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| **SCIENCE EDUCATION PLANNER: H2O ON THE GO** |
| **SCIENCE STRANDS:**Living WorldMaterial World | Physical World Plant Earth and Beyond | **MAIN IDEA:** What happens to water after it goes down the sink? (Understanding the water cycle as an interacting system.) | **LEVEL:** 1 2 3 4**YEAR:** 5 & 6**TEACHER:** Barbara Ryan |
| Nature of Science – understanding, investigating, communicating and participating and contributing. |
| **STRANDS/AOs:** | * Interacting systems: investigate the water cycle and its effect on the climate, landforms and life.
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| **KEY COMPETENCIES:** * Thinking – about consequences (how things can interact to result in something else happening) related to the water cycle.
* Using language, symbols, and texts – learn and use the water cycle terminology.
* Managing self – students will think about every use of water and possible consequences of their actions.
* Relating to others – listening, discussing and sharing ideas within groups and in class.
* Participating and contributing – working together within the class community to investigate activities and subsequent discussion.
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| **INTENDED LEARNING OUTCOMES:** The students will: |
| **Conceptual LOs** | **Procedural LOs** | **Nature of science** | **Technical LOs** |
| Students will understand that:* the water cycle as an interacting system
* the water cycle has an effect on the climate
* the water cycle has an effect on landforms
* the water cycle has an effect on life.
 | Students will be able to:* discuss their prior knowledge of the water cycle
* investigate an interacting system and learn the language
* examine the effect of the cycle on climate
* experiment with the effects of water on land
* explore New Zealand research into the effects of the water cycle on life in New Zealand lakes
* engage in scientific discussion using developing skills in listening and responding appropriately to each other.
 | Students will understand and appreciate that scientists:* are always thinking about why and how things happen – They build on (add ideas to and adjust) what they already know
* realise that different aspects of science in the natural world interact with each other to produce certain effects or consequences – this can be seen in the interaction of Earth’s system with the water cycle
* often initiate exploration because of problems experienced by human beings
* often explore problems that are a consequence of human activity.
 | Students will be able to:* navigate the Hub to research ideas
* draw and appropriately present knowledge of water cycle concepts on charts
* work together to construct and perform a dance to depict science concepts
* develop the skills for conducting an experiment
* read using a reciprocal reading approach (group or class)
* write using transactional genre.
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| **MANAGEMENT/MATERIALS:****Resources:** <https://www.sciencelearn.org.nz/resources/713-h-o-on-the-go-the-water-cycle-introduction>  |
| **ASSESSMENT ACTIVITY EXAMPLES:*** Draw a diagram of the water cycle as an interacting system.
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| **SCIENCE: PLANNING FOR TEACHING AND LEARNING: H2O ON THE GO** |
| **MAIN IDEA:** What happens to water after it goes down the sink? |

| **Micro task** | **Resources** | **Planned****interactions** | **Intended learning****outcomes** | **Reflections** |
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| **MESO TASK:** To find out what we already know about the water cycle. |
| Discuss where water might go. | * Jug of water.
 | * What is this? After students say water, ask a student to tip it into the sink. “Where has the water gone?’
 | * Focus students on thinking about the water cycle to see what ideas and knowledge they already have on the water cycle.
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| Discuss where rain might come from. | * Data projector.
* Images>[Rain](https://www.sciencelearn.org.nz/images/803-rain).
 | * Discuss the image. Where does the rain come from?
 | * Students will understand water cycle terminology offered during discussion.
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| **MESO TASK:** To understand the water cycle as an interacting system. |
| Learn the terminology and know the concepts related to the terms. | * Interactive>[Dynamic and complex: the global water cycle](https://www.sciencelearn.org.nz/image_maps/36-dynamic-and-complex-the-global-water-cycle).
* Printed version of the interactive.

**Teacher reference:*** Article>[The water cycle](https://www.sciencelearn.org.nz/resources/721-the-water-cycle)
* Article>[Earth system](https://www.sciencelearn.org.nz/resources/720-earth-system)
 | * Give each group of about 3–4 a printed version of interactive and ask them to cover 2–3 aspects of the water cycle (16 are represented).
* Students research using the computer interactive and present ideas (using pictures/diagrams/words) to the class.
* Display ideas and discuss as a class.
 | Students will use the terminology and understand related concepts to aspects of the water cycle.* Class will learn from each other to understand terms and concepts.
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| Understand the interacting system of the water cycle through dance. | * Music for dance (same for all groups).
* Interactive>[Dynamic and complex: the global water cycle](https://www.sciencelearn.org.nz/image_maps/36-dynamic-and-complex-the-global-water-cycle).
* Printed version of the interactive.
* Data projector.
 | * Each group will devise and practise a 1-minute dance to depict their aspect of the water cycle.
* Show chart made in previous lesson to class first then present the dance to the class.
* Look at the interactive again through the data projector. How are all the ‘parts’ of the water cycle interacting? How are they connected?
* Ask students to think about how they could link to another group. (Order groups so they will link together and call groups in order.)
* Do the dance again one group at a time. Use the printed interactive to see how the next group can link to the previous one. Work out some dance moves that show an interaction between the two groups. Add each group in turn, linking the concepts. Ultimately the whole class will be depicting the interacting system of the water cycle. Practise to get smooth presentation.

Whole class discussion:* What is a system?
* How is the water cycle a system?
* What are some of the interactions that are taking place?
 | * Students will understand the relatedness of the various concepts within the water cycle. The students will have some idea of the water cycle as an interacting system.
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| **MESO TASK:** To understand the effect of water (in its cycle) on the weather. |
| Understand the relationship between water and the weather through PowerPoint and discussion. | * Activity>[Precipitation and cloud formation](https://www.sciencelearn.org.nz/resources/802-precipitation-and-cloud-formation)

**Teacher reference:*** Article>[Water and weather](https://www.sciencelearn.org.nz/resources/725-water-and-weather)
 | * Watch the Precipitation and cloud formation PowerPoint as a class. Stop and discuss.
* Ask students to reiterate how water is related to weather.
 | * Understand the phases of water vapour in the air that lead to cloud formation.
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| Understand the importance of the Sun in the water cycle through watching and discussing video. | * Some newly washed clothes items – well rung out.
* Video>[Water and weather](https://www.sciencelearn.org.nz/videos/359-water-and-weather).
 | * If the weather is fine, peg out some wet washing – discuss why we might be hanging out some washing.
* Watch Video>Water and weather. Stop and discuss.
* Students draw an aspect of the cycle showing the relationship of water to the weather (include the Sun).
* Check the clothing (when it is dry). Ask what happened to the water and why.
 | * Understand that the Sun is the source of the heat energy that drives the water cycle and, in turn, influences the weather and climate.
* Reinforce the idea of the Sun as the source of heat energy causing the evaporation of the water.
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| **MESO TASK:** To have an understanding of the effect of the water cycle on landforms. |
| Understand an effect of water on land through experimenting. Explore and make predictions about some factors that affect soil run-off and groundstability, including gravity, erosion and deforestation. | * Activity>[Water run-off](https://www.sciencelearn.org.nz/resources/803-water-run-off)
 | * Follow instructions in [Water run-off](https://www.sciencelearn.org.nz/resources/803-water-run-off). Note the questions asked throughout. See related teaching notes.
 | * Students will appreciate the interrelatedness of the water cycle with land.
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| **MESO TASK:** To have some understanding of the effect of the water cycle on life – specifically how human activities can affect this. |
| Explore some New Zealand research involving the water quality in the Rotorua lakes to observe how human activity can affect life in the water cycle. | * Picture of a desert and one of a rainforest.
* Article>[Water quality in Rotorua Lakes](https://www.sciencelearn.org.nz/resources/714-water-quality-in-rotorua-lakes).
* Data projector.

**Extension activity:*** Activity>[Groundwater contamination](https://www.sciencelearn.org.nz/resources/1255-groundwater-contamination)
 | * Show two pictures. What are the differences? Why?
* Why is water important? What would happen if there was no water?
* Discuss how the water cycle is important for life.
* Have students view [Water quality in Rotorua Lakes](https://www.sciencelearn.org.nz/resources/714-water-quality-in-rotorua-lakes) (on screen or paper).
* Reciprocal reading with class, clarify terms and ideas.
* Discussion: What is algal bloom? What do the bacteria and nutrients in run-off have to do with algal bloom? How does it affect the lake? Life in the lake? Life around the lake? Humans? (Further research: Google algal bloom and its effects.)
* Discuss in small groups the problem, what needs to be done, some ideas how this could be done.
* Transactional writing: ‘Solving the problem in the Rotorua lakes’.
* Follow instructions in activity>[Groundwater contamination](https://www.sciencelearn.org.nz/resources/1255-groundwater-contamination) if time.
 | Students will: * understand the necessity of water and how water contributes to life throughout the water cycle journey
* understand that the water cycle is involved in the production of life – this might have positive or
* negative effects
* appreciate that research in New Zealand shows the effects of human activity within the water cycle
* appreciate that all actions have consequences
* practise problem solving.
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| Summarise and assess the unit. | * Jug of water.
* Paper for drawing.
 | * Show the jug of water and ask what it is. Ask a student to tip it down the sink.
* Where did the water go? Where might it go from there? What else might happen to it? What might be a result of that?
* Class discussion on the water cycle as an interacting system.

**Assessment:*** Draw a diagram of the water cycle as an interacting system.
 | * To return students to original question and check their understanding of the water cycle as an interacting system.
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