



Kiwifruit DNA Extraction

Making Sense of the Living World is a strand of the science curriculum that attracts a lot of interest from primary school-age students, because many TV programmes feature DNA and Forensic Science in their story lines. Primary school age groups are also one where parents are willing to attend events in support of their children's education. Fun activities break barriers, get parent and child co-operating and provide a novel 'learning' setting.





Timeline

Time	Activity
6pm 15 min	<p>Welcome</p> <p>Name tags provided, ice-breakers (e.g. round the room introductions)</p> <p>Eating a light meal</p> <p>Explain the goal of the workshop - To learn more about science and science jobs.</p>
6:15 10 min	<p>Introduction to workshop</p> <p>Discussion: what is science? What makes something living? What is DNA and cells?</p> <p>In this workshop we will extract some DNA from kiwifruit.</p>
	<p>Dropper introduction</p> <p>Demonstration of how to use a dropper to suck and squeeze.</p> <p>Students practice sucking water from one container and transferring it to another.</p>
6:25 5 min	<p>Separation Game</p> <p>Often in science we wear special clothes to keep things clean so in this game each student will dress up in some special clothes – a pair of overalls, some gloves and a mask.</p> <p>Once you have your special clothes on you will quickly go to the other side of the room where you will find a dropper and a container of liquid. The liquid is in two layers. You have to use your dropper to carefully suck off the top layer without getting any of the bottom layer mixed in. Put the top layer into the empty container. When you separated as much of the top layer as you can take it to the presenter for marking. Once we say go we are expecting you to do this as carefully and quickly as possible.</p> <p>Parents - to help your child achieve the goal.</p>
6:30 20 min	<p>DNA extraction</p> <p>Parents and students work together to complete a DNA extraction following step by step demonstration.</p>
6:50 15 min	<p>Chemical Role play.</p> <p>Students and parents dress up as different chemical characters and role play what happens to cells when the extraction solution is added.</p> <p>Now that we understand more about what these different chemicals are doing lets go on to finish our DNA extraction.</p>
7:05 5 min	<p>Reflection/Conclusion</p> <p>What you have done today is the first step to studying DNA and how it works.</p> <p>Discussion about why we are interested in DNA, and what we can do with it.</p> <p>Students can take their container of DNA home with them.</p>
7:10 10 min	<p>Career Overview</p> <p>Members of the team talk briefly about their science jobs and careers information is given out.</p>
7:20 5 min	<p>Presentations</p> <p>Students receive their certificate for being part of the workshop.</p> <p>Group photos</p>
7:25 5min	<p>Reflection</p> <p>Parents and students complete a post-workshop questionnaire about the session. Students receive an instruction booklet and extraction kit so they can repeat the workshop at home.</p>
7:30	<p>Farewell</p>



Kiwifruit DNA Extraction

Instructions

1. Fill a cup 1/3 full of water. Add half a teaspoon of salt and 3 teaspoons of dishwashing liquid. This is your special extraction liquid.
2. Peel one Kiwifruit and dice it up into small pieces.
3. Put the fruit pieces into a self-sealing plastic bag and push out all the air. Seal the bag. Using your fingers, squeeze and smash the Kiwifruit for 2 minutes.
4. Open your bag and add nine (or a few more) teaspoons of your special extraction liquid. Push out all the air from the bag and reseal it. Squeeze the mixture with your fingers for 1 minute.
5. Place a filter into the plastic measuring jug. Pour your fruit mixture from the bag into the funnel. Let the liquid drip through the filter into the jug (about 3min).
6. Half fill a see-through container "A" with the liquid you have collected in the jug. You need about 10-15mL.
7. Add the same volume (10-15mL) of cold Methylated Spirits to the container by tilting it slightly and running the Meths gently into the container. Try not to mix the two liquids.
8. You should be able to see the Meths floating on top of the fruity liquid. Leave the mixture on a bench to settle for about 5 minutes.
9. Can you see the white/clear Kiwifruit DNA appearing in the meth's layer?
Use your dropper to gently investigate without mixing the layers.
10. Gently scoop/suck up the Kiwifruit DNA from the purple Meths layer and put it in a second container. Make sure you don't include any of the green layer underneath.

Well done! You have successfully extracted DNA from Kiwifruit!

Ingredients

- Kiwi Fruit (or another type of soft fruit or vegetable)
- Chopping board
- Knife and peeler
- Zip lock plastic bag
- Measuring spoon
- Dishwashing liquid
- Salt
- Water
- Medium-sized plastic container, at least 100mL capacity (x2)
- Dropper
- Filter
- Ice bath/Freezer
- Methylated Spirits
- Measuring container
- Screw top vial