Lesson 2: Bio-based plastics
making plastics from better sources

How can we make plastic from plants?

Plastic is traditionally made from oil from fossil fuel, a non-renewable resource. The extraction of oil contributes to habitat disruption, air and water pollution, and the release of greenhouse gases, intensifying climate change. The energy-intensive processes involved in plastic manufacturing lead to substantial carbon emissions. In this lesson, children learn about and make bio-based plastics as an alternative to traditional fossil fuel-based plastics.

Science concepts
The children will consider
- that the use of oil from fossil fuel, as the main ingredient of plastic, has an impact on the environment
- alternative ingredients with which plastic could be made

Science skills
- setting up tests (even though this is not a test, the children are using similar skills)
- observing and measuring

Key vocabulary
bio-based plastic, fossil fuel, oil

You will need
There are two alternative approaches to this activity. You could make a class batch of bio-based plastic, with an adult making the mixture on a hob or small groups could make their own bio-based plastics, using a microwave.

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Hob

To make one class batch of bio-based plastic, using a hob:

- 25 g potato starch*
- 75 ml water
- 30 ml white vinegar
- 15 ml glycerine
- a square of baking parchment (20 x 20cm)
- a small saucepan
- access to a hob
- wooden spoon
- Additional Printable: Bio-based plastic - instruction sheet for hob

*If you extract the starch from potatoes, you will need chopped potatoes (500g of potatoes provides 40–50g of starch), a blender, sieve and large plastic bowl)

Microwave

To make group batches of bio-based plastic, using a microwave, each group will need:

- a flat-bottomed container
- a plastic beaker or yoghurt pot
- a spoon or stirrer
- 2 tsp potato starch
- 30 ml warm water
- 2 tsp white vinegar
- 1 tsp glycerine
- Additional Printable: Bio-based plastic instruction sheet for microwave

Additional notes for the microwave method:

Only teachers should carry out the microwaving stage.

We used an 850 W microwave on the medium setting for 2 minutes 30 seconds. It is important that the cooking time is long enough for the mixture to become thick and gloopy but not so long that the mixture dries out completely. Teachers are advised to practice the process in the microwave they will use to establish the time needed.