WILD WATERS AND RISKY RIVERS

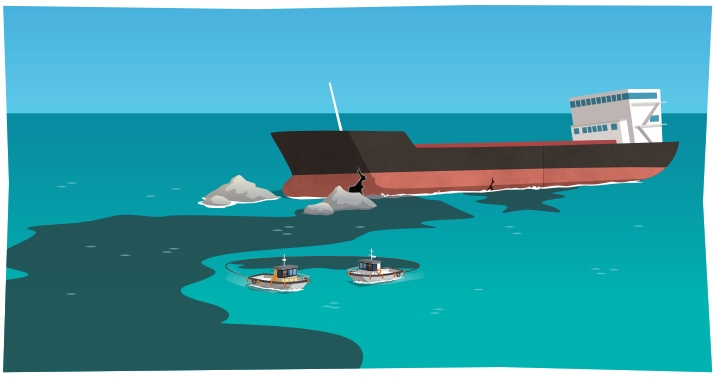
HI THERE! **JON** AKA **THE RIVER SURVEYOR** HERE, I'M HERE ON TRAGIC ISLAND TO TACKLE SOME OF THE TERRIBLE TROUBLESV WITH MY TEAM FROM **STORM GEOMATICS** -- SPECIFICALLY THOSE HAPPENING IN MY FAVOURITE PLACE: **THE WATER!**

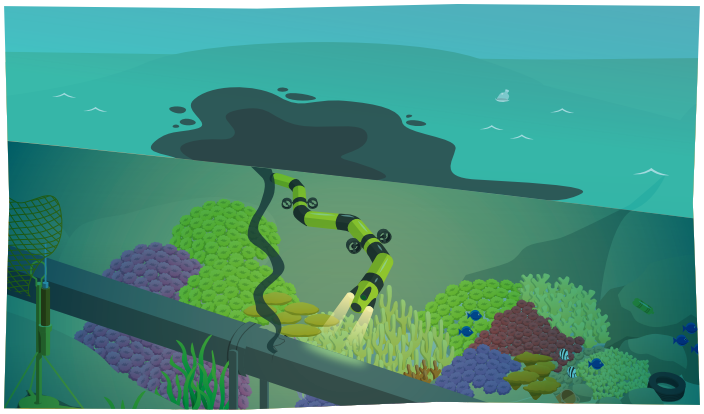
CAN YOU HELP US TO EXPLORE WHAT'S GOING ON AND MAYBE FIND SOME USEFUL INFORMATION AND SAFE SOLUTIONS TO ALL THE WATERY WORRIES!?

TASK 1: POLLUTION PROBLEMS

COMPUTING OBJECTIVES - MAKING EFFECTIVE SEARCHES)

There's a whole host of catastrophic calamities occurring on Tragic Island, but two in particular are having a terrible effect on the surrounding waters. Can you see the damaged tanker leaking oil into the sea in G,5?





There's more potent pollution pouring into the water in C,1, where a poorly-maintained underwater oil pipe has sprung a leak. When oil spills into an aquatic environment, it can harm animals and plants that live both on or near the surface, as well as under the water.

Because of this, oil spills can affect food chains, including human food resources - which we will explore later. For now, can you complete the 'Pollution Problems' warmup quiz, which will help you to understand the impact of some of the worst oil spill disasters in history.

TASK 2: RUINED RIVERS

It's not just on Tragic Island where pollutants bring peril to the water and its inhabitants - nor are they confined to coasts or the ocean! Urban and residential areas have water pollution problems all of their own.

One big issue is microplastics. Microplastics are teeny bits of plastic - so small they often can't be seen without a microscope. They are made in two ways. The first is that they are manufactured as 'microbeads' - tiny pieces of plastic that are added to things like facewash or toothpaste to help with scrubbing! Other microplastics are formed when bigger pieces of plastic break down.

Either way, microplastics are often washed down the drain and find their way into water sources like rivers, lakes, and oceans. Unlike materials such as wood or paper, plastic takes a long time to break down - thousands of years in some cases. Because of this, these microplastics can find their way into fish and other water animals, and into both tap and bottled water... which means they can end up inside our food and drink!

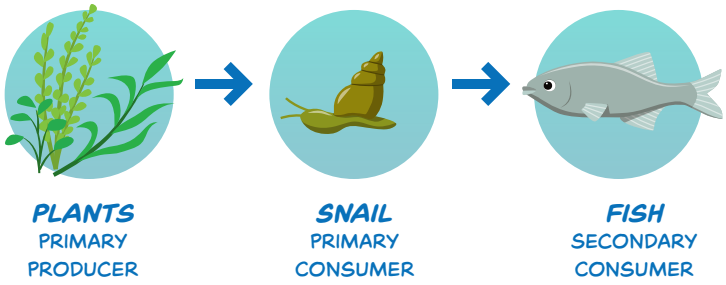
Microplastics that come from residential housing is just one form of urban/residential water pollution. Your challenge is to use the 'Ruined Rivers' activity sheet to match other potential waste sources to the type of pollution they can cause. You can then suggest a way that each type of pollution could be reduced.

For example, the banning of microbeads in cosmetic products!

TASK 3: RIVER RESIDENTS

(SCIENCE OBJECTIVES – ANIMAL HABITATS AND DIETS)

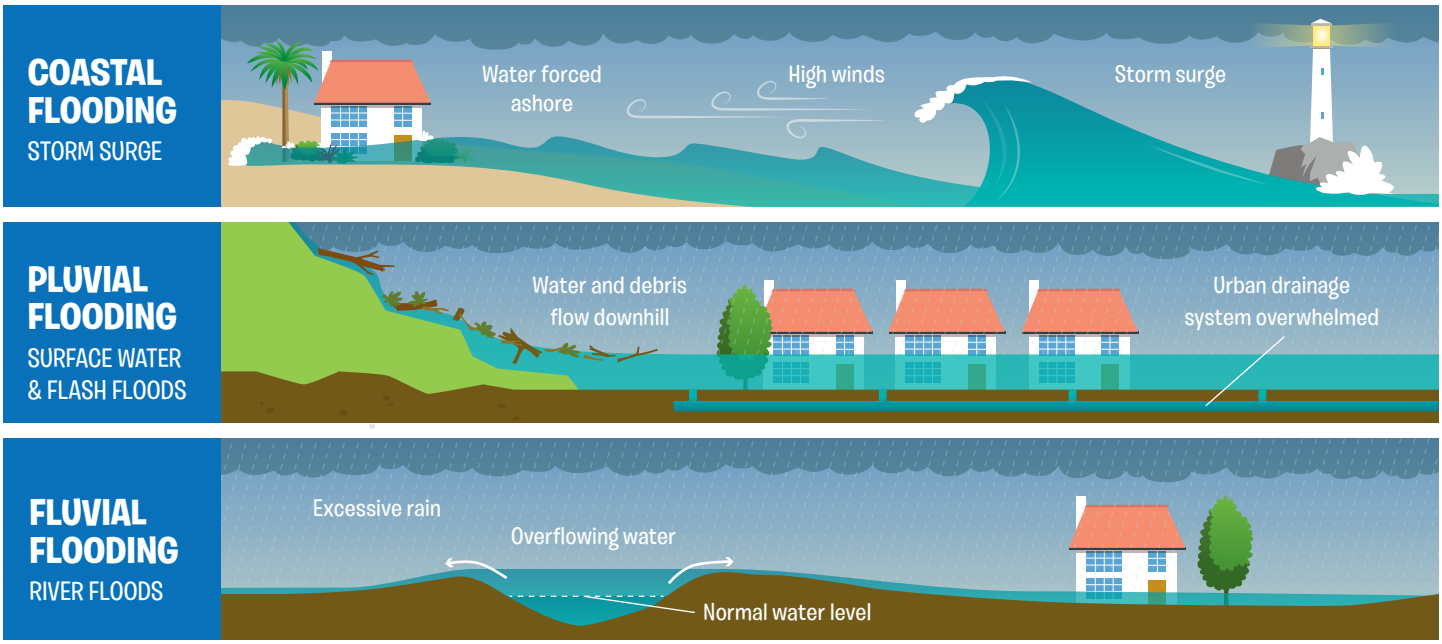
Did you know that, according to the World Economic Forum, a whopping **seventy-eight percent** of all wildlife can be found in water? And yet, at the moment, only eight percent of the world's oceans are protected. UN experts agree that this needs to drastically improve in order to guarantee healthy ecosystems across the planet. Part of the river ecosystems are **food chains**. These are linear systems of links representing the order in which organisms are consumed. Although food chain lengths can vary, aquatic ecosystems begin with primary producers (plant life), which are consumed by primary consumers, which are then consumed by secondary consumers, which can, in turn, be consumed by tertiary consumers, and so on until the top of the food chain is reached. Here is an example of a river food chain:



What do you think would happen if any one of these links was affected by river pollution? What would happen, for example, if the snail populati on was greatly reduced? Perhaps the plants would become overgrown – what damage might this cause? What would happen to the fish population? Use the 'River Residents' activity sheet to explore the river ecosystems and discover more about their importance.

TASK 4: FRIGHTFUL FLOODING

Back on Tragic Island, me and the folk at Storm Geomatics have spotted another sizeable sea-based catastrophe on the way! Can you see what's coming in A,5? It's a tsunami wave – just one of the many causes of coastal flooding, where dry and low-lying land is submerged by seawater. There are two other main types of flooding: pluvial flooding and fluvial flooding:



Can you use the 'Frightful Flooding' activity sheet to add the water to the three explanatory diagrams, showing the causes and the movement of the water in these different flood situations?

Then, can you explore the causes in more detail – and find out if any of them are manmade – and maybe avoidable!

TASK 5: RIVER RISKS

(GEOGRAPHY OBJECTIVES – GEOGRAPHICAL AND LOCATIONAL KNOWLEDGE / LITERACY OBJECTIVES – FIND AND PRESENT NON-FICTION INFORMATION)

While the dudes at Storm Geomatics work to reduce the chances of floods occurring, you've seen that waterways can be dangerous places. There are plenty of different river hazards besides flooding and pollution, including dangerous deep water, powerful undercurrents, the effects of cold water shock, weirs that can trap swimmers, and many more. For your final task, can you create a leaflet explaining these hazards, and giving your top tips to stay safe around rivers? Share your work with an adult's help and permission on Twitter (@GetKidsintSurv), and together we can spread the message of river safety!

TASK 1:

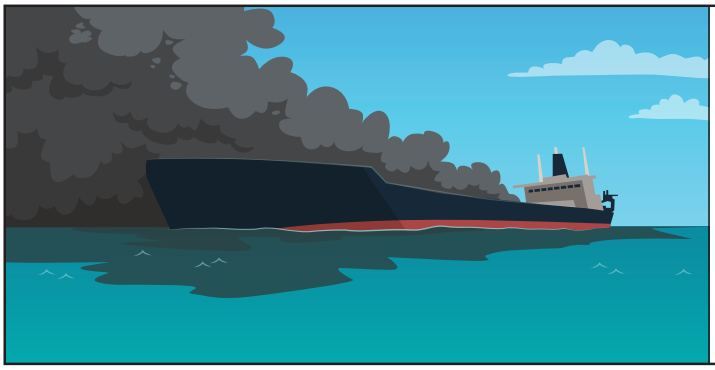
POLLUTION PROBLEMS

COMPLETE THIS ***WARMUP QUIZ*** TO HELP YOU TO UNDERSTAND THE IMPACT OF SOME OF THE WORST OIL SPILL DISASTERS IN HISTORY.

The Deepwater Horizon oil spill - the largest accidental oil spill in history - began in the Gulf of Mexico on April 20th, 2010.

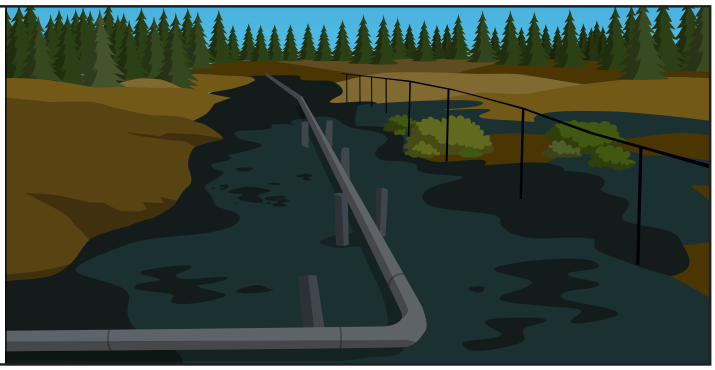
How many gallons of oil were released?

Between June 1979 and March 1980, **Mexico's Ixtoc 1** accident released up to 140 million gallons of crude oil into which bay?



The collision between **which two ships** during a tropical storm on **July 19th, 1979**, created the largest tanker spill on record?

What fault was the cause of the oil spill in the **Russian Arctic** that spilled over 84 million gallons of oil into the **Kolva River**?

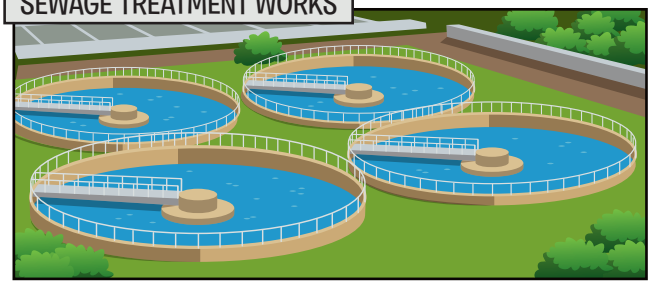


TASK 2:

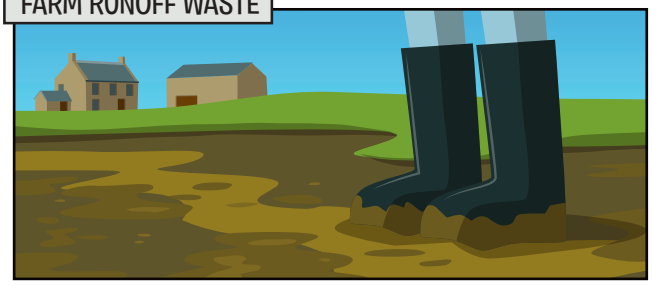
RUINED RIVERS

YOUR CHALLENGE IS TO MATCH POTENTIAL WASTE SOURCES TO THE TYPE OF POLLUTION THEY CAN CAUSE. YOU CAN THEN SUGGEST A WAY THAT EACH TYPE OF POLLUTION COULD BE REDUCED. FOR EXAMPLE, THE BANNING OF MICROBEADS IN COSMETIC PRODUCTS!

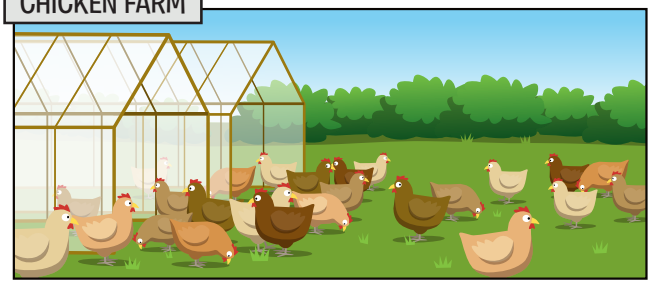
SEWAGE TREATMENT WORKS



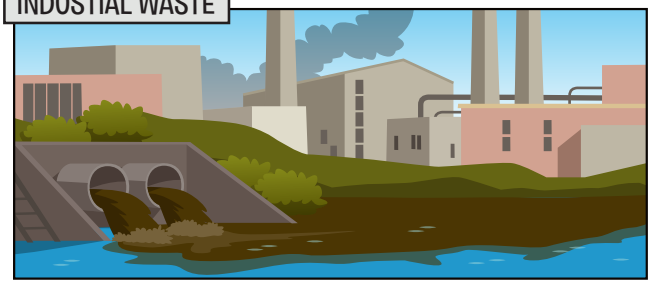
FARM RUNOFF WASTE



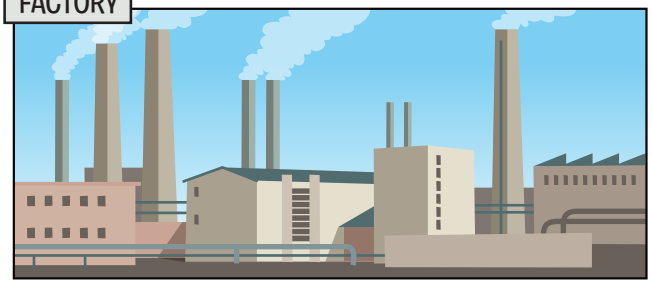
CHICKEN FARM



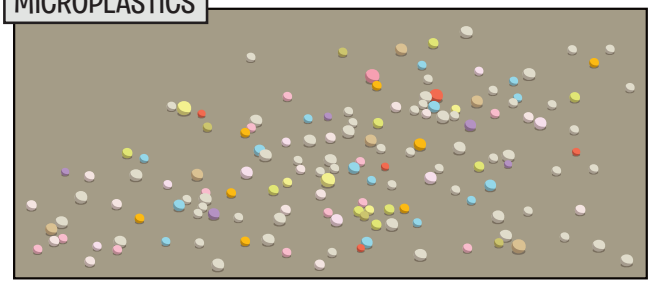
INDUSTIAL WASTE



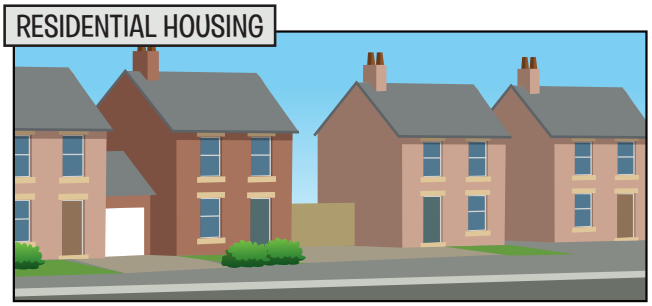
FACTORY



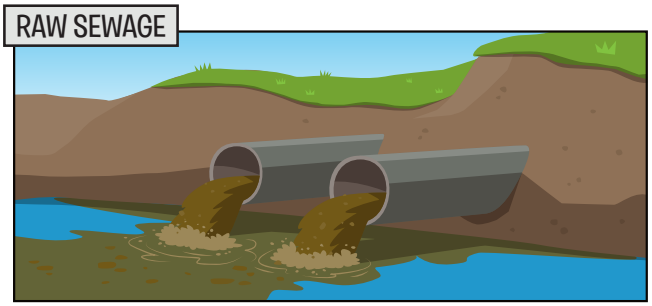
MICROPLASTICS



RESIDENTIAL HOUSING



RAW SEWAGE



Your solutions:

TASK 3:

RIVER RESIDENTS

USE THIS SHEET TO EXPLORE RIVER ECOSYSTEMS AND DISCOVER MORE ABOUT THEIR IMPORTANCE.

Here is an example of a three-step river food chain:

PLANTS (PRIMARY PRODUCER) **SNAIL** PRIMARY CONSUMER **FISH** (SECONDARY CONSUMER)

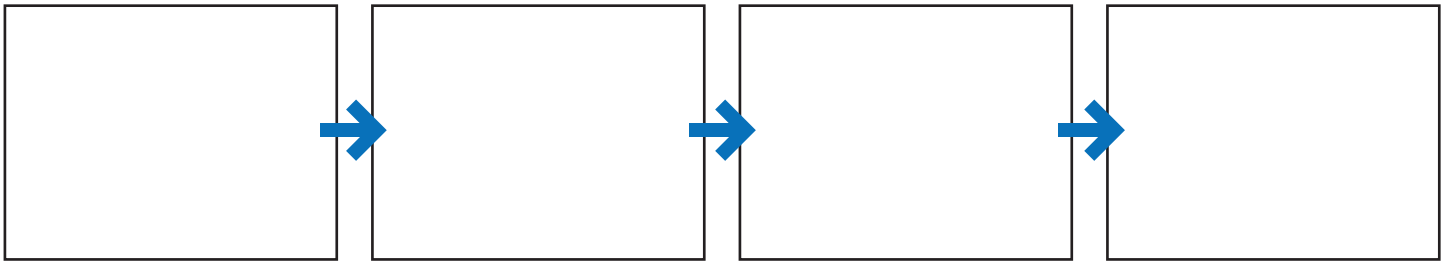
What do you think would happen if river pollution affected...

The plants? _____

The snails? _____

The fish? _____

Create your own four-step river food chain below:



(PRIMARY PRODUCER) (SECONDARY CONSUMER) (PRIMARY CONSUMER) (TERTIARY CONSUMER)

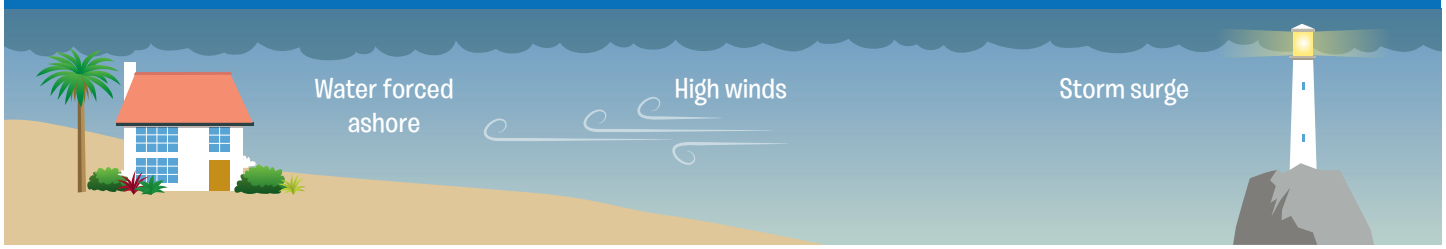
What would happen if river pollution affected any of these links?

TASK 4:

FRIGHTFUL FLOODING

USE THIS ACTIVITY SHEET TO ADD THE WATER TO THE THREE EXPLANATORY DIAGRAMS, SHOWING THE CAUSES AND THE MOVEMENT OF THE WATER IN THESE DIFFERENT FLOOD SITUATIONS. THEN, EXPLORE THE CAUSES IN MORE DETAIL -- AND FIND OUT IF ANY OF THEM ARE MANMADE!

COASTAL FLOODING (STORM SURGE)



CAUSES: _____

_____

_____

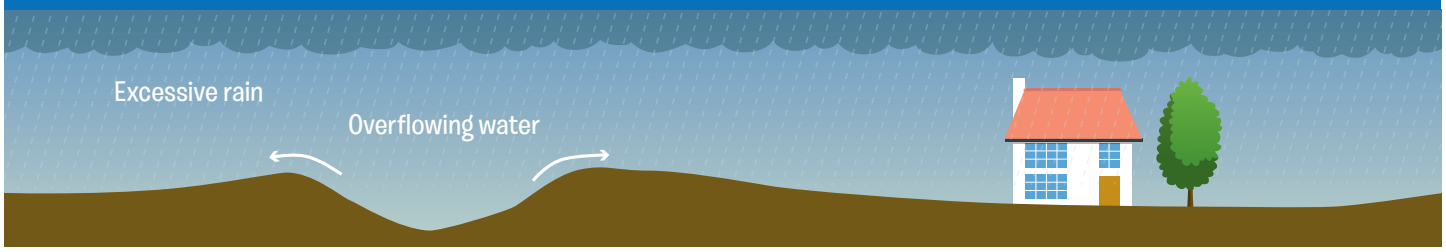
PLUVIAL FLOODING (SURFACE WATER & FLASH FLOODS)

CAUSES: _____

_____

_____

FLUVIAL FLOODING (RIVER FLOODS)



CAUSES: _____

_____

_____