



Things to make and do

Be a DNA detective

This simple experiment allows you to isolate DNA – the chemical that shapes life – from strawberries.

WARNING!

Ask an adult to help you handle rubbing alcohol. Avoid getting it on your skin or in your mouth or eyes.

What you need

- Rubbing alcohol (containing at least 70% isopropanol; sold at most pharmacies)
- 90ml water
- 2 drinking glasses
- 10ml washing-up liquid
- ¼tsp salt
- 2 strawberries
- Knife
- Zip-seal food bag
- Sieve or strainer
- Spoon
- 1 small glass
- Cotton bud
- Magnifying glass

DID YOU KNOW?

DNA is sticky, so any type of rod (even a pencil) can be used to get it out of the glass. Twist the rod to lift out the DNA strands.

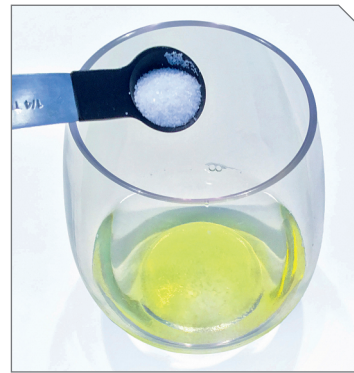




1 Two hours before you start, put the rubbing alcohol in a freezer. Start the test by pouring 90ml water into a glass.



2 Next, pour 10ml of washing-up liquid into the same glass (10ml is about 2tsp).



3 Stir in ¼tsp of salt until it completely dissolves. This is the DNA-extraction mixture.



4 Cut the tops off two strawberries and place them in a plastic food bag with a zip closure.



5 Carefully pour the DNA-extraction mixture into the zip-seal bag with the strawberries.



6 Squeeze the bag gently to get rid of as much air as possible. Don't let any mixture escape. Seal the bag.



7 Squash the strawberries with your hands until there are no big bits left. Leave to rest for 10 minutes.



8 Hold a sieve over a glass. Pour the mixture carefully through the sieve and into the second glass.



9 Use a spoon to press the mashed-up strawberry against the sieve to squeeze out any remaining liquid.



10 Now pour the liquid into a small glass. This will help to isolate the DNA on the surface.



11 Carefully pour 1tsp of the cold rubbing alcohol onto the top of the mixture. Watch closely to see white strings of DNA separating out.



12 Use a cotton bud to remove the stringy DNA. You can examine it more closely with a magnifying glass. Wash all equipment when finished.

How does it work?

All living things on Earth, from tiny bacteria to blue whales, contain a chemical called DNA in their cells. The DNA contains the instructions for how organisms grow and develop.

In strawberries (and in your body), DNA is contained in a tiny sack in the centre of the cell, called the nucleus. Smashing up the strawberries breaks the cells apart to form a messy gloop. The washing-up liquid busts open

the strawberries' thin fatty cell walls, just like it removes grease when you wash the dishes. The salt strips away proteins (another important cell chemical) that hold the DNA strands together. Passing the squished-up strawberries through a sieve removes any tough plant matter.

DNA stays dissolved in water but won't stay dissolved in alcohol. When you add rubbing alcohol, it causes

the DNA to separate out from the rest of the liquid mixture. The alcohol is lighter than the water so it floats to the surface, forming two layers. The purified DNA settles into the top layer.

A single strand of DNA is too small to see, even with a magnifying glass, but this in this experiment the DNA strands clump together. This is exactly the kind of technique that scientists use to isolate DNA for testing.



DNA has a double-spiral shape.