

Teacher Resource

Aquaponics School

Focus Questions

1. What are the main elements in an aquaponics system?
2. The plants in an aquaponics system are grown in soil. True or false?
3. What waste is used to help fertilise the plants?
4. Compared to most farms how much water does an aquaponics system use?
 - a. 10% less
 - b. 19% less
 - c. 90% less
5. Draw the cycle of an aquaponics system.
6. What type of fish did the kids use in their aquaponics system?
7. How often do they feed the fish?
8. What plants are they growing? Name two.
9. What do the kids do with the produce?
10. What did you learn watching the BTN story?

Activity

Class discussion

Students will discuss the BTN *Aquaponics School* story in pairs and then share their thoughts with the class.

- What do you THINK about what you saw in this video?
- What does this video make you WONDER?
- Where is the food you eat grown?
- Think of three questions you would like to ask the kids in the BTN *Aquaponics School* story.

Activity

Glossary

Students will brainstorm a list of key words that relate to the BTN *Aquaponics School* story. Students may want to use pictures and diagrams to illustrate the meaning and create their own glossary. Here are some words to get them started.

Aquaculture	Aquaponics	Hydroponics
Waste	Species	Nitrogen
Cycle	Oxygen	Fertiliser

Key Learning

Students will learn about the basics of aquaponics and investigate the biological and chemical mechanisms behind it.

Curriculum

Science – Year 4

Living things depend on each other and the environment to survive.

Science knowledge helps people to understand the effect of their actions.

Science – Year 5

Living things have structural features and adaptations that help them to survive in their environment.

Science – Year 6

The growth and survival of living things are affected by physical conditions of their environment.

Science – Year 7

Interactions between organisms, including the effects of human activities can be represented by food chains and food webs.

Classification helps organise the diverse group of organisms.

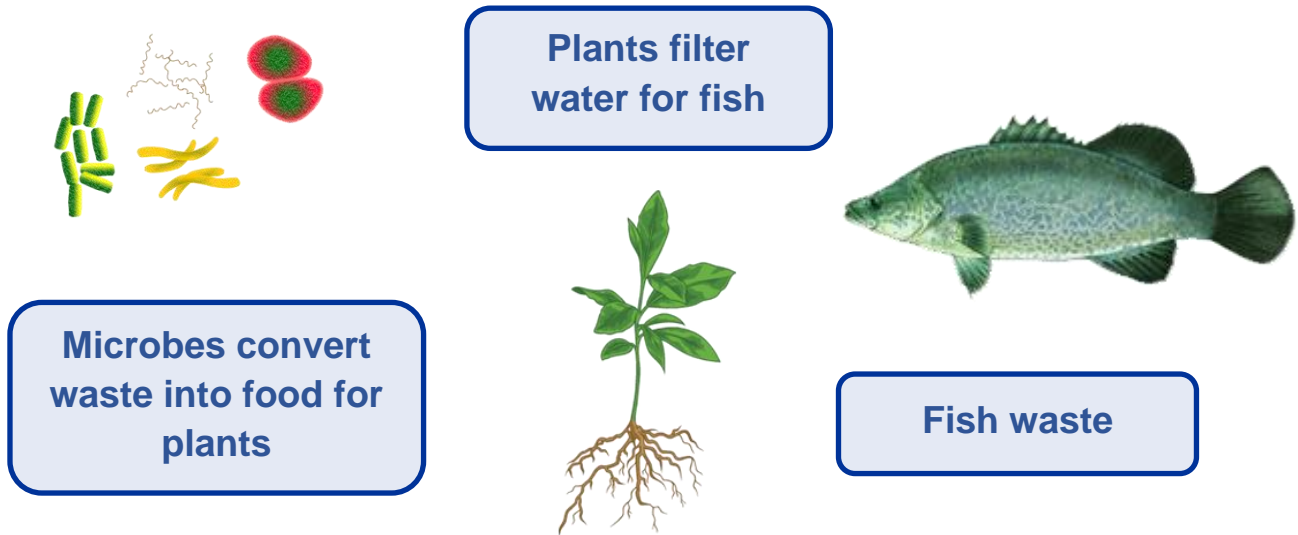
Geography - Year 4

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

Activity

Aquaponics cycle

After watching the BTN *Aquaponics School* story students will arrange the following images and processes and add arrows to create a diagram demonstrating the cycle of aquaponics. Students will then investigate each step of the cycle in more detail explaining the biological and chemical mechanisms behind it.



Activity

KWLH

The KWLH organiser provides students with a framework to explore their knowledge on the topic of aquaponics and consider what they would like to know and learn.

<i>What do I <u>k</u>now?</i>	<i>What do I <u>w</u>ant to know?</i>	<i>What have I <u>l</u>earnt?</i>	<i><u>H</u>ow will I find out?</i>

Questions for inquiry

Students will develop their own question/s for inquiry about aquaponics practice. Students will collect and record information from a wide variety of sources. Students may develop their own question for inquiry or select one of the questions below.

- What is aquaponics? Include the terms aquaculture and hydroponics in your explanation.
- What are the advantages and disadvantages of aquaponics for food production?
- What are the benefits of aquaponics compared to traditional farming?
- What is the aquaponics cycle? Include as many of the following words in your description as possible: animal waste, bacteria, absorb, nutrients, oxygen, nitrogen and ammonia. Draw a diagram to demonstrate the cycle in aquaponics.
- What do plants need to grow? What are the four main basic needs of a plant? If you have ever taken care of plant, describe what you have done to care for your plant.
- What do fish need to survive?

Activity

Research Project

There are many fish that can be successfully raised in aquaponics systems which are suited to the climate in Australia. These include Barramundi, Silver Perch, Trout, Golden Perch, Catfish, Murray Cod, Jade Perch, Australian Bass, Black Bream, Eels and Yabbies.

Students will choose a fish that can be raised in an aquaponics system in Australia and create a profile on that fish. Students can use the following structure to help guide their research.

Research project	
Scientific and common name	
Classification	
Describe its appearance What does it look like (shape, size, colour, special features)?	
Locate where this species can be found. Describe its natural habitat.	
What conditions does this fish need to survive in an aquaponics system? (pH levels, climate, water temperature, tank size, life span).	
What type of food does it eat (in an aquaponics system)?	
Interesting facts <ul style="list-style-type: none">• What is your favourite thing about this species?• What surprised you about your research?	
Photograph or illustration	

Activity

Aquaponics in your school

Aquaponics is a great teaching tool for core STEM subjects like Maths, Biology, Chemistry and Engineering. Consider whether your class could set up its own school aquaponics system, a hands-on learning experience to learn more about what aquaponics is, how it works, and the biological and chemical mechanisms behind it. Your class could then teach other students in the school about what they have learnt.

Project based learning

Watch one of the following BTN stories to learn about other hands-on projects that kids are working on at home and in their classrooms around Australia.



[BTN Worm Wee](#) – Meet some school kids who've made a business out of collecting and selling worm wee.



[BTN Bee Business](#) – Learn more about how this 10-year-old is keeping bees and collecting honey.



[BTN Endangered Seeds](#) – Meet some school kids who are working with scientists to save Australia's endangered plants by harvesting their seeds.



[BTN Bush Tucker Garden](#) – This school is growing its own Indigenous edible garden and then teaching kids how to cook with the plants they harvest.



[BTN Barra School](#) – Meet some students who breed barramundi at school that are then sold on to a restaurant for their award-winning menu.

Activity

Choose a project

Individually or in small groups, students will choose one of the following projects to work on and then present their findings to the class.

Instruction manual

Write an instruction manual with steps on how to make and care for an aquaponics system at your school. Consider using illustrations or photos to demonstrate steps in your instruction manual.

DIY Seed paper

Make your own plantable seed paper. Visit Gardening Australia for [instructions](#) on DIY Seed Paper. Think of different types of stationery you could make – for example – school notices or gift wrap!

Dirty water project

Experiment with a range of materials to turn dirty water into clean water.
Materials: dirt, water, rocks, cotton balls, cup, kitty litter, coffee filter and a plastic bottle cut in half. What worked well and what didn't work so well?

pH: acids & bases

In the safety of your [virtual lab](#), test an acid, a base and a neutral substance and use pH to identify their properties. Test solutions (e.g. vinegar) to find out whether they are acidic, basic or neutral.

Useful Websites

School aquaponics – ABC Gardening Australia

<https://www.abc.net.au/gardening/factsheets/schools-in/9433892>

Build your own aquaponics garden – Gardening Australia

<https://www.youtube.com/watch?v=HTq364RwH44>

Aquaponics Girraween Primary – ABC News

<https://www.abc.net.au/news/rural/2016-06-22/aquaponics-girraween-primary/7532704>