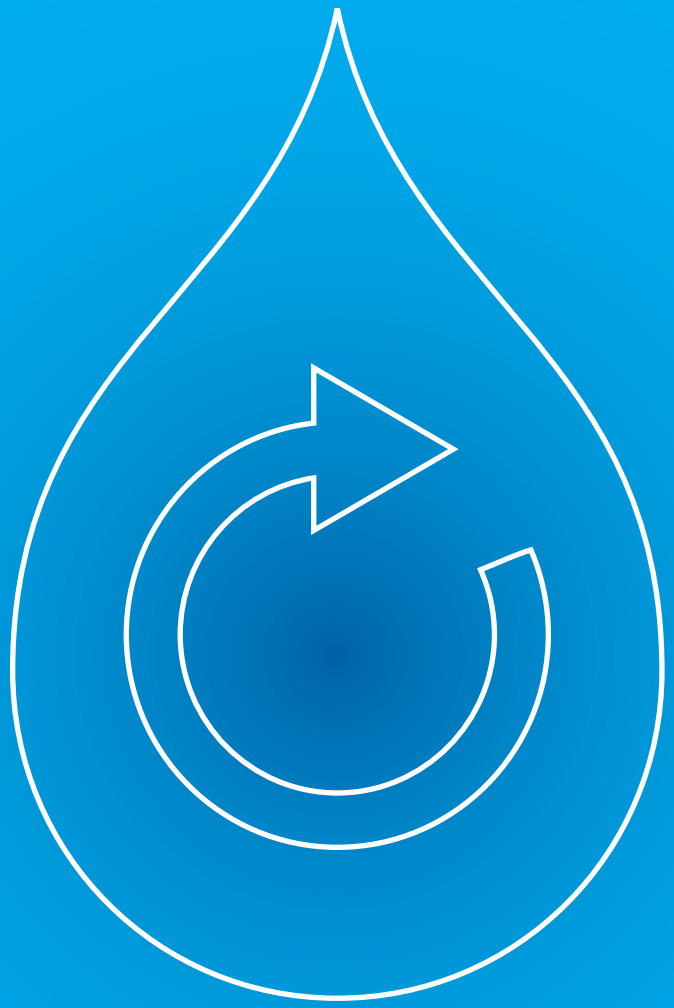
An Taisce
The National Trust for Ireland

Green-Schools
An Taisce

Green-Schools Programme

Information for secondary schools

Water



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WATER

Welcome

This booklet is designed to be an interactive resource that teachers and students can use to explore important issues relating to water. The accompanying lesson plans will engage students in a practical way and walk you through the various topics.

Green-Schools

Green-Schools, known internationally as Eco-Schools, is a whole school, long-term, action based programme and award scheme operated in Ireland by An Taisce. Schools who successfully implement the 7 steps of the programme are awarded a Green Flag. The themes of the programme are: Litter and Waste, Energy, Water, Travel, Biodiversity and Global Citizenship. Green-Schools is a programme of FEE (The Foundation for Environmental Education).

Irish Water

Irish Water is Ireland's new national water utility that is responsible for providing and developing water services throughout Ireland. Irish Water is delighted to be working with Green-Schools on this very worthwhile initiative, helping to educate young people in schools throughout Ireland about water conservation. Together we can improve and secure this precious resource that will be vital to the social and economic life of this nation far into the future.

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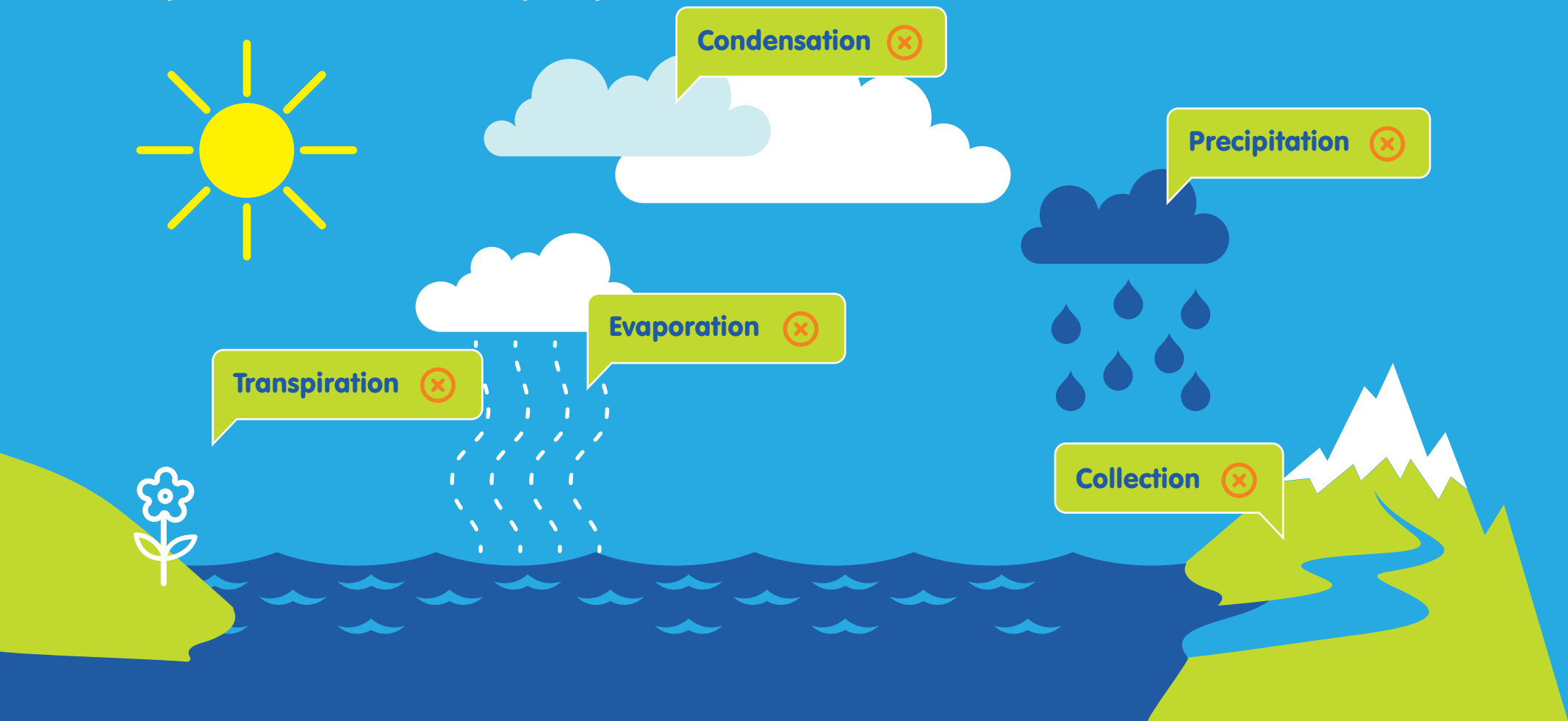
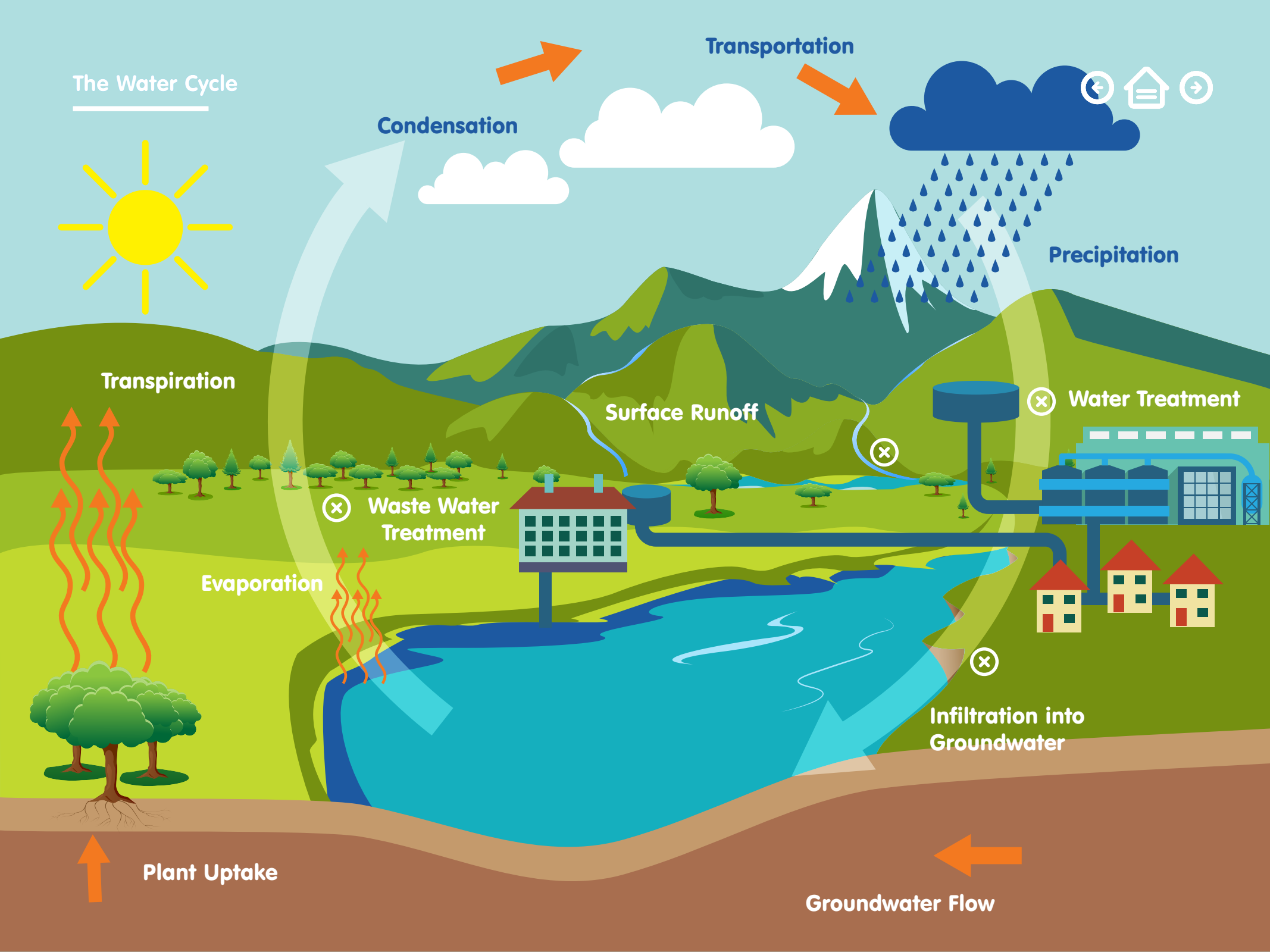
Hover over this symbol to reveal a text box. To hide it, click outside the text box.

Contents

1. The Water Cycle

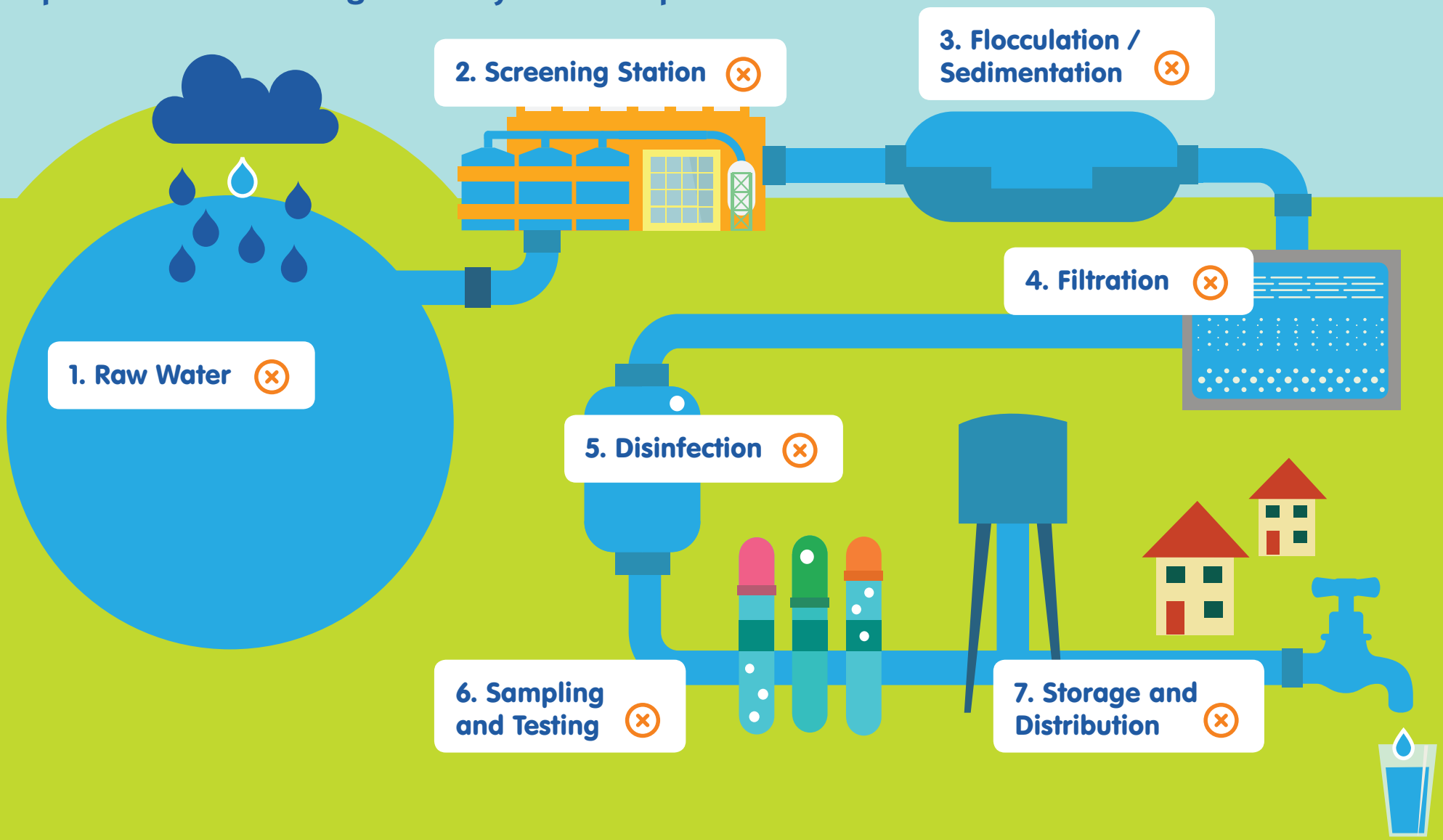
The earth's water is always moving on, above, and below the surface of the earth. For example, a river flowing into an ocean. The amount of water on earth has remained more or less the same over time and it is continuously going through various processes that can change it into a liquid, gas or solid. These processes are known as evaporation, transpiration, condensation, precipitation, and collection.




The Water Cycle
Transportation
Condensation
Precipitation
Transpiration
Surface Runoff
Water Treatment
Waste Water Treatment
Evaporation
Infiltration into Groundwater
Plant Uptake
Groundwater Flow

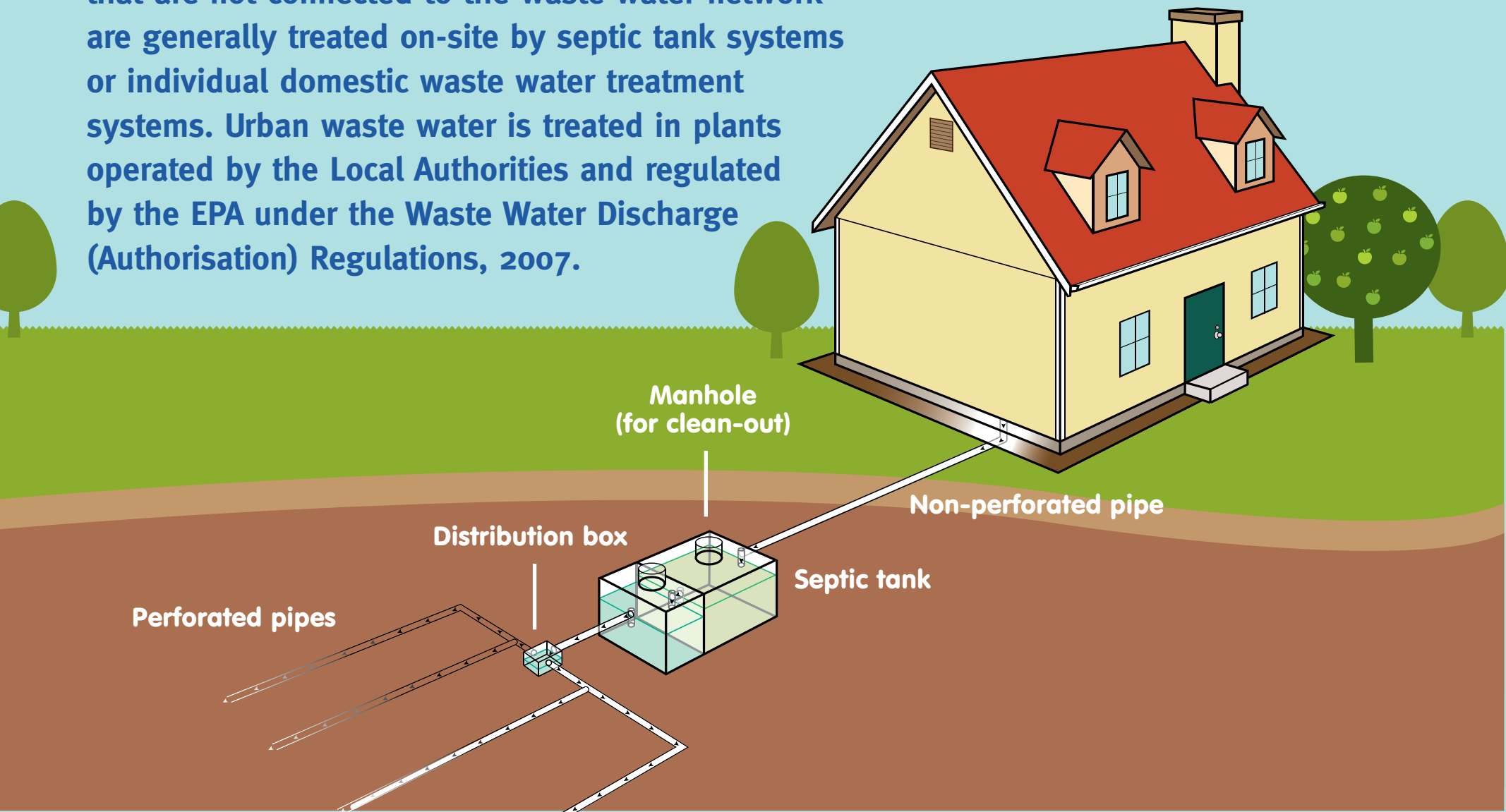
Water Treatment

When a drop of water enters a river it can end up in a treatment plant where it undergoes many different processes:

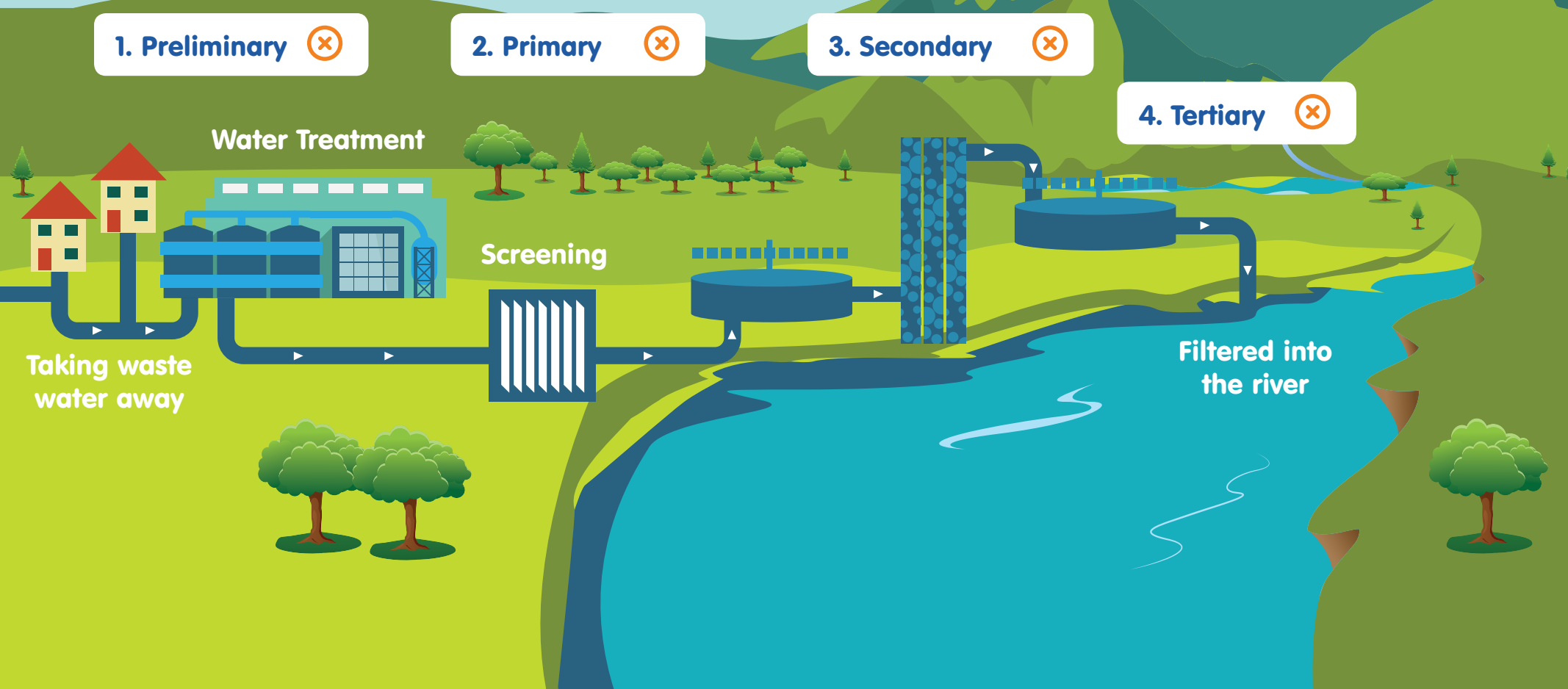


Waste water treatment

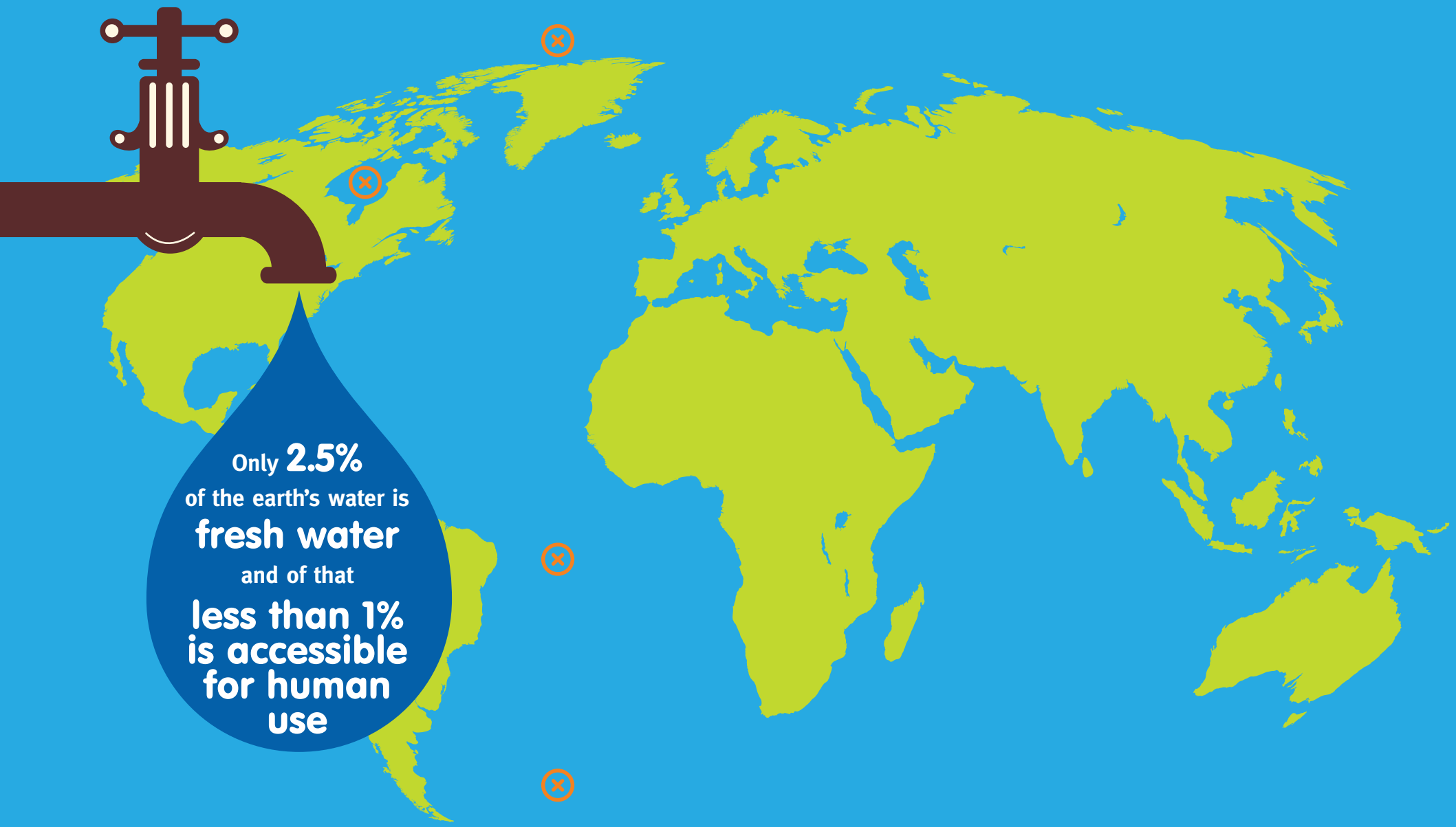
Waste water from single houses in the countryside that are not connected to the waste water network are generally treated on-site by septic tank systems or individual domestic waste water treatment systems. Urban waste water is treated in plants operated by the Local Authorities and regulated by the EPA under the Waste Water Discharge (Authorisation) Regulations, 2007.



Sewage is the term used to describe waste water which is produced by domestic, industrial and commercial sources and discharged into the waste water network (i.e. sewers). Sewage is generally treated in a series of stages called preliminary, primary, secondary and tertiary treatment and these stages involve physical, chemical and biological processes.



2. Water Conservation



‘Water Conservation’ means protecting and managing this limited fresh water supply and protecting the aquatic environment.

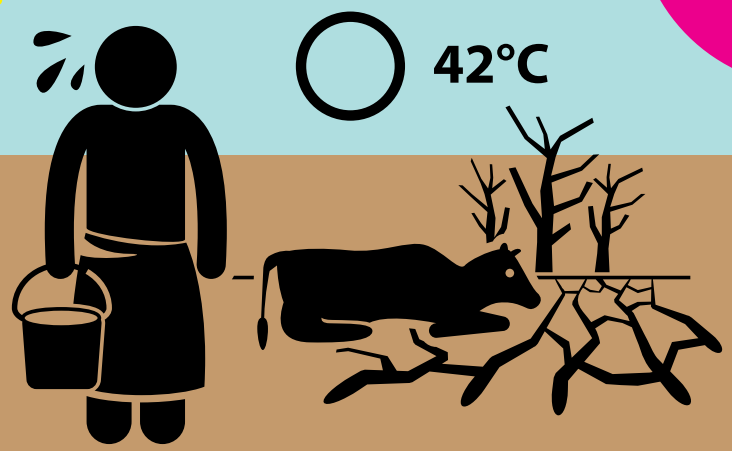
The reason for this is to make sure we have enough clean water for current and future generations. Water is an extremely important resource; it influences weather, it shapes the landscape and it supports all life.

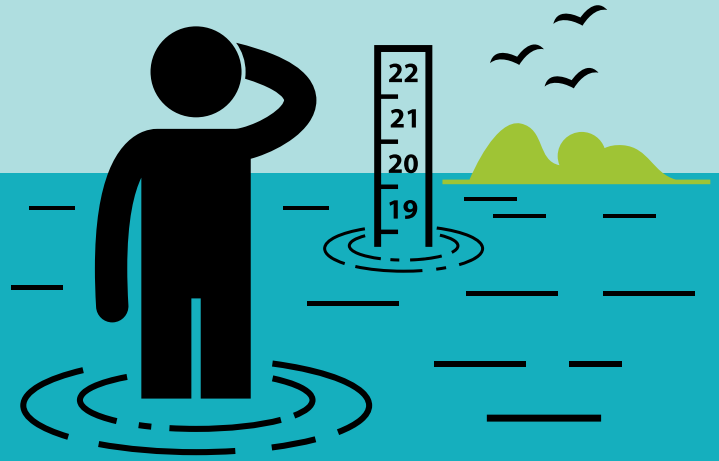
How is water used?

Water is also used in industry (e.g. for food processing, running machinery, refrigerating foods), **transport** (e.g. for running boats, trains, cars and buses), **public health** (e.g. for firefighting, running hospitals, producing medicine), **agriculture** (e.g. for crops and livestock) and in the **production of energy**.

There are huge pressures on our water resources as it is used in almost every part of daily life and, as the earth's population grows, so too will the demand. Climate change is another major issue that affects our water resources.

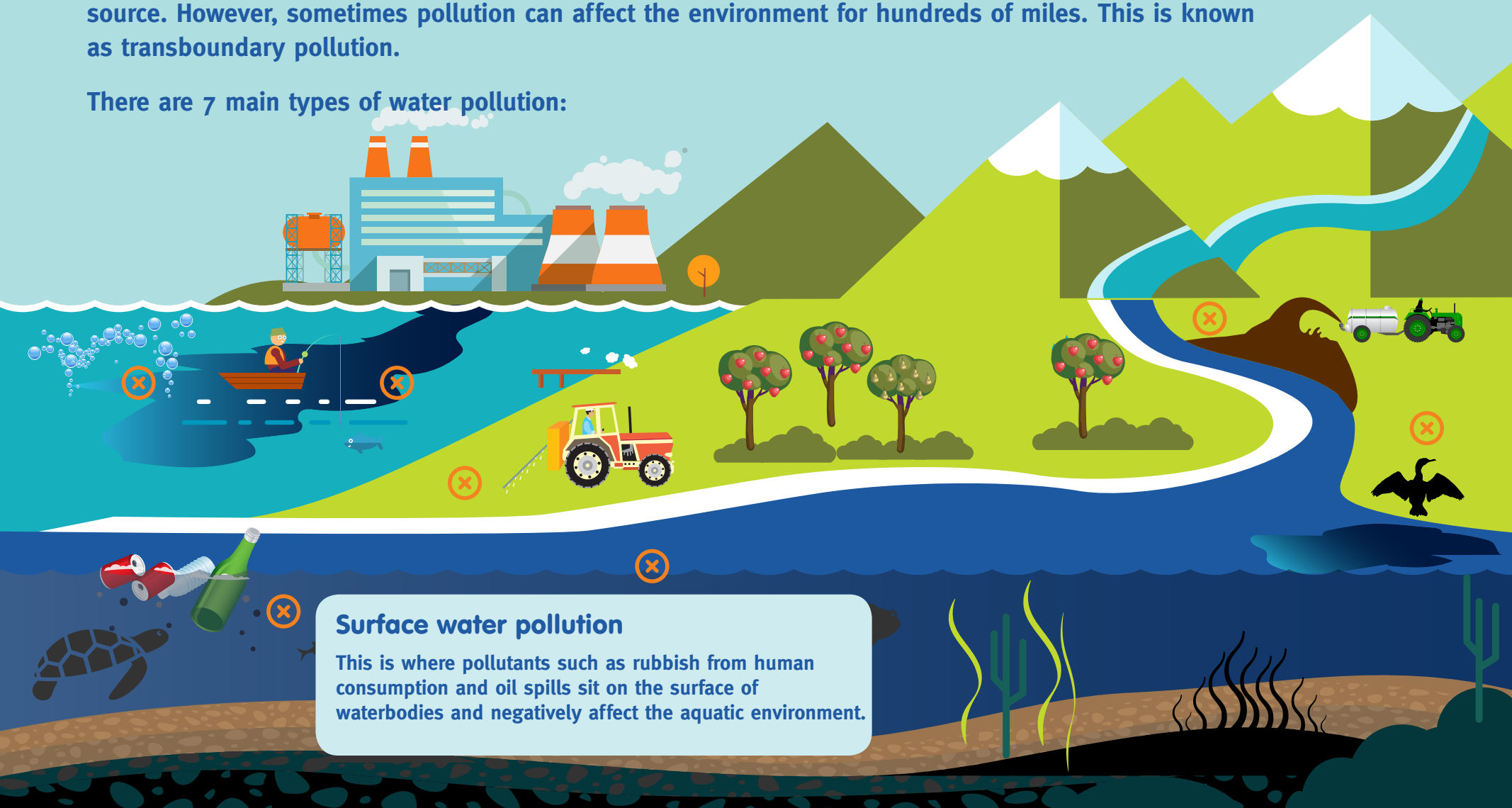
Can you think of other examples?





Pollution due to human activities is also a major threat to our water resources. Water pollution is the contamination of waterbodies e.g. rivers, lakes, groundwater and oceans by untreated substances, chemicals and particles. Pollution can be point source (pollution from one source) or nonpoint source (pollution from many sources) and predominantly affects the immediate area surrounding the pollution source. However, sometimes pollution can affect the environment for hundreds of miles. This is known as transboundary pollution.

There are 7 main types of water pollution:



Surface water pollution

This is where pollutants such as rubbish from human consumption and oil spills sit on the surface of waterbodies and negatively affect the aquatic environment.

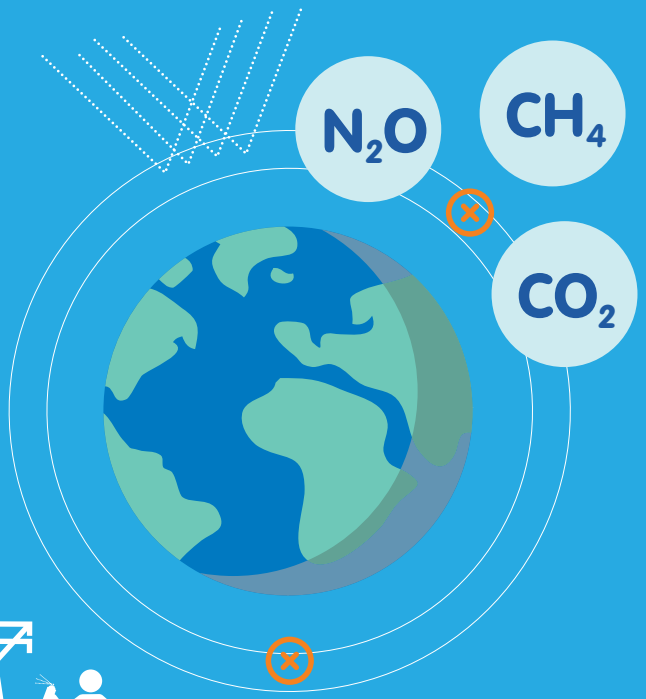
Water Conservation

As water is used by everybody on the earth it is important that everyone plays a part in conserving it, from individuals to homeowners to schools, businesses, industries and national governments.

Some of the things you can do to protect our water:

3. Climate Change

Climate change is now widely acknowledged as the biggest challenge facing our global environment and the human species today. It can be defined as a change in global and regional weather patterns over time.



Cause

The earth's climate has been changing consistently and very slowly over its 4.5 billion-year history. The changes were due to natural processes such as plate tectonics, volcanic activity, and interactions between land, oceans and the atmosphere, as well as variations in sunlight. However, the most recent changes in climate have been as a result of human activity.

Climate Change Impacts

The earth's climate is getting warmer, and the signs are everywhere. As global temperatures continue to rise, we'll see more changes in our climate and our environment.

Climate Change

Students from all over the world are taking action to slow down the impacts of climate change. When you add together all the actions taken by students from every corner of the globe it makes a big positive difference to our planet.

Saving water saves energy, which in turn reduces greenhouse gas emissions. It takes a lot of energy to treat the water you use every day to make it safe to drink and to deliver it to your house. It takes even more energy to turn it into hot water.

What you can do:

Calculate your usage

Calculate your water usage to see how much you use.

Water audit

Conduct a manual water audit to find out the ways you use water.

Look for and fix leaks

You can look for drips and leaks in taps, toilets and radiators. You can put food colouring in the toilet cistern, give it some time and see if it shows up in the bowl. If it appears in the bowl without flushing, you have a leak!

Fix any leaks you find, as a dripping tap can waste over 4 litres of water per day.

Be water wise

Turn the water off while brushing your teeth, try taking shorter showers, use dual flush toilets correctly, turn off urinals at night and on weekends, use watering cans instead of sprinklers for the garden and a bucket of water instead of a hose to clean your car.

Go low–flow

Install water–efficient appliances and plumbing fixtures like dual flush toilets, hippo bags and low-flow showerheads. Every time you flush the toilet you use 6 litres of water, but with a dual flush or a hippo bag, a flush can be 3 litres!

The Green-Schools Programme

You can make a difference by getting involved in the Green-Schools programme in your school.

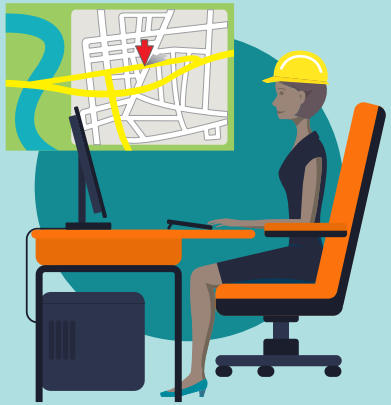
With 7 steps to follow there is an action for everyone!

For further information go to:
www.greenschoolsireland.org

4. Water People

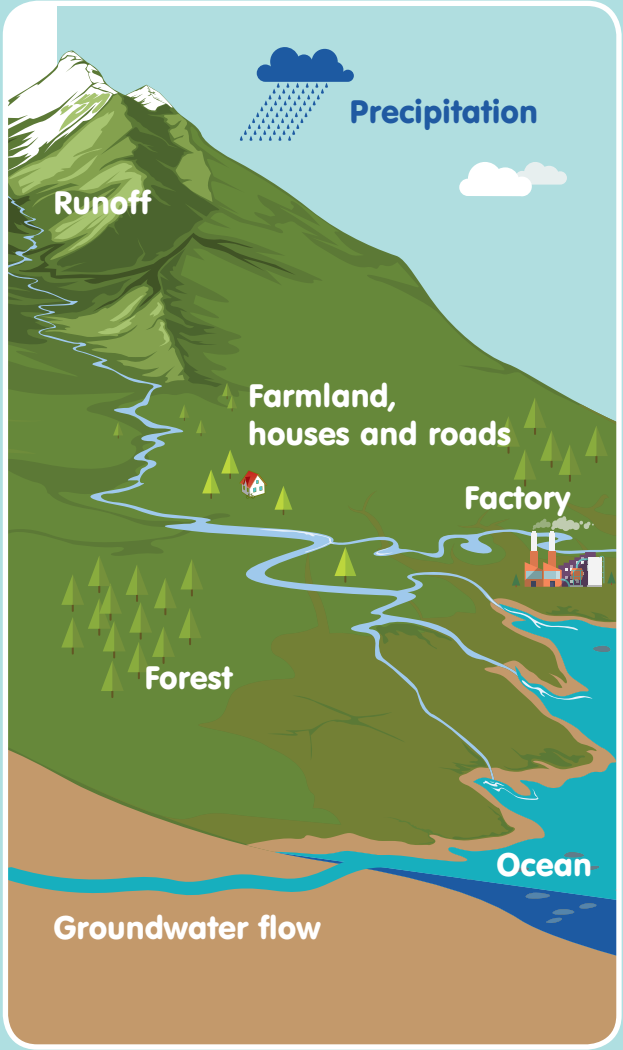
A lot of people are involved in water processes. The general areas of employment include engineering; organisational services; communications, policy and education; laboratory and science; operations, maintenance, trades, and environmental.

Can you guess what I am doing?



What is a Watershed?

A watershed is an area of land where all of the water that is under it, or drains off of it, collects into the same place (e.g. a river).



Water People

5. Lesson Plans

Summary of Lesson Plans

Lesson plans on all sections of the water resource can be found on the Green-Schools website: www.greenschoolsireland.org/resources/water.215.html

Our animated videos on the Green-Schools 7 Steps in Action and Our Water from Cloud to Glass can also be found on the above link

Lesson Plan 1: The Water Cycle

Learn about the water cycle through discussion, drawing and carrying out condensation and evaporation experiments.

Lesson Plan 2: Water Conservation

Learn, through discussion and observation, about the importance of water, the many different ways we use it, how it can be wasted and the measures we can take to save it.

Lesson Plan 3: Climate Change

Learn about climate change, the causes, its impact on our environment and what you can do to help stop it, through discussion, experimentation and investigation.

Lesson Plan 4: Water People

Learn about those who are involved in providing our water and observe, discuss and investigate where water comes from and its movement.