Waste Management and Recycling

Waste management is how we handle all the rubbish that we create every day. It involves collecting waste, transporting it to the right places, treating it to make it less harmful, and sometimes even recycling it into something new.

Managing waste properly is important because if we don't, it can harm the environment.

Engineers design systems to manage waste and create recycling processes that help protect the environment.

The Sustainable Development Goals

The 17 Sustainable Development Goals (SDGs) were adopted by the United Nations in 2015 as a call to "end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity". Find out more here: https://www.undp.org/sustainable-development-goals.

Waste Management, Recycling and the SDGs

Effective waste management supports **SDG 12 (Responsible Consumption and Production)** by promoting recycling and reducing waste.

It also supports **SDG 13 (Climate Action)** by reducing greenhouse gas emissions from waste.

Engineers contribute to **SDG 9 (Industry, Innovation, and Infrastructure)** by developing new recycling technologies.

Types of waste

- **Organic:** Waste from plants and animals, like food scraps and garden clippings. This waste can often be composted to help grow new plants.

- **Recyclable:** Paper, glass, plastic, and metals can be recycled. Turning old items into new products saves resources and reduces the amount of rubbish we need to get rid of.

- **Non-Recyclable:** Certain types of plastics and packaging, which cannot be recycled easily and usually end up in landfills.

- **Hazardous:** Some waste, such as batteries, chemicals, and old electronics, can be dangerous. These need to be disposed of very carefully so they don't harm people or the environment.

The 3 Rs: Reduce, Reuse, Recycle

These three steps can be followed to reduce waste:

Reduce: Use fewer resources to generate less waste (the best way to manage waste is to create less of it in the first place).

Reuse: Find new ways to use items instead of throwing them away.

Recycle: Process materials so they can be used to make new products.

Image: cottonbro studio via Pexels.

Waste and the environment

If waste can't be reused or recycled, it can sometimes be burned to create energy. This must be done carefully to avoid pollution.

Another option is to bury waste in landfill sites. Landfills take up space, and sometimes harmful chemicals can leak into the ground and water. When waste rots in landfills, it creates methane gas, which traps heat in the atmosphere.

Not disposing of waste properly can cause issues for wildlife, such as:

- Animals can mistake rubbish for food or get tangled in it. For example, birds might eat plastic, making them sick, or sea turtles can get stuck in plastic rings.

Image: Ilie Barna from Pixabay.

- A lot of rubbish, especially plastic, ends up in the ocean. This plastic breaks into tiny pieces called microplastics, which harm fish and other sea animals, and can even end up in our food.

- **What else can you think of?**

Find out how Lucy Hughes is creating a plastic made from natural marine materials, so even if it isn't recycled properly and does end up in the sea, it won't harm the wildlife there: https://www.youtube.com/watch?v=Q_vhDAZnH0g

Minecraft Challenge

Use your engineering skills to design and build a **recycling centre** in Minecraft that processes different types of waste.

Think about how you can design sections for sorting, processing, and storing different types of materials like plastic, metal, and food waste.

Consider the layout of your recycling centre as well. How will you ensure it operates efficiently and sustainably?

Include features like **composting for food waste** and **smelting for metal recycling**.

- Add anything else you think of!

You could use:
- some of the engineering techniques we have covered
- your own ideas

If you do not have access to Minecraft you could:
- draw your design
- build your own using simple materials.