When Water Lost Her Way

Lesson Plan Year 5 - 6
Exploring the Water Cycle

Contents

Learning Objective

Explore the water cycle drawing an understanding of the unique properties of water that can occur naturally on earth as a solid, liquid or gas and transition between these from changes in temperature. Investigate the influence the water cycle has on living things and how living things adapt to the physical conditions of their environment.

Curriculum Links

Year	Australian Curriculum/ Victorian Curriculum Science Understanding			Australian Curriculum/ Victorian Curriculum Science Inquiry Skills/Science as human endeavour
Year 5	Solids, liquids and gases have different observable properties and behave in different ways ACSSU077 /VCSSU076		Living things have structural features and adaptations that help them to survive in their environment ACSSU043	Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multi-modal texts ACSIS093
Year 6	Changes to materials can be reversible or irreversible / i.e. melting, freezing and evaporating & investigating the change in state caused by heating and cooling ACSSU095/ VCSSU077	Sudden geological changes and extreme weather events can affect the Earth's surface ACSSU096 / VCSSU079	The growth and survival of living things are affected by physical conditions of their environment ACSSU094	Scientific knowledge is used to solve problems and inform personal and community decisions ACSHE100

When Water Lost Her Way

Lesson Plan Year 5 - 6

Exploring the Water Cycle

Lesson Summary

Read *When Water Lost her Way* and explore the water cycle presented in the story and how living things are influenced by water and their physical environment using an inquiry based thinking routine (think-puzzle-explore).

Begin with gathering the collective understanding of water and the water cycle from the class. Use the story to stimulate further discussion and identify questions or puzzles about the water cycle, focusing on the different states that water can change between. Collectively work out how this can occur (focusing on changes in temperature). Explore images of living things in the story and investigate how they are influenced by water and the physical conditions of their environment. Follow with exploring an identified interest/puzzle area from the group or use one of the suggested exploration activities. Collectively summarise and reflect on what everyone has learnt about water and the water cycle and why it is important that water in our environment is managed appropriately.

Cross Curriculum Links- Australian Curriculum

Critical & Creative Thinking	Inquiring – identifying, exploring and organising information and ideas; Identify and clarify information and ideas; organise and process information, identify and clarify information and ideas
Literacy	Comprehending texts through listening, reading and viewing Navigate, read and view learning area texts
Numeracy	Using measurement - Estimate and measure with metric units ('Build you own water cycle' activity)
Sustainability	Investigating how changing the physical conditions for plants impacts on their growth and survival such as salt water, use of fertilizers and soil types (elaboration of ACSSU094)

When Water Lost Her Way

Lesson Plan Year 5 - 6
Exploring the Water Cycle

Lesson Plan

THINK: (Engage, Question, Predict) Gather knowledge from the room
What do you know about water and the water cycle? What are the different forms of water? What do you think this story will be about? (Clues: Illustrations, title, etc.)

Collate all the information from the room on a white board

Read the story *When Water Lost Her Way*

Discuss what everyone thought of the story

PUZZLE: What questions or puzzles do you have from the story? Optional suggested questions to stimulate conversation are below or refer to the activity hand out for further suggested questions
What do you think the annotated images on the last pages of the story are trying to show? (refer to Activity hand out for prompts) How does water change from a solid to liquid to gas? How is this represented in the images? refer to Q1 of activity handout for prompts.

EXPLORE: What do you want to know more about or further explore in the water cycle? A summary of some optional further explorative activities are provided below			
Build you own water cycle *Refer page 4*	Explore the properties of water *Refer page 4*	Water quality and water management *Refer page 5*	Adaptations of living things *Refer page 5*

REFLECT/COMMUNICATE: Some suggested summary questions for the class/group are provided below
What did you learn about water and the water cycle? What would you like to further explore about the water cycle?

When Water Lost Her Way

Lesson Plan Year 5 - 6

Exploring the Water Cycle

Exploration Activities

Build your own water cycle		
Time 10 min & 4-5 hours wait time then 10-15 minutes	Materials 1 large bucket, 1 small container, glad wrap, 1 litre of water & a measuring jug, table salt	• Place the small, empty container inside the large bucket (or a known/measured amount of water to cover the base of the container) • Fill a 1 litre jug with water- observe it together then add 5-6 table spoons of salt - stir up the water with the salt, observe its colour & taste • Empty the salty water into the large bucket covering its base (this is like the ocean), record the measured volume emptied • Ensure the small bucket has no water in it and sits in the middle of the large bucket • Cover the large bucket with glad wrap and place outside in the sun for 4-5 hours • Go back and check on the experiment and see how much water has dripped down and filled the small container- measure this with your measuring jug • Taste the water in the small container – is it salty? If not, where is the salt- discuss how on a relative basis salt will accumulate in oceans (the large container) due to evaporation which leaves the salts behind • Discuss together how much water evaporated, then condensed on the glad wrap and fell into the small container- what would happen if it was a much hotter or colder day? • Discuss as a group the role that heat / temperature plays in changing water between a solid, liquid or gas.

Explore properties of water		
Time 20 min	Materials ice cubes, plastic bucket, boiled water in a furnace or kettle, clear plastic cups or glass jars, soils- (mud/clay and sand), olive oil	• Observe ice on liquid water – what does it do? *Observe that it floats, it is cold & hard. Explore how water expands when in solid ice, how this allows it to float and how the expansion of ice can break apart rocks.* • Boiling water- although hard to see, watch in the sunlight as water vapour moves off a hot mug • Put a bit of dirt (compare mud/clay/sand) in water filled plastic bottle/jar and mix thoroughly • Observe what changes- does the water look dirty or clean and why do you think this is (Comparing clays & sands)? • Drop a couple of teaspoons of oil in water. What happens? Does it mix? Why/ Why not? • Discuss how the experiments show water can be easily polluted and what this means for water management

When Water Lost Her Way

Lesson Plan Year 5 - 6

Exploring the Water Cycle

Water quality and water management		
Time 20 min	Materials Computer/ iPads for group work, butchers paper and coloured textas for writing observations	• Look at the last page in the book showing how much water is stored in different places on earth • Can you work out which water stores are salty and fresh? • What does this mean for managing our water resources? • Research your local water retailer and where the water from the tap comes from. • Drawing on learnings from Activity 'Explore properties of Water', if water is easy to pollute what does this mean for management of our fresh water resources? How can water be polluted and what can you do at school and/or at home to maintain clean water in our environment?

Adaptations of living things and its implications for management		
Time 20 – 30 min	Materials Computer/ monitor for the group or ipads for group work Butchers paper and coloured textas for writing observations	• Watch video clip • Together identify features of the cave salamander (pale skin – no pigment, poorly developed eyes – blind) • Discuss what would happen if the cave salamander was brought out in sunlight- reflect on how unique adaptations of living things to their environment can be fragile • Discuss why it's important for us to study different living things (creatures/pants) and understand their needs from the environment so we can help ensure that our activities don't negatively impact on their survival • What are some of the 'trade offs' that as a society we have to make in considering the needs of all living things?

For simplicity these activates describe the actions to take for further exploration. You can follow a 'predict- activity- reflect' routine or an alternative thinking routine that focuses on predicting and reflecting.

The layout of this lesson plan was based on Visible Thinking for inquiry based learning (Think-Puzzle-Explore), for further reading on this topic follow the link below:

http://www.visiblethinkingpz.org/VisibleThinking_html_files/03_ThinkingRoutines/03d_UnderstandingRoutines/ThinkPuzzleExplore/ThinkPuzzleExplore_Routine.html

When Water Lost Her Way

Lesson Plan Year 5 - 6
Exploring the Water Cycle

Activity Hand Out

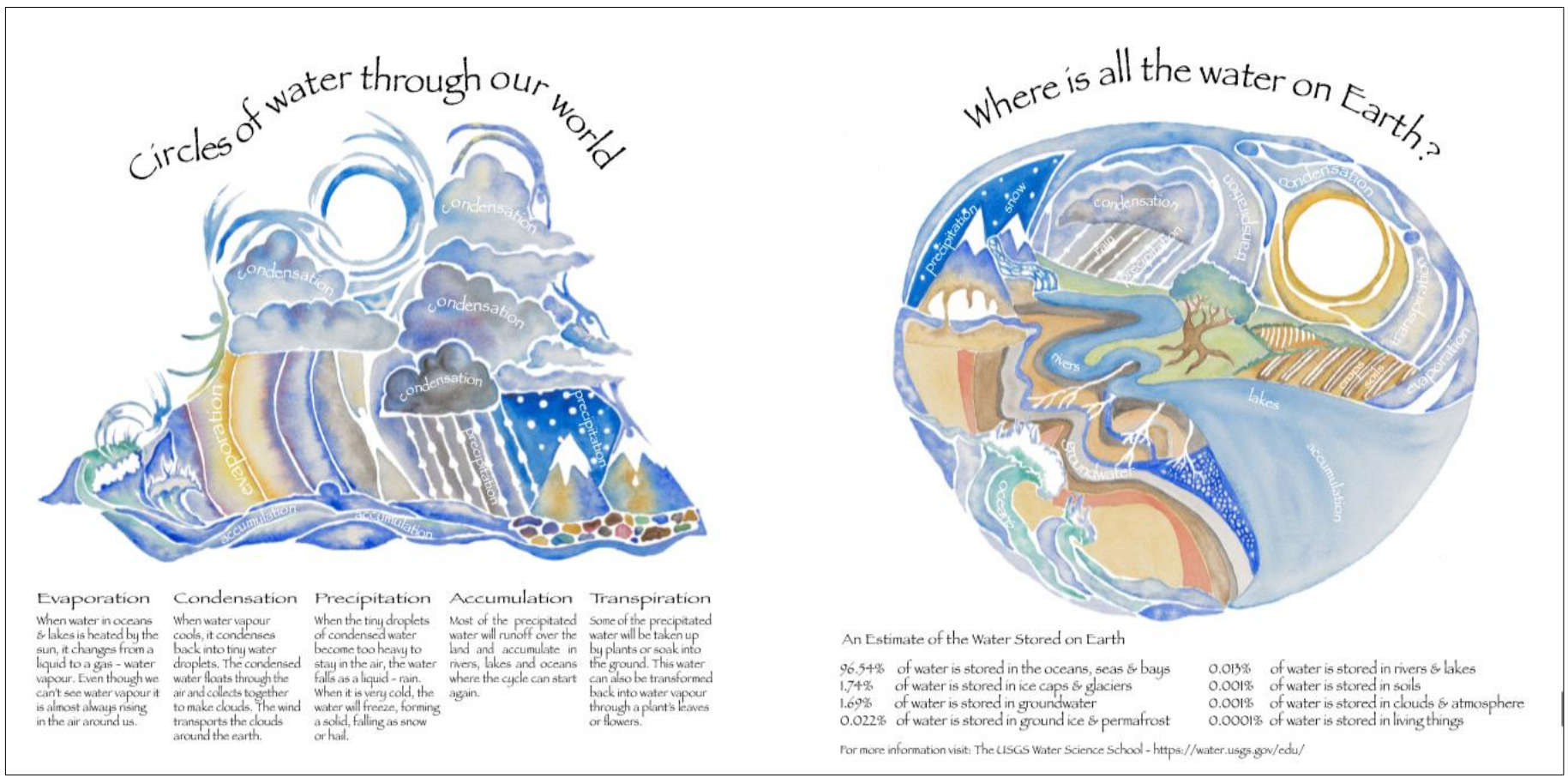
This hand out covers three broad areas- The Water cycle, properties of water and water & life.

These could be completed over a couple of lessons or choose areas of interest most suited to the individual class.

The Water Cycle

Q1. What do you think the annotated images below are trying to show? What is puzzling about them?

What would you like to know more about or explore?



I think the image on the left is

about:_____

I think the image on the right is

about:_____

What is puzzling about the image on the left

is:_____

What is puzzling about the image on the right

is:_____

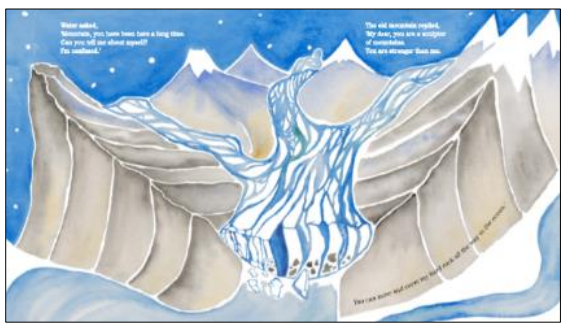
I want to find out more

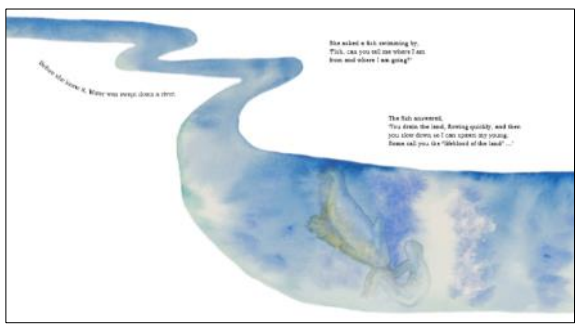
about:_____

_____

_____

Q2. Identify water in the images below and whether water is in the form of a solid, liquid or gas





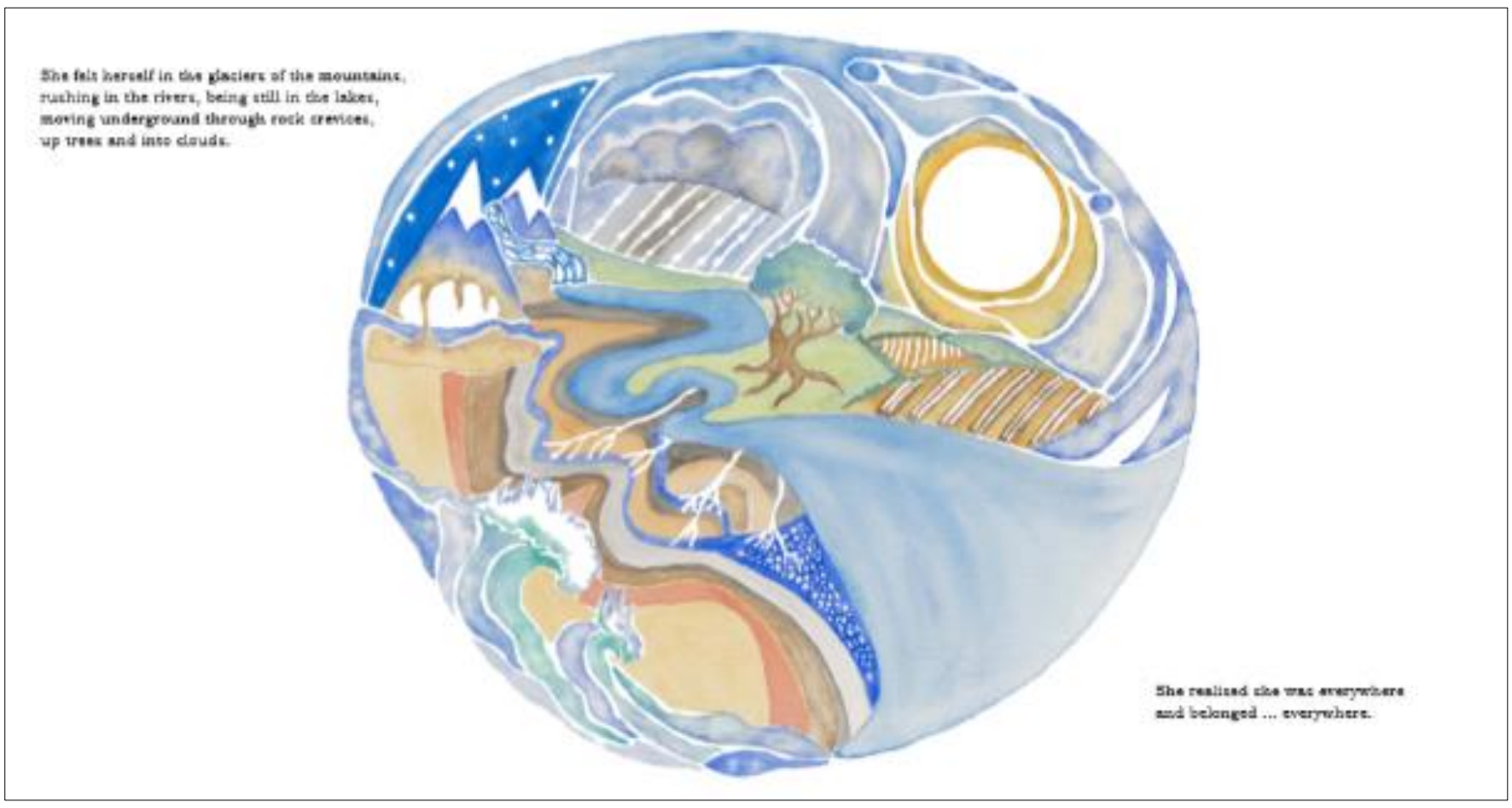
_____ _____ _____

Q3. How does water change between the different forms/states above? (*focus on temperature & how the energy from the sun drives evaporation)* For each example above explain what would happen if you added or removed heat?

Add heat_____ Add heat_____ Remove heat_____

Remove heat_____ Remove heat_____ Add heat_____

Q4. Identify the water you expect to be fresh and salty in the illustration below *(hint- refer to annotated image Q1)*. Add the letter 'F' for fresh water stores and 'S' for salty water on the diagram below: (teachers refer appendix 1 of activity hand out)



Q5. Investigate where most of our water is stored that we drink. Consider as a group our reliance on surface waters (dams/rivers). What percentage of water stored is available for human use? (refer to Q1 & Author's note)

_____

_____

Q6. Think about how extreme weather events- such as prolonged drought and floods. How do these events impact on the surface of the earth?

_____

_____

The properties of water

The mountain says '*you are a sculptor of mountains. You are stronger than me. You can move and carve my hard rock all the way to the ocean.'*

Q7. What does the mountain mean in this statement?

_____

_____

Q8. How can ice break rock and transport it great distances? (refer to author's note)

_____

_____

The reed in the lake notes *"I eat the nutrients that you carry down the river and in turn this makes you clean again…'*

Q9. How can water carry nutrients? *This is further explored in the activity- 'Exploring the properties of water.'*

_____

_____

_____

When Water Lost Her Way

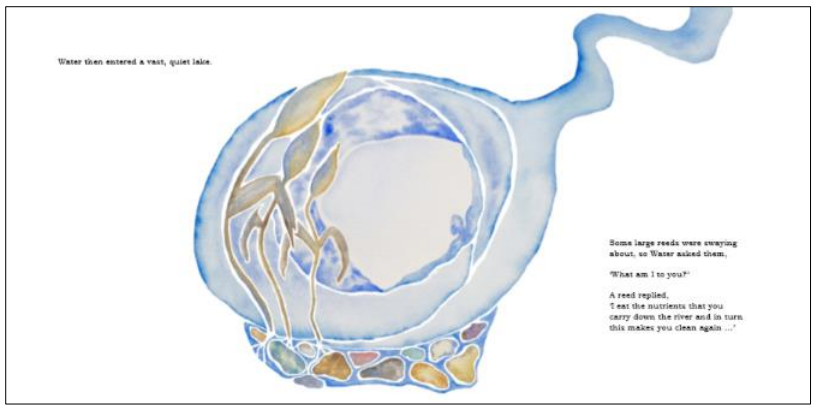
Lesson Plan Year 5 - 6

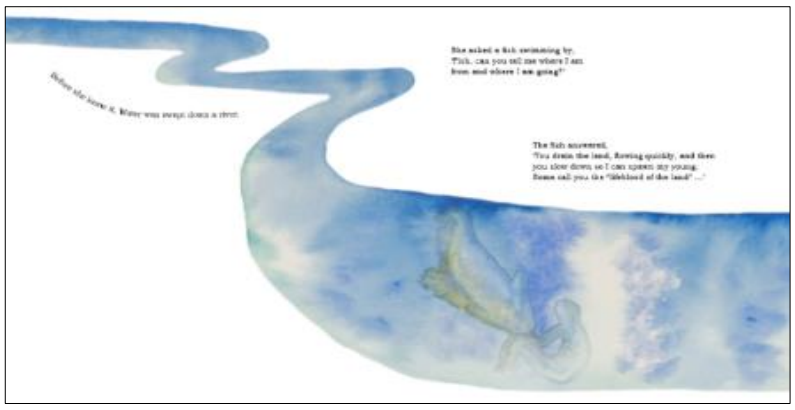
Exploring the Water Cycle

Water and life

Q10. Choose an image below and think about and write down how the character from the story relies on water.

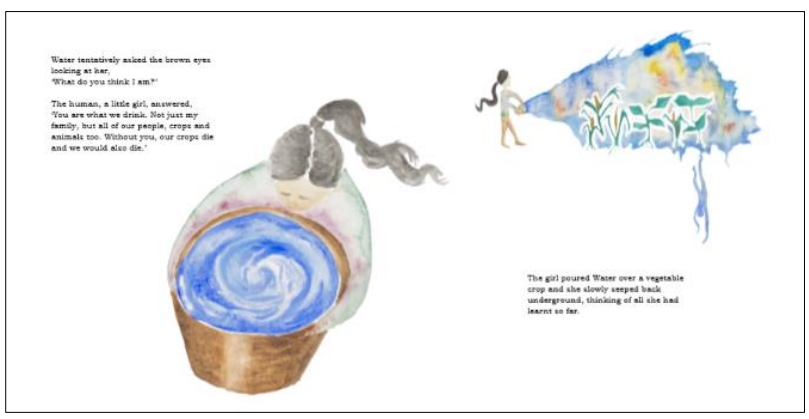
You may need to read bits of the story again to assist.

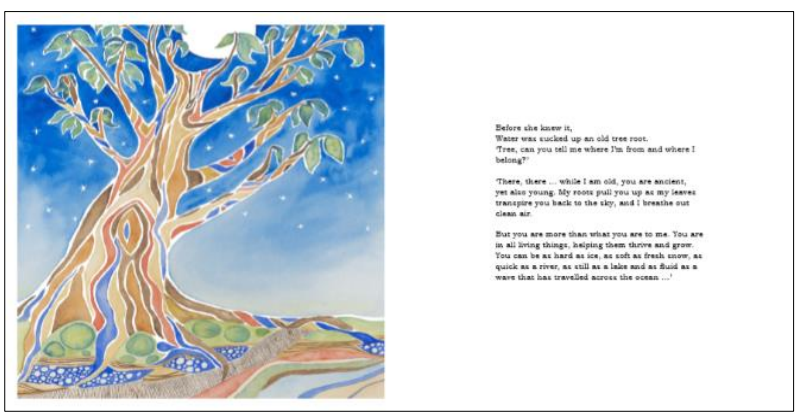




_____ _____

_____ _____



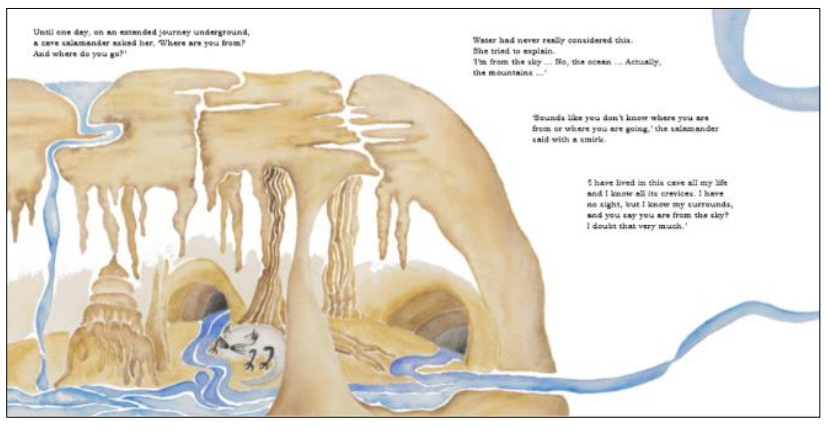


_____ _____

_____ _____

Q11. List some of the ways the cave salamander has adapted to live in the cave environment.

For further investigation refer to external resources. Why do you think the author used a cave salamander in this part of the story?



_____

_____

_____

_____

_____ _____

_____

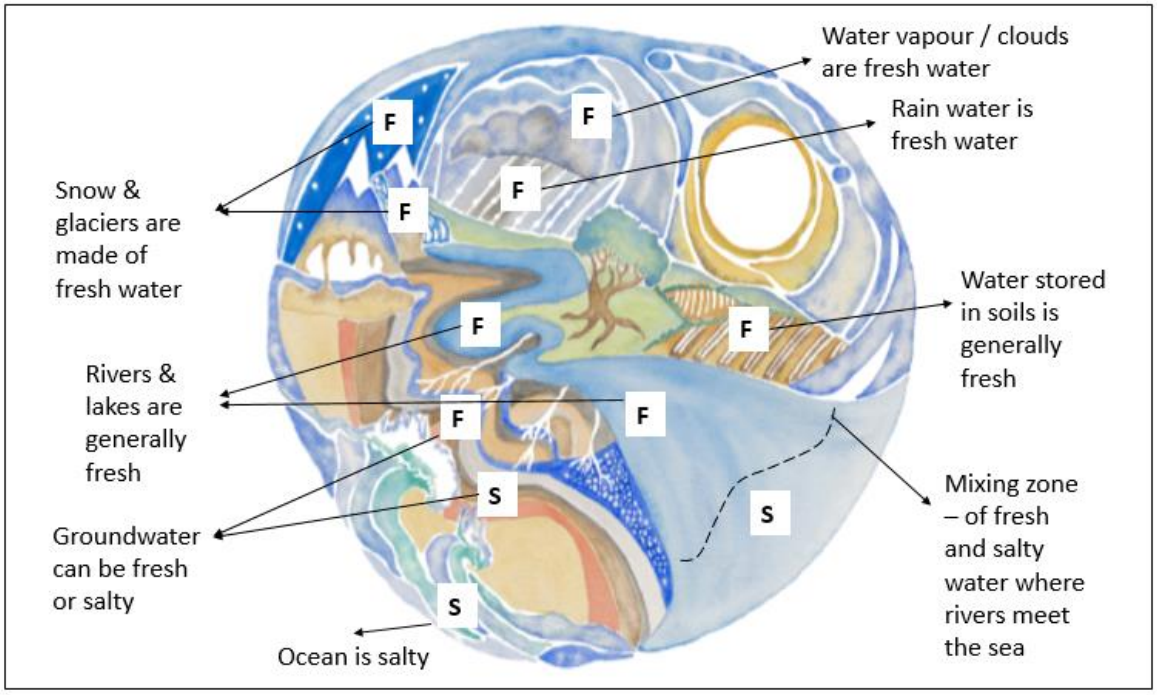
Q12. Is it important to study different living things (creatures/pants) and understand their needs from the environment? Why/why not?

Q13. What are some of the 'trade offs' that as a society we have to make in considering the needs of all living things? Consider competing interests, our scientific understanding and social value.

Q14. Can you list any current projects (railway, roads, large scale building, urban development) you are aware of where these considerations need to be made?

Appendix 1- Teaching notes for activity hand out

Fresh water stores are shown with an 'F' and 'S' indicates salty water stores



External Resources on the Water Cycle:

Visible Thinking Routines- Lesson plan structure was based on thinking routines

http://www.visiblethinkingpz.org/VisibleThinking_html_files/03_ThinkingRoutines/03d_UnderstandingRoutines/ThinkPuzzleExplore/ThinkPuzzleExplore_Routine.html

Cave Salamander – exploring adaptations to the physical environment- Utube clip

www.arkive.org/cave-salamander/proteus-anguinus/video-00.html

Water cycle rap – Utube music video explaining the water cycle

https://www.bing.com/videos/search?q=the+water+cycle+rap&&view=detail&mid=DF87D2F356DD4F07CE6CDF87D2F356DD4F07CE6C&rvsmid=FD42B5F7CA7BADCED556FD42B5F7CA7BADCED556&FORM=VDQVAP

USGS Water Science School - the proportions of water stored on earth

https://water.usgs.gov/edu/earthwherewater.html

Natural Water Cycle Animation- animated breakdown of the water cycle by South East Water

https://www.educationsoutheastwater.com.au/resources/natural-water-cycle-interactive

FUSE Resources for Victorian Curriculum - including water cycle

http://fuse.education.vic.gov.au/VC/Teacher?science

Global Water Issues- supporting resources on global water issues & sanitation

http://www.globaleducation.edu.au/global-issues/gi-water-and-sanitation.html

Water Aid Organisation links

www.water.org

www.wateraid.org.au