



This session will provide information to the students on the theory behind plastic recycling. We discuss the difference between biodegradable and compostable plastic, the circular economy and mechanical and chemical recycling.

SOLUTIONS FOR PLASTIC WASTE



This video can be played to provide another style of learning for the students. Audio will be required, however there are audio cues available. The video goes for 1 minute.

https://www.youtube.com/watch?v=aTcMPy6L88E&ab_channel=EllenMacArthurFoundation



The best way we can stop plastic pollution is by stopping using plastic.

We start here by providing some common alternatives that students may easily be able to swap into their lives.

Students could be asked if they are already using any of these alternatives? What kind of alternatives do they have? Were they easy to buy?

COMPOSTABLE ALTERNATIVES

BIODEGRADABLE

BREAKS DOWN
NATURALLY

MONTHS - YEARS

COMPOSTABLE

BREAKS DOWN INTO
NON-TOXIC &
NUTRIENT RICH

90-180 DAYS

Compostable vs. Biodegradable Plastic

Biodegradable Plastic: Breaks down naturally by microorganisms like bacteria and fungi into water, carbon dioxide, and biomass. Time to decompose varies from months to years.

Compostable Plastic: A type of biodegradable plastic that breaks down into non-toxic, nutrient-rich compost in a composting environment, typically within 90-180 days.

Key Difference:

All compostable plastics are biodegradable, but not all biodegradable plastics are compostable. Compostable plastics require specific conditions to break down and leave no harmful residues.

DISCUSSION

**CAN YOU THINK OF OTHER PLASTIC
ALTERNATIVES?**

**WHAT PLASTIC ALTERNATIVES ARE
YOU ALREADY USING?**

A group discussion can be had with students about plastic alternatives, and what is already been used?

CIRCULAR ECONOMY



This video can be played to provide another style of learning for the students. Audio will be required, however there are audio cues available. The video goes for 1 minute and 30 seconds.

https://www.youtube.com/watch?v=aqeulFxqT1Y&ab_channel=EllenMacArthurFoundation

CIRCULAR ECONOMY



In a circular economy, products and materials remain in use for as long as possible through processes such as maintenance, reuse, refurbishment, remanufacturing, recycling, and composting. When applied to plastics, the circular economy focuses on:

- Creating durable and recyclable products in the first place.
- Collecting used plastics to make new products, reducing waste.
- Closing the loop by keeping any plastic that is ever produced by recycling it.
- Reducing the amount of plastic waste and pollution.
- Overall, it's about keeping plastics in the system and reducing environmental impact.

RECYCLING PROCESSES - MECHANICAL

MECHANICAL = SAME POLYMER, NEW FORM



There are two main recycling methods. The first one is mechanical.

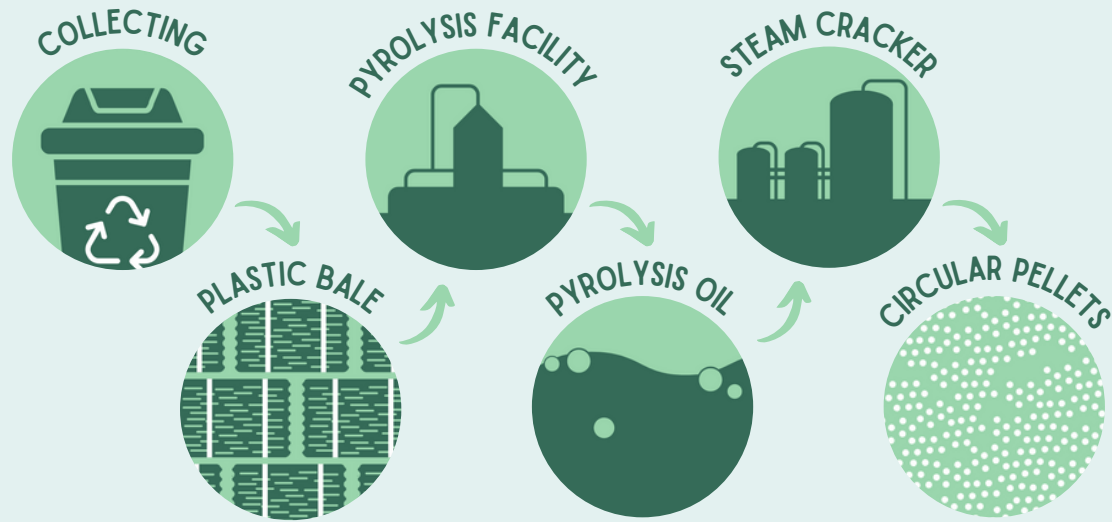
This process keeps the polymer, just reshapes into new plastic.

One of the limitations of this process is that it has limited life and can only be recycled so many times

In the Toys for Turtles lessons, we are doing mechanical recycling.

RECYCLING PROCESSES - CHEMICAL

CHEMICAL = CREATES VIRGIN POLYMER



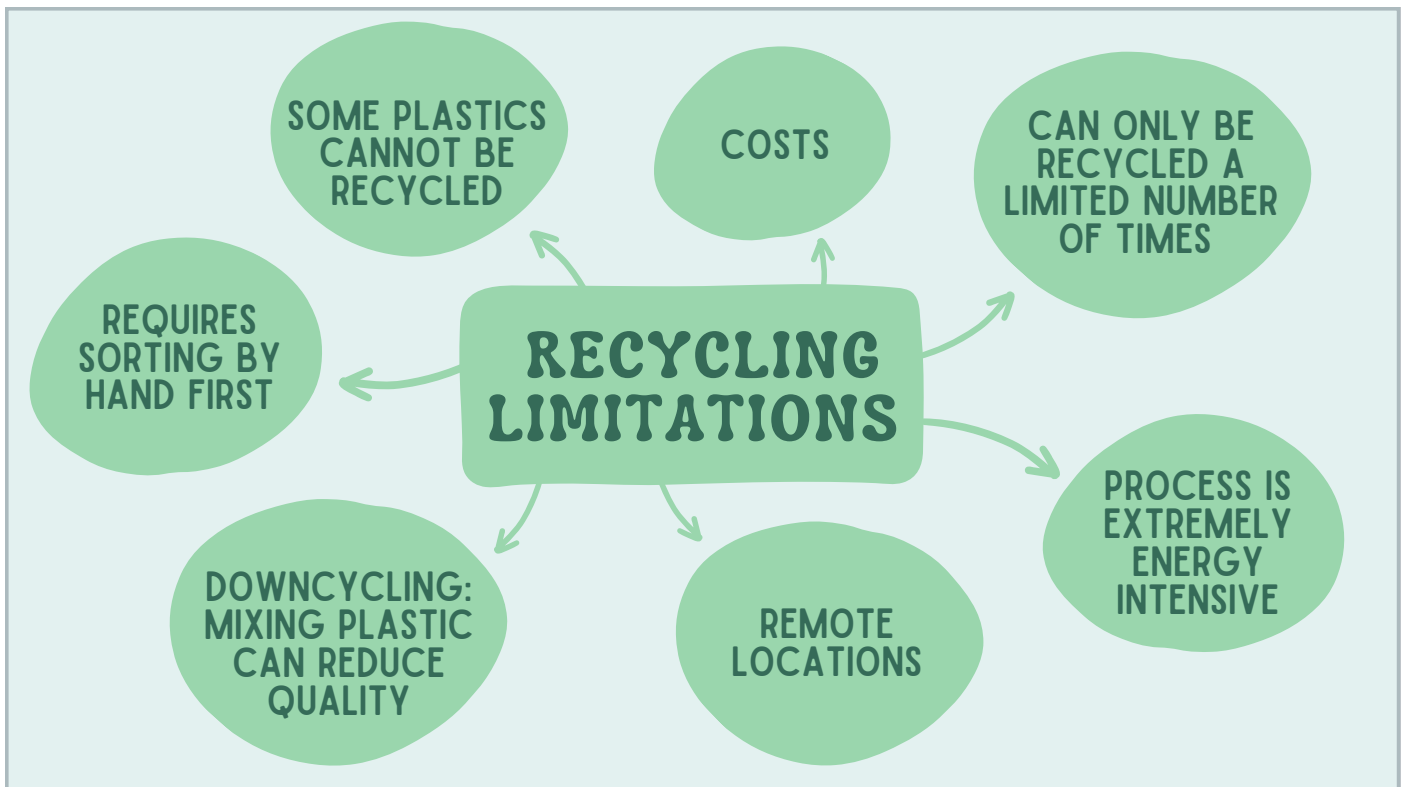
The second plastic recycling method is chemical, which can also be referred to as advanced recycling.

Chemical process separates material into monomers, and creates virgin plastic.

While mechanical recycling involves processing plastic waste into secondary raw materials or products without significantly altering the material's chemical structure, chemical recycling converts polymeric waste back into secondary raw materials or recycled feedstocks, reducing the need for virgin fossil resources.

Benefits:

- can recycle mixed materials
- gives raw/virgin material
- can be done over and over again, does not impact plastic quality



Like anything in life, there are limitations to recycling.

There are a few limitations listed here, but particularly relevant to Arnhem Land is the fact that you are in such a remote location. There is no recycling at certain times of year. We can do projects like collecting the bottle lids as we are for Toys for Turtles, but there is lots of other plastic that cannot be recycled.

Students could discuss some of the reasons why these limitations exist.



But... in many cases, the benefits of recycling plastic outweigh some of the limitations.

This includes reducing waste, giving plastic a new life, saving costs and helping the environment.

Students could be asked to think of ways to combat some of the limitations listed previously so that recycling can still occur.

IMPORTANCE OF WASTE DISPOSAL



HELPS TO KEEP THE
ENVIRONMENT
CLEAN

HELPS THE
COMMUNITY STAY
HEALTHY



There are lots of easy things to do that will help keep the environment clean too. One of these is waste disposal.

By putting our waste in the correct bins, we can keep the environment clean, and help keep the community healthy.

INNOVATIVE SOLUTIONS

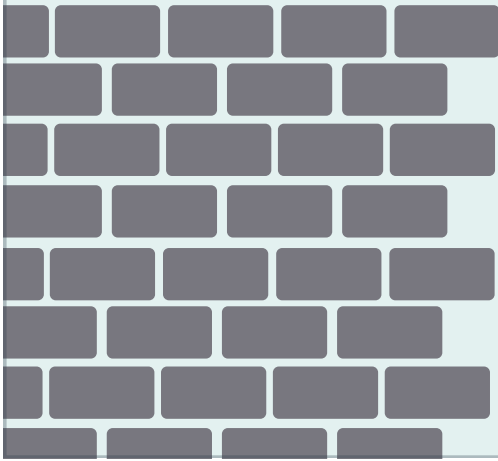


There are many innovative solutions that scientists and engineers are coming up with to help recycle.

All the items in this slide are able to be created with recycled plastics.

INNOVATIVE SOLUTIONS

BUILDING SUPPLIES: E.G.
BRICKS AND PAVERS



MAKING
FURNITURE



BUILDING ROADS

On a larger scale, plastic has been used in the furniture and building industry.

The exciting part is, that recycling technology is quickly advancing, so soon we will hopefully be able to provide recycled products for most things that we need plastic for!

DISCUSSION POINT

**WHAT ARE SOME ITEMS THAT YOU
COMMONLY RECYCLE?**

Students can discuss items that can commonly be recycled.

With recycling in Nhulunbuy only available at certain times of the year, what can we recycle and when can we recycle it?

DISCUSSION POINTS

HOW MUCH PLASTIC IS NEEDED FOR EACH ITEM?

WHAT COULD THESE MACHINES BE USED FOR ON A LARGER SCALE?

WHAT ARE THE LIMITATIONS OF THE MACHINES?

This slide provides some further questions that tie recycling in with the machines that we are using. This will lead into the next activity, which is a group activity where students can design a new recycling facility.

ACTIVITY

DESIGN A NEW RECYCLING FACILITY



Students can work in groups to design a recycling facility.

They should think about if they want it to be a mechanical or chemical recycling facility and what items they want to create. They should consider some of the limitations and benefits of recycling and how to make sure these are accounted for.

There is an activity sheet explaining in further detail included in the lesson pack.