

GEOGRAPHY

Factors that Shape Places

Factors that change environments

How do people influence places and the management of spaces within them?



Module

8

Water...WOW! Module
Water Pollution

GEORGES RIVER ENVIRONMENTAL
EDUCATION CENTRE



This resource supports the Georges Riverkeeper Stage 3 Education Module 8: Water Pollution

Outcome: Explains interactions and connections between people, places and environments GE3-2

Focus Question: How do people influence places and the management of spaces?

Learning Intentions: I can understand how Aboriginal people (or First Nations people) shaped the land using firestick farming. I can describe how people have influenced our rivers and oceans by polluting the water with plastic.

Success Criteria: I can describe how Aboriginal people farmed the land. I can help prevent microplastics from entering our waterways.

Overview:

We all know plastics can be transported from human populated areas to the marine environment by rivers, wind, tides, rainwater, storm drains, sewage disposal, and flooding, or can directly reach the sea from boats and offshore installations. But plastics break up into increasingly smaller pieces mostly due to the effect of sunlight and heat. These plastic fragments, commonly called microplastics when smaller than 5mm, represent the vast majority of human-made debris present at beaches, seafloor, and in the water column. The effects of plastics on food webs and ecosystems have become focus of concern over the last decade. Plastics that enter the oceans are become increasingly toxic by adsorbing oily pollutants on their surface. When plastic is ingested, these concentrated toxins can be delivered to animals and transferred up their food chains to top-order predators such as humans and large fish. There are actions we can take to influence places and help manage the water pollution entering our rivers and oceans. We can start our investigation in our school grounds.



Aboriginal and Torres Strait Islander Histories and Cultures

Firestick Farming

Take a look at this amazing video about Firestick Farming '[Using fire to shape the land](#)'.

Fire stick farming is a practice that demonstrates Aboriginal and Torres Strait Islander understanding of the physical requirements for the growth, germination, fruiting and regeneration of particular plant species. Through regular cultural burning, ash is provided as a source of nutrients to those species and fertilizes the land, providing optimum soil chemistry to ensure an abundance of such resources. Fire also stimulates the production of fruiting bodies of important edible fungi. For example, *Laccoccephalum mylittae*, commonly known as “native bread”, is a valued edible Australian fungus that increases the production of fruiting bodies after fire. Aboriginal cultural fire practitioners understand that adjusting the physical conditions of the environment through fire management promotes the productivity of plants such as cycads (*Macrozamia communis*) and yams. The application of fire on Yuin country (south coast NSW) improved productivity of cycads after fire treatment with approximately an 8-fold increase in increased proliferation of seeds. Some Aboriginal people use the practice of fire-stick farming to fertilise the land prior to planting yams. The yam harvest is promoted by tilling and aerating the soil prior to burning in a mosaic pattern, which enables the ash to penetrate through the soil and provide nutrients to the yam plantation.

Fire increases the production of food resources and demonstrates the long-held knowledge that Aboriginal peoples have of the physical conditions that particular species within their environment require for growth and survival ([source](#)).

Refer to artwork “Indigenous Australians using fire by Joseph Lycett c1817 ([source](#)).



Factors that change environments

How do people influence places and the management of spaces?

What are microplastics?

Watch the amazing 3.36 minute video on Plastic Pollution [‘What Are Microplastics And How Are They Harming Our Oceans?’](#). Microplastics form when bigger bits of plastic break up into smaller bits. They can even break off our clothes when we wash them. You probably have some microbeads at home right now in your scrubs or shampoos. There are about 300,000 of them in the average bottle of face scrub. Even some toothpastes have plastic microbeads in them too. Microplastics are becoming a really big problem, especially in our rivers and oceans. Looking at plastic in the environment, over 85% of that is microplastic. That's really bad news especially for marine animals because those little plastic pieces look a lot like food to them. That plastic can get stuck in their stomach making it harder for them to digest food. Another big problem is that plastic often has dangerous chemicals in it and they can seep into the animal's body. This not only causes issues for them, it can also be a real danger for the animals that eat them - including humans. Unlike other rubbish, microplastic is just too small to get filtered out in water treatment plants, and that means they just end up floating straight out to sea. So, many people say the best way to stop them is just to get rid of them altogether (sourced from the [video](#)). Also refer to the fact sheet on [‘Microplastics: Small Plastic, Big Problem’](#).

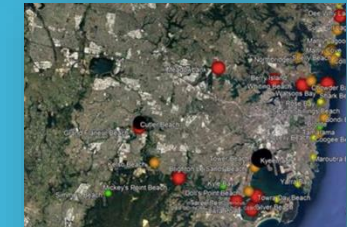
ACTIVITY 1: Microplastics at school?

The students from Loftus Public School conducted an audit of the school stormwater drains to see what is contributing to stormwater pollution from their school grounds. From the initial inspection of some of the drains, the students found that most of the pollutants were organic based leaves, sticks and soil. There was however an alarming find in the drain below a playground with Softfall underneath it. They found tiny particles of the rubber Softfall in the sediment collected in there which would end up in the local creeks. They now aim to come up with a solution to fix this stormwater contaminant leaving their school grounds. What is in your school drains? How can you help reduce the contaminants you found?



ACTIVITY 2: AUSMAP - Microplastics in the Georges River

[AUSMAP](#) is an ambitious coalition of school students, environment groups, universities and educators gathering critical new data about microplastic in our waterways. Using the data collected by the network of citizen scientists and researchers, AUSMAP is creating vivid maps of microplastic pollution hotspots around Australia. This program engages students in citizen science, to connect them to the natural world and to inspire change for a sustainable future. Some of the initial AUSMAP results for the Georges River catchment, that can be seen on the current [results map](#), include Grand Flaneur Beach as being ‘High’ and Kelso Beach ‘moderate’. Watch as Georges Riverkeeper takes samples for [AUSMAP](#). Teachers at the Georges River Environmental Education Centre are trained in using AUSMAP methodology and have an AUSMAP kit they can help schools use ([video](#)).



ACTIVITY 3: Microplastics Animation



Students from St Georges Girls High School celebrate a ‘Green Day’ each year and the teachers from Georges River Environmental Education Centre deliver a 2-hour workshop on how to create stop motion animations. The students during this time create a one-minute animation on microplastics and what students can do to help solve the problem. They then showcase their animations at their concluding assembly.

The stimulus video shown to these students before they started to animate was [‘What Are Microplastics And How Are They Harming Our Oceans? Plastic Pollution’](#). The teachers at Field of Mars Environmental Education Centre have developed a free Apple iTunes U Course titled [‘Movie Bugs Animation’](#) that guides on how to use iStopmotion.



These are free water education resources for teachers and students about water in the Georges River catchment in South Sydney, and more generally, in Australia. These education modules have been prepared for Stage 3 in primary schools.

They cover facts for kids about drinking water, water uses, the water cycle, water pollution, water conservation, rainfall, drought, floods, aquatic food webs, and how to measure water conditions using waterbugs, plus much more.

www.georgesriver.org.au/learn-about-the-river/schools

There are many different stakeholders and landowners in the Georges River Catchment who all have a responsibility to manage their land in a way that ensures there is a minimal impact on the river and its ecosystems.

Georges Riverkeeper's Members:



Georges Riverkeeper's Partners:

