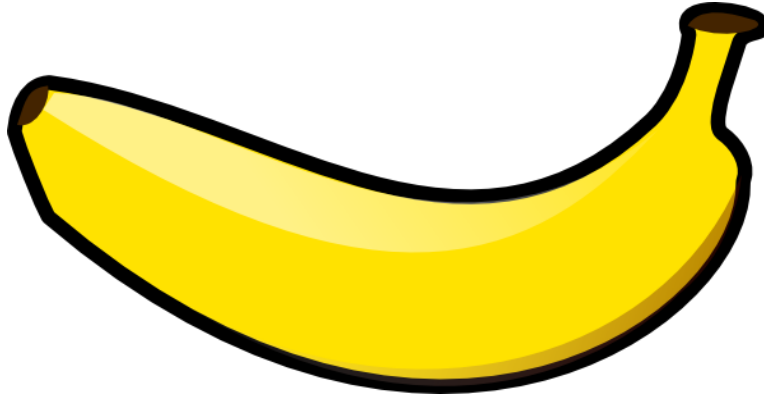


Fruit DNA Extraction



(Ages K-12)

~30 mins

Background: DNA is the hereditary material of all cells. It's what makes you, you. Even simpler things like fruit have DNA. Today you'll be able to actually extract the DNA from a (insert fruit, probably banana).

Materials: For this experiment you will need: measurements can be approximated

Fruit – Kiwi, Strawberries, and Banana all work well

5 g dish soap

2 g salt

100 ml tap water

100 ml of ice cold alcohol (isopropyl alcohol can usually be found at the pharmacists); put in a freezer for at least 30 mins before starting the experiment

Access to hot water - about 60 °C

Sieve or coffee filter paper

Two glass beakers (or old jam-jars) (this may also be a plastic cup)

Several bowls of different sizes, including a large bowl for making a water bath

A paperclip

As far as measuring goes I think we can either provide measuring tools or use translucent plastic cups and get roughly how much there should be. We can work out how much 5 g of soap is then just show them (Fill your soap to this line etc). I think also with the isopropyl, I can imagine will be more pricey so if we can get one bottle and aliquot 125 mls for each camper that'll be better.

Steps:

- 1) Mash up the fruit of your choice in a bowl. Bananas, kiwis and strawberries all work well. (Remove the skin of the bananas and kiwi, we just want the insides!) This can be done with a styrofoam or paper bowl with plastic fork (Camp isn't very good about plastic waste)
- 2) In a separate bowl, mix the washing up liquid, salt and tap water. Stir gently trying to avoid making too many bubbles in the mixture. This is your extraction buffer.
- 3) Add the fruit to the extraction buffer and mix again. Mash your fruit sample as much as you can, but again, try to avoid making too many bubbles. (We can tell them to mix until uniform, probably no longer than a minute)
- 4) Make a water bath with a temperature of about 60 °C. (A large washing up bowl works well for this.) Leave the fruit extraction mixture to incubate for 15 minutes. (I feel that this step will be interesting, I will ask Corey if we can assume they have hot water)
- 5) After 15 minutes, filter your fruit mixture through a fine sieve or coffee filter. This will remove all the solid material that you don't want. You should be left with a clear(ish) liquid.
- 6) Take the ice cold alcohol and very slowly, drop by drop, pour it down the inside of the container with your fruit mixture. What you want to do is produce a layer of the alcohol floating on top of the fruit mixture.
- 7) At the interface between the alcohol and the fruit mixture, you should see a white cloud-like substance forming. Use a hook (a bent paperclip would work) to slowly draw the DNA up and out of the solution.

[DNA Extraction from Fruit](#) - this video shows what the process looks like.

How does it work: DNA can be found in all cells! Using our mixture of soap and salt we can make the cells that are storing the DNA explode. Once the cells burst, all their DNA is available for collection. We use the ethanol to collect the DNA since ethanol and DNA do not mix. At the end of the experiment, you'll see a whitish goo which is DNA. (The salt makes the DNA more hydrophobic and the salt will attract the DNA due to its positive charge - making that jumbled mess.)

Material links

[Dish soap](#)

Salt (camp may have this, we can ask)

Isopropyl - this may actually be harder to come by in these times, again we can ask camp

[Paper bowls](#)

[Plastic cups](#)

[Plastic forks](#)

[Coffee filter](#)

Paper clips

Fruit - banana, kiwi, strawberry. Can be picked up from store