



Activity 3 – Turning Potatoes into Plastic

Learn to make a simple kind of bioplastic from potato starch.

You will need:

- 2 Potatoes
- Water
- 5ml 100% vegetable liquid glycerin
- 5ml white vinegar (cider, pickling or wine)
- Food colouring
- Non-stick saucepan
- Measuring jug
- Silicone sheet or aluminium foil
- Beaker or bowl
- Spatula or wooden spoon
- Hob or camping stove
- Sharp knife
- Blender (stick or tabletop)
- Vegetable peeler
- Coffee filter and stand
- Measuring spoons



Time required: 2 hrs plus 2 days drying

Suitable for Age 10+

Safety Tips:

- Adult supervision will be needed when using a knife to cut the potatoes and to blend the potato cubes.
- Caution is advised when stirring hot liquids on the stove.



Instructions:

Extracting the starch from the potatoes

- 1) Wash and peel the potato. Cut the potato up into cubes about 1cm²
- 2) Add 250ml of water and the cubes of potato to the blender and turn it on high for a minute or two until smooth.
- 3) Strain off the cloudy water using a coffee filter or jelly bag.
- 4) If storing to make later, spread out on some greaseproof paper and leave to dry.

Making the resin

- 1) Measure out 60ml (4 tbsp) of cold water and pour it into the beaker.
- 2) Measure out 10g (or about 1 tbsp) of starch from the potato and add that to the water.
- 3) Add 5 ml (about 1tsp) of vinegar to the mixture. Mix well.
- 4) Add 5ml (about 1tsp) of glycerin to the mixture, more glycerin will make it softer and more flexible, less will make it harder and stiffer but more brittle. Mix well and put the mixture in the saucepan.

Watch our instructional video: <http://zone.recycledevon.org/videos/>

Instructions cont...

- 5) If you want coloured plastic, add about 5 drops of the food colouring now.
- 6) Turn the stove on low and heat the mixture in the saucepan while constantly stirring. When it starts to thicken up turn the heat up to medium and stir even more. When it starts to boil, keep boiling it for 5 minutes. It should be clear and sticky.
- 7) Pour the "goeey" substance into a mould, like a bowl or spread it onto a sheet of aluminium foil or a silicone sheet to dry.
- 8) Depending on humidity, it should take about 1 day to dry in a sunny place. You can dry it faster by putting it in an oven set to 90°C for 1-2 hours.

Useful Tips:

- ★ You can substitute cornflour for the potato starch if you want to reduce the time this activity takes. Use 10g of cornflour at Stage 2 of the resin process.
- ★ You will find glycerin in the cake making section of the supermarket or order it online for delivery.

DID YOU KNOW?

- Plastics based on petroleum products account for 5% of the global use of fossil fuels.
- Bioplastics can reduce CO₂ emissions by 30-80% compared to traditional plastics.
- 2.11 million tonnes of Bioplastics were produced in 2018.
- Bioplastics cannot be recycled in domestic collections in the UK. Put them in your black bin.

Further ideas for Bioplastics:-

There's a good explanation of bioplastics here:

<https://www.explainthatstuff.com/bioplastics.html> or a good video by City to Sea here: <https://youtu.be/2by0-Gb6FXU>

There are also some other plastic based activities here:

<https://www.kidsagainstplastic.co.uk/learn>

The chemistry of bioplastics is explained here: <https://youtu.be/YqY276MK-iY>

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Home Schooling

Children in Y5 and Y6 will love being scientists by mixing up chemicals, especially when they realise that they are making plastic! Secondary age students will be used to following instructions in science experiments.

In Y5 children learn about reversible and non-reversible changes to materials, e.g. that salt dissolved in water is reversible, while burning something usually isn't, so ask about what they think is happening in this experiment.

You could explore further experiments using this method, what variables could they change, how could it be a fair test and how would they record their results.

