate | What student investigations or application of knowledge would extend their understanding? Representations?  
- Conduct home investigations on how much water they use  
- Participating in discussions or explorations on uses of water  
- Estimating, hypothesizing, predicting, observing, testing, retesting, analyzing and interpreting, explaining, ordering and sequencing, mapping, identifying water use, following verbal instructions, classifying, writing, reading, speaking and self-evaluating. |
| Explain | What are the current scientific explanations? How best can the students represent their understanding?  
- See elaborate (above) |
| Explore | What hands-on, shared experiences of the phenomenon are appropriate? Representations?  
- Experiments/investigations on water usage  
- Activities involving water  
- Data collecting |
| Engage | How can we engage students and elicit their prior knowledge? Representations?  
- De bono’s thinking hats  
- Y chart  
- Documenting |

Comment [D1]: Assessing the responses to all of these activities can provide information for further planning and learning and development.
### Unit at a Glance

<table>
<thead>
<tr>
<th>Phase</th>
<th>Lesson</th>
<th>At a glance</th>
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<tbody>
<tr>
<td>Engage</td>
<td>Lesson 1</td>
<td>Finding out what students know about water and its uses through brainstorming and small group work.</td>
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<tr>
<td>Explore</td>
<td>Lesson 2</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Evaluate</td>
<td>Lesson 5</td>
<td></td>
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</tbody>
</table>

### Alignment with the Australian Curriculum: **Science**

<table>
<thead>
<tr>
<th>Strand</th>
<th>Sub-strand</th>
<th>Code</th>
<th>Year 2 content descriptions</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Understanding (SU)</td>
<td>Earth and space sciences</td>
<td>ACSSU032</td>
<td>Earth’s resources, including water, are used in a variety of ways</td>
<td>1-5</td>
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<tr>
<td>Science as a Human Endeavour (SHE)</td>
<td>Nature and development of science</td>
<td>ACSHE034</td>
<td>Science involves asking questions about, and describing changes in, objects and events</td>
<td>1-5</td>
</tr>
<tr>
<td></td>
<td>Use and influence of science</td>
<td>ASCHE035</td>
<td>People use science in their daily lives, including when caring for their environment and living things.</td>
<td>1-5</td>
</tr>
<tr>
<td>Science Inquiry Skills (SIS)</td>
<td>Questioning and predicting</td>
<td>ACSIS037</td>
<td>Respond to and pose questions, and make predictions about familiar objects and events</td>
<td>1-5</td>
</tr>
<tr>
<td></td>
<td>Planning and conducting</td>
<td>ACSIS038</td>
<td>Participate in different types of guided investigations to explore and answer questions, such as manipulating materials, testing ideas, and accessing information sources.</td>
<td>1-5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ACSIS039</td>
<td>Use informal measurements in the collection and recording of observations, with the assistance of digital technologies as appropriate</td>
<td>4, 5</td>
</tr>
<tr>
<td></td>
<td>Processing and analyzing data and information</td>
<td>ACSIS040</td>
<td>Use a range of methods to sort information, including drawings and provided tables</td>
<td>1-5</td>
</tr>
<tr>
<td>ACS</td>
<td>ACSIS214</td>
<td>Through discussion, compare observations and predictions</td>
<td>1-5</td>
<td></td>
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<td>--------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>Evaluating</td>
<td>ACSIS041</td>
<td>Compare observations with those of others</td>
<td>4, 5</td>
<td></td>
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<tr>
<td>Communicating</td>
<td>ACSIS042</td>
<td>Represent and communicate observations and ideas in a variety of ways such as oral and written language, drawing and role play</td>
<td>1-5</td>
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</tbody>
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### Australian Curriculum general capabilities and cross curriculum priorities table

<table>
<thead>
<tr>
<th>General capabilities</th>
<th>Australian Curriculum description</th>
<th>Water in Our World examples</th>
</tr>
</thead>
</table>
| Literacy             | Literacy knowledge specific to the study of science develops along with scientific understanding and skills. PrimaryConnections learning activities explicitly introduce literacy focuses and provide students with the opportunity to use them as they think about it, reason and represent their understanding of science. | In Water in our world the literacy focuses are:  
  - Labeled diagrams  
  - Role-plays  
  - Factual texts (optional)  
  - Graphs  
  - Factual recounts  
  - Posters  
  - Explanations |
| Numeracy             | Elements of numeracy are particularly evident in Science Inquiry Skills. These include practical measurement and the collection, representation and interpretation of data. | Students:  
  - Collect, represent and interpret data from investigations. |
| Information and communication technology (ICT) competence | ICT competence is particularly evident in Science Inquiry Skills. Students use digital technologies to investigate, create, communicate, and share ideas and results. | Students are given opportunities to:  
  - Use interactive resource technology to view, record and analyze information.  
  - Use ICT to create presentations to communicate ideas, including digital animation. |
| Critical and creative thinking | Students develop critical and creative thinking as they speculate and solve problems through investigations, make | Students:  
  - Use reasoning to develop questions for inquiry |
| Evidence-based decisions, and analyse and evaluate information sources to draw conclusions. They develop creative questions and suggest novel solutions. | - Formulate, pose and respond to questions  
- Predict how and where and what might happen  
- Consider different ways of thinking about water use |
|-----------------|--------------------------------------------------|
| Ethical behavior | Students develop ethical behavior as they explore principles and guidelines in gathering evidence and consider the implications of their investigations on others and the environment | Students:  
- Ask questions of others, respecting each other’s point of view. |
| Personal and social competence | Students develop personal and social competence as they learn to work effectively in teams, develop collaborative methods of inquiry, work safely, and use their scientific knowledge to make informed choices. | Students:  
- Work effectively in collaborative learning teams  
- Take turns and role-play effectively  
- Use appropriate oral communication skills |
| Intercultural understanding | Intercultural understanding is particularly evident in Science as a Human Endeavour. Students learn about the influence of people from a variety of cultures on the development of scientific understanding. | - Cultural perspectives opportunities are highlighted where relevant.  
- Important contributions made to science by people from a range of cultures are highlighted where relevant. |

**Cross-curriculum priorities**

There are three cross-curriculum priorities identified by the Australian Curriculum:

- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia’s engagement with Asia
- Sustainability.

**Aboriginal and Torres Strait Islander histories and cultures**

Water in Our World focuses on exploring the environment in a scientific way. Students are provided opportunity to investigate ways in which water is used.

Aboriginal and Torres Strait Islander peoples traditionally have different patterns of water use in their lives, as well as different distribution and management systems. Therefore, it is recommended to make connections with Aboriginal and Torres Strait Islander community members to provide their cultural perspectives.
Sustainability
The Water in Our World unit provides many opportunities for students to develop understandings of Water. It encourages them to reflect on the idea of water being essential to their lives and highlights how it is an essential and valuable resource. This will therefore assist students in developing the necessary skills and knowledge in order to live a more sustainable life through conservation of water. Students will be involved in discussion and activities on ways they can make changes, both at home and at school.

Teacher background information
Water is critical for sustaining life – it is the essence of life. “It performs essential functions within terrestrial and marine ecosystems and represents an important input into Australia’s economy, particularly agriculture” (ABS, 2012).

Water covers three quarters of the earth’s surface, but only one percent of our world supply is readily available for use by people or animals. The other 99 percent is either too salty or is frozen as ice or snow. Earth, is made up of 80% water. Water is vital for the food we grow, leisure, survival and even power generation. Not only does water surround us, but it is a part of us. Our bodies are made up of 70% water. Water is essential for our daily survival as the human body requires 2 liters of water per day.

Since people use the majority of water we all have a role to play in conserving it for the future. Australians use 100 buckets of water per head per capita. Of this, only 1% is used for drinking. Most of this drinking quality water is used for washing, flushing toilets and watering lawns (Rain rain, don’t go away!, 2012). Conserving water does not mean a major change to our lifestyles. It simply means cutting down on the amount we use and not wasting water. And there are lots of easy ways to do that. Many parts of Australia have been in long-term drought, which is why increasing evidence of effects of increased water use is of extreme importance for our future.

Misconceptions
There are many misconceptions students have regarding water. However, the main misconception this unit will try and address is related to The Water Cycle. According to the study by Osman Cardak (2009), students usually develop misconceptions as a result of their own interpretations. If these are not detected and compensated, “they continue for long years and constitute significant barriers in understanding process.” (Cardak, 2009). When addressing students misconceptions related to the water cycle, it is recommended that “science education should focus on studying natural cycles in context of their effects on daily lives of humans instead of separating these cycles into specific scientific fields” (Cardak, 2009). Students were shown to have trouble understanding the concept of the water cycle and how water can be found in many different forms – gas, liquid, etc.
Lesson 1 - Engage

Overview
- Engage children in discussion and reflection
- Access prior knowledge and understanding of water, finding out what students know about water using De Bono Hats
- Identify current issues related to water. E.g. drought, sustainability, etc.
- Develop students awareness that water is essential for life
- Find out what children know about The Water Cycle

Lesson/assessment focus
- Diagnostic assessment is an important aspect of the engage phase. In this lesson you will discover what children already know about water. From this, you can plan the extent you will need to scaffold children in the next lessons.

Key outcomes

Science
- Describe water
- Identify a source of water
- Provide three facts of water
- Identify uses of water

Literacy
- Verbal and written communication/record on their understanding of water

Required equipment
- De Bono’s Thinking Hats sheet
- Poster paper
- Writing materials

Lesson steps
Children work in small groups. Brainstorm ‘Water’ using De Bono’s Thinking Hats.
- White hat: what do you know?
- Yellow hat: positives – swimming, drinking, etc.
- Black hat: the negatives – e.g. drowning, floods, tsunamis
- Red hat: how do you feel about water?
- Blue hat: where do we go from here? E.g. issues of drough, sustainability, usage and conservation
- Green hat: are there any different ways we could conserve water in our school?

Children must also include a diagram of their understanding of The Water Cycle.

Comment [D3]: Each lesson outlines the specific lesson/assessment focuses, demonstrating an understanding of assessment strategies.

Comment [D4]: This demonstrates the capacity to interpret student assessment to evaluate student learning and modify teaching practice.
Groups share ideas and present information on a concept map, poster.

*Copies of any worksheets or descriptions of activities*

**De Bono’s Six Thinking Hats**

**Blue Hat Thinking - Process**
- Thinking about thinking
- What thinking is needed?
- Organizing the thinking
- Planning for action

**White Hat Thinking - Facts**
- Information and data
- Neutral and objective
- What do I know?
- What do I need to find out?
- How will I get the information I need?

**Green Hat Thinking - Creativity**
- Ideas, alternative, possibilities
- Provocation - "PO"
- Solutions to black hat problems

**Yellow Hat Thinking - Benefits**
- Positives, plus points
- Logical reasons are given.
- Why an idea is useful

**Black Hat Thinking - Cautions**
- Difficulties, weaknesses, dangers
- Logical reasons are given.
- Spotting the risks
Red Hat Thinking - Feelings

- Intuition, hunches, gut instinct
- My feelings right now.
- Feelings can change.
- No reasons are given.
Lesson 2 – Explore

Overview

- In the previous lesson, students brainstormed all of their knowledge of water on posters. This lesson is designed to elaborate on the water cycle which they were instructed to include on their posters.
- The aim is to provide a hands on experience relating to the Water Cycle. Students explore and discuss the water cycle to develop a deeper understanding about water sources and water usage.

Lesson/assessment focus

- Formative assessment is an ongoing aspect of the explore phase. It involves monitoring students’ developing understanding and giving feedback that extends their learning.

Key outcomes

Science

- Make predictions about what will happen with their Water cycle models
- Describe the Water cycle
- State why water conservation is important in relation to the water cycle.
- Demonstrate an understanding that water conservation is an act of stewardship for the Earth.

Literacy

- Record information
- Contribute to discussions
- Use oral, written and visual language to record and report ideas on the water cycle.

Required equipment

- Refer to worksheet on making their own water cycle
- Computers

Lesson steps

1. Class discussion on the water cycle and what children know. Teachers may refer to posters from previous lesson.
2. Option – show children this water cycle presentation
3. In pairs, allow children to play this interactive game on the Water cycle
4. Creating your own Water Cycle
   - This will establish a deep understanding of the concepts involved in a water cycle.
   - Tell students that the water moving about in the water cycle does not fall exactly where it evaporated from. Some places receive more and some receive less rainfall. Each place has different needs for its water. The area may not receive enough precipitation in the form of
rainfall and that can be a problem. That is why it is so important to conserve water. Explain to the students that everyone needs to save water and that they can also help their friends and families conserve water by sharing what they have learned about water.

5. Conclude with a discussion on what they have learnt, referring back to their initial thoughts on the previous lessons posters.

Copies of any worksheets or descriptions of activities

Creating your own water cycle

You will need:
- a large metal or plastic bowl
- a pitcher or bucket
- a sheet of clear plastic wrap
- a dry ceramic mug (like a coffee mug)
- a long piece of string or large rubber band
- water

Steps:
- Put the bowl in a sunny place outside.
- Using the pitcher or bucket, pour water into the bowl until it is about ¼ full.
- Place the mug in the center of the bowl. Be careful not to splash any water into it.
- Cover the top of the bowl tightly with the plastic wrap.
- Tie the string around the bowl to hold the plastic wrap in place.
- Watch the bowl to see what happens.

The "mist" that forms on the plastic wrap will change into larger drops of water that will begin to drip. (You can speed up the dripping by carefully moving the bowl – don’t splash! – into the shade.) When this happens, continue watching for a few minutes, then carefully peel back the plastic. Is the coffee mug still empty? Water from the "ocean" of water in the bowl evaporated. It condensed to form misty "clouds" on the plastic wrap. When the clouds became saturated it "rained" into the mug!

This experiment adapted from resources provided by the Monroe County Water Authority - http://www.mcwa.com/MyWater/KidsWaterFun.aspx#cycle
Lesson 3 – Explain

Overview

- In the previous lesson, children created their own water cycles. At the end of the lesson children began to think about ways they could conserve water. This lesson extends on this idea. Children will come up with ways to conserve water.
- Do we use as much water as we need?
  - Students explain ways to save water. Note if students are able to:
    - Identify ways water can be wasted
    - Describe reasons for trying to conserve water
    - Describe ways to conserve water
- This will indicate their capacity to make connections between water use and water conservation.

Lesson/assessment focus

- Formative assessment is an important aspect of the explain phase. It involves monitoring students developing understanding and giving feedback that extends their learning. In this lesson you are looking for evidence for students that students are developing an understanding of sources of water, and of the ways water is collected, stored, moved and used.
- You are also able to look for evidence of student’s use of appropriate ways to represent what they know and understand about water and give them feedback on how they can improve their representations.

Key outcomes

Science

- Represent stages in the journey of water from a source to a point of use
- Communicate ways in which they can conserve water
- Make connections between the water cycle and water conservation

Literacy

- Use language and gestures to model the water supply system
- Use scientific vocabulary appropriately in their writing and talking.

Required equipment

- A selection of containers

Lesson steps

1. Looking at water usage through an activity adapted from Rain rain, don’t go away! (2012):

Capacity
- Encourage students to fill and empty a selection of containers with water to demonstrate various quantities. Introduce formal measurement of liquids, millimeters and liters. Show students a variety of commonly used containers such as lemonade bottles, milk bottles and orange juice bottles to demonstrate 1 and 2 liter quantities.
- Ask students to estimate the number of 1 liter containers it would take to:
  o Wash hands
  o Flush the toilet
  o Have a shower
  o Brush teeth
  o Wash dishes
  o Water the garden
- Present students with the estimated quantity in liters of water consumption:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Litres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flushing toilet</td>
<td>10</td>
</tr>
<tr>
<td>Double flush</td>
<td>5</td>
</tr>
<tr>
<td>Having bath</td>
<td>100</td>
</tr>
<tr>
<td>Having shower</td>
<td>200</td>
</tr>
<tr>
<td>Using dishwasher</td>
<td>50</td>
</tr>
<tr>
<td>Using washing machine</td>
<td>150</td>
</tr>
<tr>
<td>Using garden sprinkler</td>
<td>1000</td>
</tr>
<tr>
<td>Using garden dripper</td>
<td>4</td>
</tr>
<tr>
<td>Washing car</td>
<td>200</td>
</tr>
<tr>
<td>Hosing driveway</td>
<td>100</td>
</tr>
</tbody>
</table>

- Ask students to consider one method of reducing 10 liters of water it takes to brush our teeth. Students then present their ideas.
- Using a glass of water and 3 x 2 liter OJ containers, demonstrate to students the savings if a glass of water is being used instead of a running tap.
- Should we be careful with our water usage?
- Explore the answer to this important question using DE Bono’s Six Thinking Hats.
2. Once activity is complete, students are to predict how much water they think they use in one day at home. They can record this in their science books.

Copies of any worksheets or descriptions of activities
Lesson 4 – Elaborate

Overview

- Students have gained enough information on water, water sources and the water cycle to now conduct an investigation.
- Students will gather data from home and compare with other students on their water usage and ways to conserve water.

Lesson/assessment focus

Summative assessment of the investigating outcomes is an important aspect of the elaborative phase.

Key outcomes

Science

- Observe water uses at school and home
- Record their observations about water uses
- Share observations and contribute to the construction of a class graph

Literacy

- Use oral, written and visual language to report observations and reflect on experiences of water use at home
- Contribute to discussion to develop a class graph
- Retrieve information from a graph

Required equipment

- Writing materials
- Computers

Lesson steps

1. Instruct students to go home and collect data using the worksheet
2. Use the data and place into a comparison table showing the class who uses the most water, etc.
3. Compare students predictions on how much water they use per day to their data collection.
4. Class discussion on ways to conserve water at home.
5. Each child to create a poster with a catchy slogan and idea to save water.

Copies of any worksheets or descriptions of activities

HOW MUCH WATER DO YOU USE AT HOME!?

<table>
<thead>
<tr>
<th>Where/What</th>
<th>How long is the tap running for?</th>
<th>How many times per day?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bath</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shower</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lesson 5 – Evaluate

Overview
- This lesson is designed to bring the whole water unit together. Children will participate in group activities to reflect on their knowledge and understandings.

Lesson/assessment focus
- Summative assessment of the conceptual learning outcomes is an important aspect of the evaluate phase.

Key outcomes
Science
- Describe ways they and others use water
- Identify the source of their water and how it is transported
- Identify ways to use water responsibly
- Demonstrate understanding of the water cycle

Literacy
- Use language to clarify their understanding and reflect on their experiences
- Use language and visual representations to communicate their ideas

Required equipment
- Writing materials
- Paper
- Computers

Lesson steps
1. Teacher will refer back to the students posters made in lesson one. Using a then and now type of table, the teacher will compare what children knew then to what they know now.
2. Students will be broken into small groups and will work collaboratively to:
   a. Draw and label the water cycle
   b. Write down 5 interesting facts about water that they have learnt
   c. One way to conserve water
3. Students will then be divided into two groups. One group will be representing water usage at home and the other group will represent water usage at school. Each group will work together to create a presentation on ways they can conserve water in their particular location.

- Students may present this to the class in the form of a role play, puppet show, PowerPoint presentation, diorama, posters, etc.
- A combination of different representations may be used. The aim of the presentations is to engage the rest of the class and to show what they know/what they have learnt over the unit.

Use questions such as:

- What new things have you learned about water?
- What ideas have you changed?
- What activities helped you change your ideas?
- What activities helped you learn new things?

*Copies of any worksheets or descriptions of activities*
Appendix: Equipment

Water Conservation
South-East Water-20 ways to save water
Water Wasters Quiz

General
http://www.waterinschools.com/watercounts/games/waterwise.htm

The Water Cycle
The Water Cycle
South-East Water-Water Cycle Game http://www.kidzone.ws/water/

References

http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1301.0~2012~Main%20Features~Water~279

http://www.dropinthebucket.org/learn/