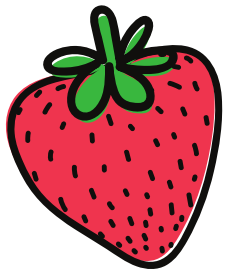
Science in the Kitchen!

Extracting Strawberry DNA



What do you need?

- Strawberries
- Knife
- Cutting board
- Spoon
- Zip lock bag
- I cup of dishwashing liquid
- 1/4 cup of salt
- 4 1/2 litres of water
- Paddlepop sticks
- Clear cup
- Methylated spirits
- Toothpicks
- Cleaning cloth

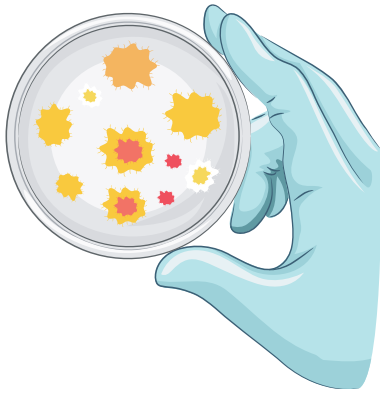
Risk Assessment:

Hazard	Risk	Safety Precaution
Using methylated spirits (toxic, flammable)	Students may spill or come in contact with methylated spirits (ingest or splash in eye). Methylated spirits may ignite and start a fire.	Methylated spirits should only be handled under the strict guidance of a parent or guardian.
Using a knife to cut fruit	Cut from knife	A parent or guardian should be present to assist in using the knife safely
Allergy to herbaceous plants (strawberries)	Allergic reaction	Do not use any fruits you have a known allergy to

1. Place the methylated spirits in the freezer for about an hour
2. Cut your strawberries into pieces with the help of a parent/guardian/teacher
3. Place half a strawberry into a zip-lock bag, remove the air and seal it. Squash the strawberry by rolling your fist over it.
4. Make a DNA extraction solution out of 280mL water, 1 tablespoon of dishwashing liquid and a quarter teaspoon of salt. Stir the ingredients together until the salt is dissolved.
5. Add 3 tablespoons of your DNA extraction solution to your ziplock bag and swish the mixture around.
6. Place the strainer over a plastic cup and pour the strawberry mixture over the filter to remove any strawberry chunks
7. Transfer the filtered liquid into a tall, slim cup
8. Ask a parent/guardian/teacher to tilt the cup and slowly and carefully pour an equal amount of the ice-cold methylated spirits into a cup so that it slides down the side of the container
9. Try to avoid mixing the methylated spirits and the strawberry juice and keep your eye out for bubbles appearing where the two liquids meet
10. Twirl a toothpick in the solution and pull out the snotty fibres to see the DNA from thousands of strawberry cells clumped together! There is so much DNA it is visible to the naked eye!

Science in the Kitchen!

Growing Bacteria on Homemade Agar Plates



What do you need?

- 4x teaspoons of beef stock powder
- 4x cups of water
- 4x teaspoons of gelatin
- Saucepan for boiling mixture
- 2x agar plates or takeaway containers
- Spoon
- Sticky tape
- Permanent marker to label plates/containers
- Cotton swab
- Warm spot to grow bacteria, such as a box underneath a desk lamp

Risk Assessment:

Hazard	Risk	Safety Precaution
Boiling growth media on a stove	Students or parents/guardians may sustain a burn or the solution may spill	Students must have adult supervision and assistance to heat the growth media on the stove and pour the media into the containers
Growing unknown microbes	Hazardous bacteria or fungi may grow on the takeaway containers	Containers should only be allowed to grow microbes for a maximum of 2 weeks. Swabs from the nose or throat should not be used to prevent the risk of growing human pathogens. Takeaway containers should be secured with a lid and sealed with sticky tape after initial growth has commenced and should be viewed only through the container. Containers should not be opened and must be disposed of within two weeks by placing into a sealed ziplock bag or a plastic bag that is sealed with tape or a tight knot, and then disposed into general rubbish.

1. With the help of a parent or guardian, pour your water into the saucepan and bring to the boil
2. Add beef stock powder, sugar and gelatin to the boiling water and stir until all the ingredients have dissolved
3. Cool the mixture for around 10 minutes. The mixture needs to be still hot to avoid the gelatin setting in the saucepan and to prevent contamination from bacteria in the air.
4. Take the lid off your containers and have a parent or guardian half-fill the containers with the hot mixture. Only take the lid off when you are ready to pour the mixture, to prevent contaimination from bacteria in the air.
5. Immediately put the lid back on the containers and place in the fridge for about four hours until the mixture has set. The containers can be stored in the fridge for up to two days.
6. Once the mixture has set, you can collect your bacteria! Bacteria is everywhere - in the house, in the backyard, on your hands...
7. To test the effectiveness of hand sanitiser, try placing your unwashed hand on the solid gelatinous mixture before immediately putting the lid back on. You can also rub a cotton swab on your unwashed hand and then run the cotton swab along the top of the mixture in a squiggly line.
8. Then sanitise your hand, and place your sanitised hand on the mixture in your other container before immediately putting the lid back on.
9. Tape the containers closed and label them with a permanent marker.
10. Place the closed containers somewhere warm so that your bacteria can grow for 2-3 days, ideally a box underneath a desk lamp. You can still grow your bacteria at room temperature, but it may take a little longer. Make sure to never open the containers again and dispose of them correctly within two weeks.