

Today's lesson is on the types of plastic. The students will learn about the 7 main types of plastic, and common items that they are made of.

We will then learn about microplastics, the different types and how they are made.

OVERVIEW

PLASTIC VARIES, DEPENDING ON
WHAT IT IS USED FOR

SOME IS FLEXIBLE, SOME IS RIGID

Plastic can vary in texture and flexibility, depending on what it is used for.

Some plastic is rigid, this includes things like chairs, tables, car parts, storage boxes, etc.

Some plastic is flexible, this includes things like fibres used in clothing, laminated sheets, plastic shopping bags.

The students can be asked to name any rigid or flexible plastics that they see in the classroom

TYPES OF PLASTIC

RESIN IDENTIFICATION CODE (RIC) SYSTEM



Not all plastic is created equal; it comes in various shapes, colors, and types, each serving different purposes.

Some plastics are reusable, while others are not due to their chemical composition. Likewise, some can be recycled, while others require alternative disposal methods.

In 1988, the Resin Identification Code (RIC) system was introduced by the Society of the Plastics Industry, categorising plastic resins into seven groups. The objective was to establish a consistent national system that promotes post-consumer plastic recycling. Over time, with minor adjustments, the RIC has become the globally recognised standard for classifying plastics.

HOW DO WE TELL THEM APART?

- PLASTIC IS OFTEN MARKED WITH THE SYMBOL OF WHICH TYPE IT IS
- LIDS ARE OFTEN MARKED ON THE INSIDE
- THE TYPE OF PLASTIC MATTERS WHEN IT COMES TO RECYCLING



Plastic items often have a symbol imprinted on them, which helps identify which type of plastic it is.

This is really important when it comes to recycling, as certain types of plastic cannot be mixed in the process. One of the reasons they cannot be mixed is because they have different melting temperatures.

Here, we can show examples to the class, and get them to pass them around.

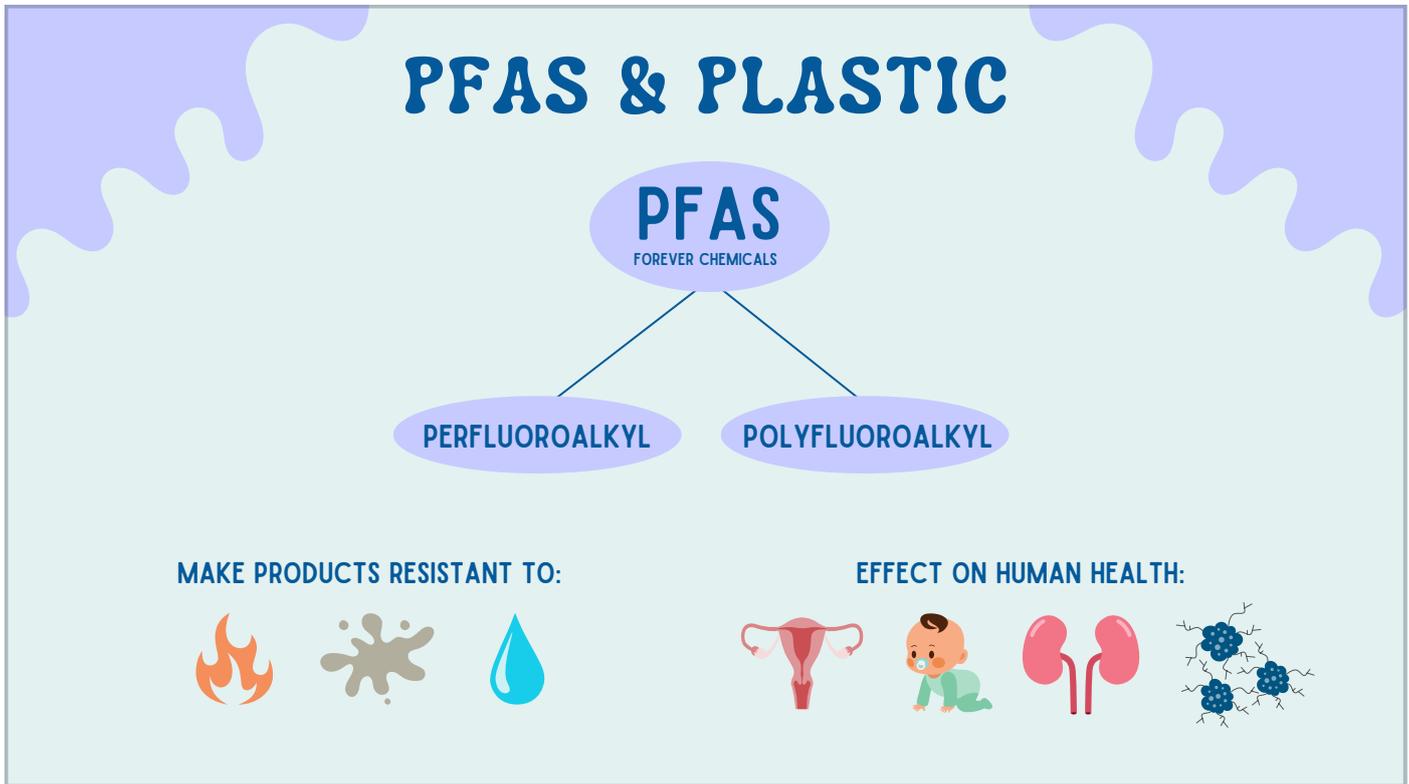
DISCUSSION POINTS

**WHAT TYPE OF PLASTIC ARE YOUR
ITEMS MADE FROM?**

IS THERE PLASTIC IN YOUR CLOTHING?

Students can be asked to look at their own items of plastic, and see if they can spot the symbol

Look on the inner label of clothing to see if they are made of plastic



PFAS (Perfluoroalkyl and Polyfluoroalkyl) compounds are man-made chemicals that are often added to plastics to make products resistant to heat, stains, grease and water.

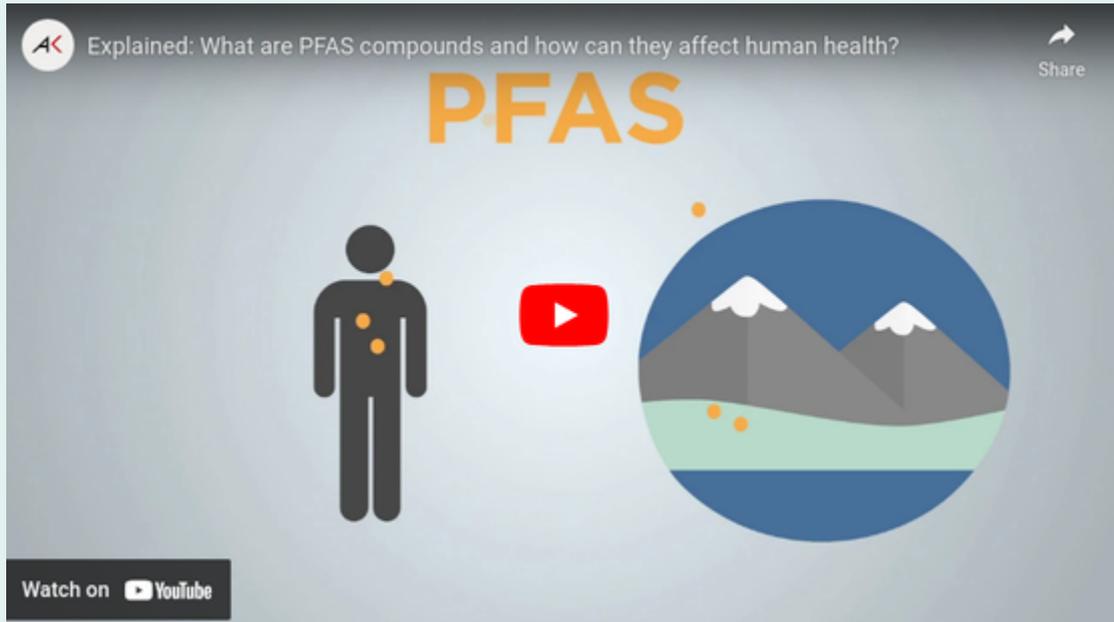
PFAS are known as "forever chemicals", as they do not break down in the environment or in human bodies.

PFAS exposure can have a negative impact on human health. Some research has shown that it has potential to effect women's reproductive health, cause developmental delays in infants and children, reduce kidney function and increase risk of cancer.

When plastic containing PFAS breaks down, these chemicals are released.

We will revisit this concept in later in the series.

PFAS



This video can be played to provide another style of learning for the students. Audio will be required, although there are audio cues. The video goes for 2 minutes.

<https://www.youtube.com/watch?v=JKg7Mr9M3CQ>

WHAT ARE MICROPLASTICS?

In the next part of this lesson students are going to learn about microplastics.

Begin by asking the students if they know what microplastics are?

Ask them if they can think of any types of microplastic?

DEFINITION OF MICROPLASTIC

PLASTIC LESS THAN 5_{MM}

Microplastics are tiny pieces of plastic that are less than 5mm in size. The upper size category of microplastics can be seen with a naked eye, while the lower size category likely requires a microscope.

There are some difference in the scientific world as to the smallest size a microplastic can get before it is termed a 'nano plastic'. But the general consensus is that this is 1 micron in size. Which is 1/1000 of a millimetre. Tiny!

TYPES OF MICROPLASTIC

PRIMARY MICROPLASTIC

PLASTIC PIECES THAT WHEN PRODUCED ARE <5MM



SECONDARY MICROPLASTIC

PLASTIC PIECES THAT BREAKDOWN INTO MICROPLASTICS



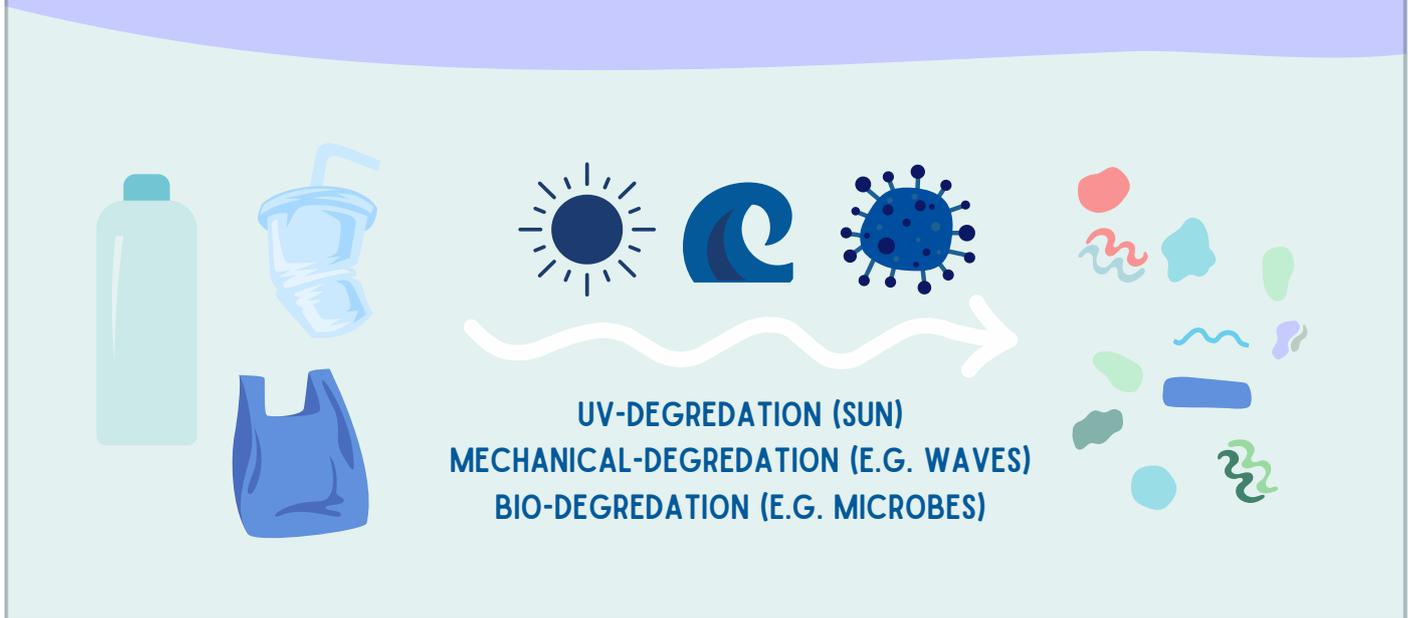
Microplastics are classically broken up in to two main types. This is primary microplastics and secondary microplastics. The two groupings are typically a reflection of how the microplastics are created.

Primary microplastics are manufactured to be that size. They are produced as microplastics. This includes things like beads, glitter, microbeads in cosmetics and nurdles.

Nurdles are the building blocks for most plastic items. Nurdles are melted down and made into many plastic items, from clothes to cars, food wrappers to artificial Christmas trees. It takes around 600 nurdles to make one plastic drink bottle.

Secondary microplastics are microplastics that used to be large pieces of plastic but have been broken down into smaller pieces. We will learn more about this process on the next slide.

MICROPLASTIC DEGRADING



When large bits of plastic enter the environment, they can break down (or degrade) in 3 main ways.

The first is through UV-degradation which is when sunlight hits the plastic and over time makes it more brittle, eventually breaking.

The second is through mechanical degradation, when a force such as a wave hits the plastic and eventually breaks down.

The third is through bio-degradation. During bio-degradation, microorganisms like bacteria and fungi feed on plastic materials, breaking them down into smaller parts.

Students could be asked to think about how these processes occur in the marine environment. Could all three be occurring at once? Will this change the speed at which the plastics are broken into microplastics?

All three of these degradation processes require time. Commonly, in the marine environment all three processes can occur at the same time.

TYPES OF MICROPLASTICS FOUND



Microplastic pieces can be categorised into 5 main types. Fragments, foam, filaments, film and pellets.

Students can be asked to think about what type of plastic may originally have made up the microplastic. Below, we have included examples of each, to help guide the student answers.

Fragments originate from the breakdown of larger hard plastic objects, like bottles or containers. These fragments can take various shapes and sizes, often with irregular edges. Fragments are hard pieces of plastic.

Foam are expanded plastic foam materials, like foam cups, packaging, and insulation. These particles are lightweight and will compress if squeezed.

Filaments are stands of synthetic materials, commonly polyester, nylon, and other textile-related plastics. These tiny threads shed from clothing, textiles, and fabrics during washing and wear.

Film originate from larger soft plastic materials, such as plastic bags and packaging. They are typically thin and flexible, resembling miniature sheets or films of plastic.

Pellets are small, bead-like plastic particles often used as raw materials in plastic production.

MICROPLASTIC IN THE ENVIRONMENT

MICROPLASTICS ARE EVERYWHERE, THEY HAVE BEEN FOUND IN THE MARIANA TRENCH,
ANTARCTICA, AND EVEN IN THE CLOUDS...



MICROPLASTIC ON THE BEACH IN
ARNHEM LAND, NORTHERN TERRITORY.
WANUWUY (CAPE ARNHEM) AND
DHAMBALIYA (BREMER ISLAND)

Microplastics have been now documented pretty much everywhere on the planet.

This includes in the deepest ocean trenches (the Mariana Trench is more than 11km deep), and the ice in Antarctica.

If students have learnt about the water cycle, here is a great place to tie in that evaporation means that microplastics can now also be found in the clouds.

On the right are some examples of microplastics found on beaches around NE Arnhem Land.

HOW MICROPLASTICS AFFECT YOUR HEALTH



This video can be played to provide another style of learning for the students. Audio will be required, although there are audio cues. The video goes for 2 minutes.

https://www.youtube.com/watch?v=aiEBEGKQp_I

PRACTICAL

**COMPLETE THE WORKSHEET ABOUT
TYPES OF PLASTIC**

Students can fill in the worksheet provided in the lesson pack