OUR FRESHWATER

All life on earth depends on freshwater, yet less than 3 per cent of the water on our planet is fresh. The rest of the water on our planet is salty seawater in the oceans.

Almost all freshwater is locked up in ice caps or glaciers or buried deep underground. We are able to use less than one per cent of freshwater as it flows through rivers and streams, ponds, lakes and wetlands.

Freshwater is our planet's most precious resource. We drink it to stay alive, use it to stay clean and water the crops that we eat. It is used in producing the cotton clothes we wear and, through hydropower and cooling water in thermal power stations, it produces the electricity that lights our homes.

Freshwater is essential for nature too. Freshwater habitats are home to more than 10 per cent of all known animals and almost half of all known fish species. Freshwater ecosystems help to regulate the temperature of the land and sea. They allow wildlife to travel vast distances through different kinds of landscape to complete their life cycles, and act as conveyor belts transporting nutrients that make soil good for growing food. The flow of clean freshwater through rivers, lakes and wetlands is very important to the survival of aquatic life. It needs to be **clean**, and it needs to be able to **flow** from place to place, rising and falling with the seasons.

WHAT'S THE PROBLEM?

Populations of freshwater species are falling faster than wildlife in any other type of habitat on our planet, and this means that many of the things we need from rivers, lakes and wetlands are also in danger of being lost.

When rivers and rainfall do not provide enough water for our needs we change the natural flow to get it. Today we are using too much water, in too many places.

Florida Manatees leave coastal seas to swim up rivers in Winter to find warmer water and abundant freshwater plants to eat. Humans are now taking so much water from springs, and polluting others, that manatees are losing their winter homes.

OUR PLANET NETFLIX

WWF

A male Callipterus cichlid in the African Lake Tanganyika collects empty shells to attract females, who need shells in which to breed.

Sandhill cranes stop on their annual migration at the Platte River in Nebraska, North America. Humans have dammed the river, and taken so much of its water, that there is little space left for the cranes. Conservationists now manage the river's flow to create the sandbanks the cranes need.

In some cases we do this by pumping water up directly from rivers or from below the ground, and end up taking more than rainwater can replace. This means there is less and less water flowing downstream or underground until eventually it dries up. People and animals who depend on that water face great problems.

We have built dams that stop the natural flow of freshwater so that we can collect water where we need it for large cities or for farming, or so we can generate hydropower as the water is released through the dam. Hydropower produces almost one-fifth of the word's electricity, but dams can hurt river environments. They stop freshwater fish being able to migrate upstream from the sea to spawn. This is a major reason why more than a third of the world's freshwater fish species are vulnerable to extinction. The dorado catfish migrates from the Amazon's delta to the Andean foothills – a journey of more than 3000 miles.

It's not just dams. Concrete is often used to strengthen and raise river banks to keep rivers from flooding. This means that land close to the river can be used to build houses or as farmland, when it was previously a floodplain. This destroys floodplain wetlands which filter pollution from water and provide homes for wildlife and places for fish to spawn (lay their eggs). This attempt to control the flow often ends up causing more problems with flooding than it solves. The man-made banks cause the increased flow of water to speed up in the river channel instead of losing energy by spreading out when it overflows the banks. River levels downstream rise much higher, much faster. As a result, the banks often break and the result is much worse floods than would have happened otherwise.

CREATING A WATER-SECURE FUTURE

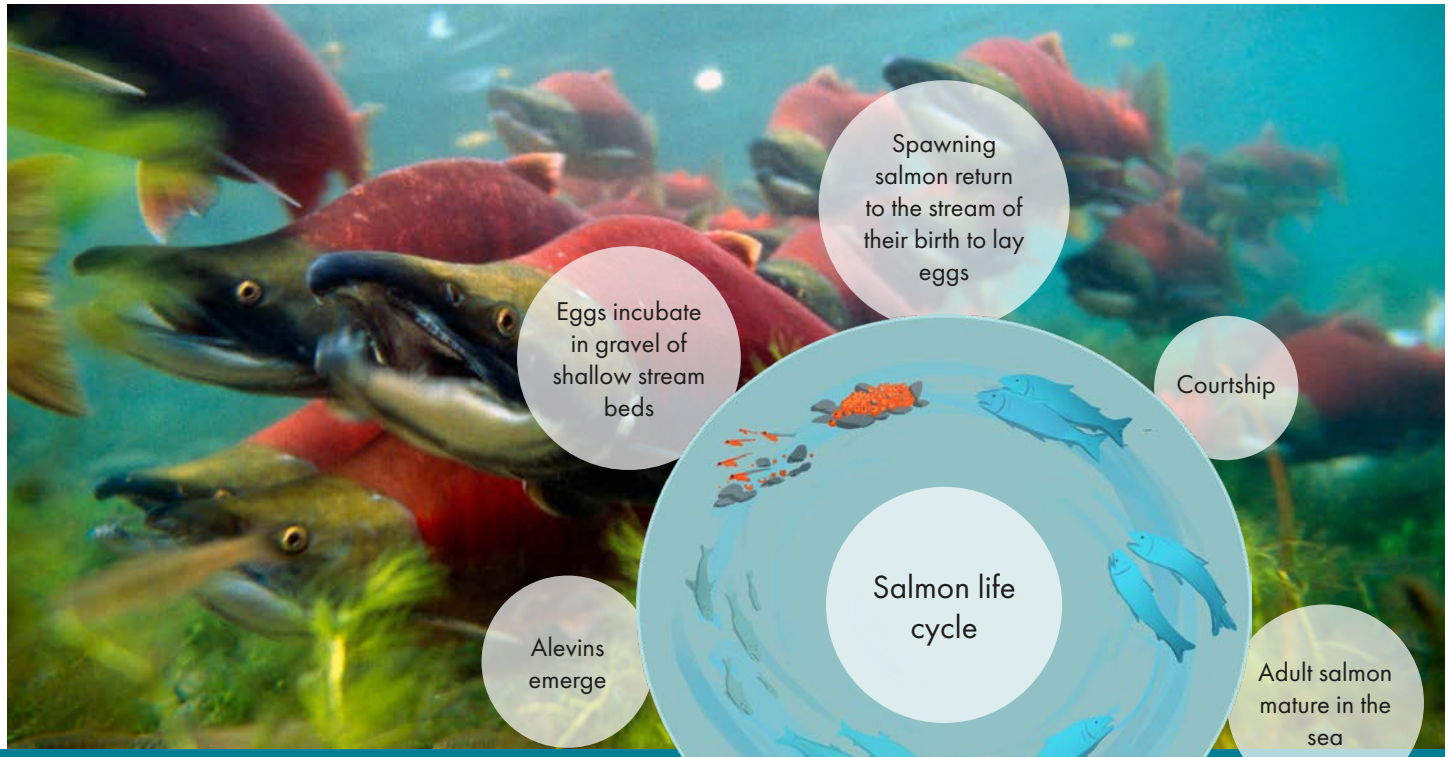
We all share one planet and by thinking carefully, we can keep freshwater flowing. About 90 per cent of the water we use goes to water crops. But this can be done more efficiently. Used wisely, drip irrigation and other technologies mean that far less water is used and there's no need to use energy to pump it. More can be grown on less land. If some of the water saved is returned to the river, animal and plant habitats are saved.

We all use water in our everyday life too, and there are things we can do at home to use less and allow more water to stay in the freshwater habitats where it is needed. We can use less water when washing, cooking, and flushing the toilet.

We can also remove or alter dams that cause problems by disrupting the flow of freshwater. And we can think more carefully about whether, and where, to build new ones. We should explore different ways to generate renewable electricity and collect water for drinking and irrigation without blocking entire rivers.


Dams block the flow of water, which prevents the transport of nutrients, sediments and wildlife.


Irrigation accounts for 90% of all the freshwater used by humans, but new farming methods can reduce this demand.
Cities can allow freshwater to flow naturally by including green spaces, permeable pavements and roof gardens.



MEET THE LOCALS: PACIFIC SALMON

Pacific salmon, as the name suggests, live for most of their life in the Pacific Ocean. They begin and end their life in fresh water, however, often traveling for thousands of kilometres in their lifetime and yet returning to the river of their birth. It's still a mystery exactly how salmon find their way home, but they seem to navigate by the stars, sense electromagnetic currents and use their strong sense of smell.

Salmon start out as fertilized eggs in gravel at the bottom of streams and lakes far from the sea. After hatching they swim downstream to the ocean where they live for many years, growing into large adults. Once fully developed their bodies change so that they can move from salt water to freshwater and they migrate upstream to reach the stream or lake in which they hatched. There they will spawn and lay eggs for the next generation.

When living in fresh water all salmon need a flow of clean, cool water. Both young and older salmon rely on streams and river features: pools and riffles. Pools are areas of a stream or river where the water is deep, slow moving, with silt or clay on the bottom. These allow salmon to hide from predators or relax in cooler water. Riffles are areas of a stream or river where the water is shallow and fast moving, with gravel or rocks on the bottom. Salmon rely on these for laying their eggs, and the flow adds oxygen to the water.

Unfortunately, when humans change the flow of a river by building dams, changing the course of a river or making it run through concrete channels, the habitat is changed so that salmon find it harder to survive and to travel up and down stream to complete their life cycle.

Dams create barriers to young salmon migrating to the ocean, and for adult fish returning to spawn. They also affect the way water moves down a river, by changing the amount and timing of flow, and its temperature and chemical characteristics. Dams also change upstream habitat from a river into a lake, where salmon become easy for predators to catch. Some dams have 'fish ladders' to give a way for salmon and other migrating fish to pass, but even the best of these still let fewer salmon through, and don't help with the other changes that dams cause to the freshwater habitat.

Wild salmon is an important source of food and income for many people, and a vital part of the freshwater and ocean ecosystem. We risk losing them if we don't stop interfering with the natural flow of freshwater.

FACILITATOR INSTRUCTIONS

KEY MESSAGES

PROBLEMS FACING FRESHWATER

- **Dams** that affect flow further downstream and stop fish migrating to complete their life cycles
- **Using too much water** at home and for farming
- **Polluting waterways** (eg pesticides washing into rivers from farmland)

SOLUTIONS

- Design different kinds of dams that aren't located in rivers with high numbers of wildlife and which allow fish to pass freely and allow water to flow more naturally
- Find ways to use less water – share the same water between industries or waste less at home / on farms
- Prevent pollution from farms and settlements being washed into waterways

SDGs LINKS

Goal 6: Ensure access to water and sanitation for all

https://www.un.org/sustainabledevelopment/water-and-sanitation/

Goal 14: Conserve and sustainably use the oceans, seas and marine resources

https://www.un.org/sustainabledevelopment/oceans/

Goal 15: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss

https://www.un.org/sustainabledevelopment/biodiversity/

Ensuring a healthy and productive future for our freshwater habitats also contributes to other SDG goals, including the following:

GOAL 1: No Poverty

GOAL 2: Zero Hunger

GOAL 3: Good Health and Well-being

GOAL 12: Responsible Consumption and Production

GUIDED DISCUSSION PROMPTS

Use these prompts to generate a class or small group discussion based on the Our Oceans briefing, or videos on ourplanet.com.

What is freshwater?

You may need to explain that the waters of the oceans are salty and so we can't use them in the same way.

Have you ever spent time by a river, stream or lake? What did you do? What was special about this place?

Allow children time to begin by discussing their own experiences.

What freshwater ecosystems can you think of?

Some are very well known, such as the Amazon river but be sure to mention local ponds and rivers.

What plants and animals can you think of that might live in these places or depend on freshwater habitats generally?

EG fish, shrimp, otters, beavers, kingfisher, herons, plants, algae, mayflies, river dolphins,

Why is freshwater important to us and our planet?

Flow – Carrying nutrients and water that plants and animals need to live.

Allowing wildlife to travel and complete their life cycle.

Fish for us to eat, water for us to grow crops and drink.

Why is freshwater important to us? Think of all the ways that you use water.

Encourage children to come up with as many ideas as they can including drinking, bathing, flushing toilets, washing up, cleaning, watering gardens and crops,

washing the car, for leisure activities such as canoeing, swimming or fishing and, indirectly, through any electricity we use.

What problems are affecting the flow of water?

Overuse of water by people and on farms. Dams that don't allow water to flow through carrying fish and nutrients to where they are needed. Farming and settlements causing pesticides to drain into freshwater habitats.

What could be done differently?

Fewer dams, or dams that allow water and fish to pass. Less water waste. Farming without pesticides and chemicals.

Can you think of what you can do to save water?

It is important that children feel empowered to do something themselves such as taking showers rather than baths, turning off the tap while brushing their teeth etc.

ACTIVITIES

ACTIVITY IDEA	SUGGESTED AGE	SUBJECTS
Young people keep a log of how much water they use in one day. Compare it with others and see if there are any ways in which they could save water. After a week, do the same thing and see who has lowered their water use by the most.	6 – 14	Citizenship
Carry out a pond dipping activity, and use the Our Planet citizen science app (Seek) or reference books to identify the range of wildlife and plants that live in the habitat. Consider what conditions they need to thrive and how the habitat provides these.	6 – 14	Science Geography
Recreate the salmons' journey upstream to spawn by setting up a salmon migration obstacle course **https://www.scienceworld.ca/resources/activities/salmon-migration-obstacle-course** Afterwards, consider what humans could change to increase the number of salmon who make it upstream to spawn. How would that help people?	7 – 11	Geography Science
Create a mini landscape from soil in a tray and sow cress seeds over the whole surface. Raise one end by a few centimetres to create a slope and ensure drainage and a container to catch water at the other end. Pour a glass of water into a single point in the centre of the highest point of the tray and let it run down through the landscape creating a river system. Each day pour another glass of water into the same point. Observe where the cress grows and how this corresponds to the river system. After a while, place one or more dams (erasers or pieces of thick card) at key points in the river system, and halve the amount of water you add each day. See what effect this has on the landscape after a few more days of watering. Discuss how this reflects the real world, and what could be done about it.	6 – 11	Geography
Write and illustrate a first person story or diary from the perspective of a salmon, imagining the challenges and dangers they may face.	7 – 11	Literacy Geography Art
Create a freshwater mural or collage	6 – 7	Art