



SCHOOL EXPERIMENTS



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DNA EXTRACTION USING A BANANA



DNA (Deoxyribonucleic Acid) is the genetic instruction manual found in every living thing! DNA contains the information needed to make proteins, cells and organs.

DNA is extracted from human cells for a variety of reasons. With a pure sample of DNA you can test a newborn for a genetic disease, analyse forensic evidence or study genes involved in heart disease. All living cells have DNA, including bananas!



In this experiment, we show you how to extract DNA from a banana so you can see the DNA strand with your very own eyes. The experiment works by firstly breaking down the cell walls that hold the DNA. This is done by mashing the banana which allows access to all the individual cells in the fruit.



When you combine the banana with detergent it breaks down the cell membranes (even further) by dissolving the lipids (fats) and proteins that make up the membranes. These fats and proteins bind to the detergent and are brought out of the solution.

When the mixture is poured through a filter, a solution is collected that contains DNA without the banana solids. Since DNA is soluble in water, ethanol is then added to bring out the DNA, which will then be drawn into the ethanol layer of the mixture.



The result; real DNA strands from a banana!

DNA EXTRACTION USING A BANANA

Equipment

Soft banana

Ziploc bag

Water

Dishwashing liquid

Salt

95% ethanol

Test tube

Skewer stick

Optional: coffee filter



Method

1. Cut whole banana into 1 inch cubes and put one banana cube into a ziploc bag
2. Add roughly 100ml tap water
3. Add a squirt of dishwashing liquid
4. Add a pinch of salt and zip up your bag
5. Once all the above are secured within the bag, mush up the banana until it is no longer a solid
6. Pour 20ml of the solution mixture into a test tube
7. Optional: You may filter your solution through a coffee filter into the tube
8. Slowly layer equivalent amount of your solution with 95% ethanol on the top
9. Bubbles will then appear with DNA around it
10. Use your skewer stick to swirl around the bubbles and the DNA should latch itself onto the stick

ELEPHANT'S TOOTHPASTE



This chemistry experiment is a huge hit with kids (and adults!) of all ages!

The chemical reaction produces a large foamy mess which looks like toothpaste squirting out of a giant tube – so big that only an elephant can use toothpaste this large!



The key ingredient is hydrogen peroxide, which is a bleaching agent and chemical often used by hairdressers. Hydrogen peroxide molecules are very unstable and naturally decompose into water and oxygen gas.

The experiment works by mixing the hydrogen peroxide with some liquid soap. A catalyst is then added to make the hydrogen peroxide break down really quickly, into oxygen and water.



Because there is a lot of oxygen trapped in peroxide, the rapid decomposition results in the oxygen needing to quickly push out of the container. As the peroxide breaks down, the soap that was mixed in will also combine with the water and turn into giant foam.

It's also good to add blue and red food colouring before the catalyst is added - to make the large column of foam look even more like toothpaste!



ELEPHANT'S TOOTHPASTE

Equipment

Dishwashing detergent
Hydrogen peroxide
Warm water
Dry yeast sachets
Food colouring, 3—4 colours

500ml cylinder (long and thin)
Small container
Paddle pop stirrer
Pipette



Method

1. Add 20 ml of dishwashing detergent to your 500ml cylinder
2. Add 25ml of hydrogen peroxide to the detergent and swirl well to mix
3. In a small container, add 1 sachet of dry yeast and add 40ml of warm water. Mix these really well with your paddle pop stick.
4. Using any food colouring of your choice, drip the colours down the sides of the cylinder
5. Once your warm water and dry yeast have been mixed really well, pour your mixture into the cylinder which already contains the hydrogen peroxide and dishwashing detergent
6. You should be able to see foam quickly rise up and over flow from the top of the cylinder

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