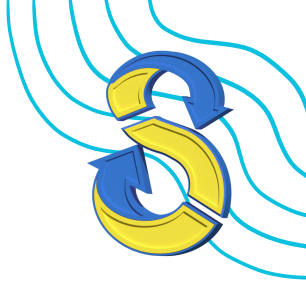


Experiments and Activities for Earth's Resources, Circular Economy, and Sustainable Materials



These are suggestions only and need
adult supervision and correct Health and
safety

**Comparing Natural vs.
Synthetic Materials**
**Experiment: How Fast Do Materials
Break Down?**



 **Materials:** Glass jars, water, natural cotton fabric, polyester fabric, biodegradable plastic, regular plastic, soil

Activity:

Fill jars with water and add a piece of cotton fabric, polyester, biodegradable plastic, and regular plastic.

**Observe changes over two weeks—
which materials break down?**

Chemical Change: Discuss hydrolysis and microplastic formation in synthetic materials.

 **Curriculum Links:** Natural vs. synthetic materials, biodegradability

Ocean Plastics & Sustainable Solutions

Experiment: Separating Microplastics from Water



Materials: Water sample
(with small plastic pieces), salt, sieve, magnet, oil



Activity:

Step 1: Mix salt into the water to increase density—some plastics float to the top.

Step 2: Use a sieve to filter larger particles.

Step 3: Drag a magnet through to test if microplastics have metal particles.

Step 4: Add a small amount of oil to bind microplastics and separate from water.

Chemical Change: How do plastics interact with different substances?

● Curriculum Links: Pollution, ocean plastics, material properties



Investigating the Impact of Landfills & Waste Breakdown

Experiment: Simulating a Mini Landfill



Materials: Two glass jars, soil, water, small organic materials (fruit peels, paper) and synthetic materials (plastic, metal foil)

Activity:

Fill both jars halfway with soil and place waste materials inside. One jar stays dry, the other has added water to mimic landfill conditions.

Leave for four weeks, checking for decomposition.

Chemical Change: Discuss anaerobic vs. aerobic decomposition (landfill methane production).

● Curriculum Links: Decomposition, landfill impact, chemistry of waste



**Investigating Biodegradable vs.
Non-Biodegradable Materials**
**Experiment: Acid vs. Alkali Breakdown of
Organic Materials**



 **Materials:** Vinegar (acid), baking soda solution (alkali), small pieces of paper, eggshell, polystyrene, and biodegradable plastic

 **Activity:**

Place materials in two containers—one with vinegar and one with baking soda solution.

Observe for fizzing, dissolving, or no change after 24 hours.

Chemical Reaction: Organic materials (paper, eggshell) should react with acid but not plastic.

Change Over Time: Discuss how landfill acidity affects waste decomposition.

● **Curriculum Links:** Material decomposition, chemical reactions, circular economy

Investigating Plaits (Plastic Recycling) & Circular Economy

Experiment: Melting & Reshaping Plastics

 **Materials:** LDPE plastic (e.g., bottle caps),
silicone mould, oven (with supervision), gloves



Activity:

**Heat LDPE plastic in a mould at low heat
(130°C/266°F) for 5 minutes.**

Observe how it melts and reforms into a new shape.

**Change Over Time: Repeat the process multiple times—how
does the plastic degrade?**

**Chemical Reaction: Explain how thermoplastics can be
reheated and reshaped, unlike thermosetting plastics.**

● **Curriculum Links: Recycling, plastic properties, material
reusability**



4. Exploring Bio-Plastics

Experiment: Making Bio-Plastic from Cornstarch



Materials: Cornstarch, vinegar, glycerin, water, saucepan, stirring rod



Activity:

Mix 1 tbsp cornstarch, 2 tbsp water, 1 tsp vinegar, 1/2 tsp glycerin in a saucepan.

Heat gently while stirring until it forms a thick gel.

Pour into a mould and leave to dry overnight.

Chemical Change: Compare its flexibility, strength, and decomposition vs. traditional plastic.

● Curriculum Links: Sustainable materials, bio-plastics, alternative to fossil-fuel plastics



5. Understanding the Life Cycle of Materials (Waste Reduction)

Experiment: Chemical Paper Recycling

 **Materials:** Shredded paper, hot water, blender, cornstarch glue, fine mesh screen

 **Activity:**

Blend shredded paper with hot water to form a pulp.

Add a small amount of cornstarch glue to bind fibres.

Spread onto a mesh screen and press out water.

Dry to make recycled paper.

**Change Over Time: Discuss how paper fibres weaken after multiple
recycles.**

 **Curriculum Links: Recycling, chemical properties of paper**

