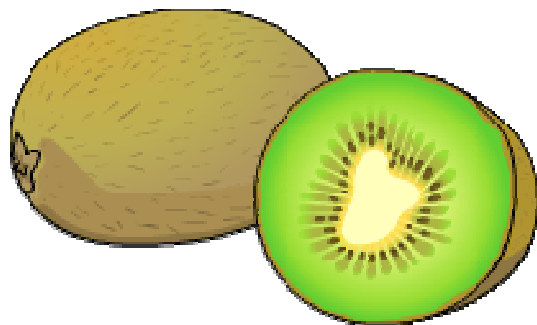


**Worksheet: Extracting DNA**

You will need:

- kiwi fruit
- cell lysis solution
- cold ethanol
- a white tile
- a set of scales/a balance
- pestle and mortar
- 2 beakers
- filter paper and funnel
- test tube and rack
- measuring cylinder
- pipette
- stopwatch

**Stage 1.**

In this stage, you are going to break into the kiwi fruit cells and free the DNA from the nucleus.

1. Using the balance, measure out 30g of kiwi fruit onto a white tile.
2. Add the kiwi to the pestle and mortar and mash it up until the lumps have been removed. Place the mashed kiwi fruit into a 250cm<sup>3</sup> beaker.
3. Pour the cell lysis solution into the beaker until there are equal amounts of mashed kiwi fruit and cell lysis solution.
4. Place the beaker into a water bath at 60°C for 15 minutes. Stir the liquid using a glass rod every two minutes.

Whilst one of you is doing this, tidy away all of the equipment you have used so far to ensure your table is ready for stage two.

**Stage 2.**

1. After 15 minutes, move your beaker into the ice bath and let it cool for five minutes. Stir gently with a glass rod every minute.
2. Whilst the mixture is cooling, set up a filter by adding filter paper into the funnel and place it over a beaker.
3. Once the liquid is cooled, filter it through the funnel. It will take approximately five minutes to filter 5cm<sup>3</sup> of the mixture, the mixture must be left alone to filter slowly.

Answer this question whilst your mixture is filtering:

**Q1. What are the physical and chemical processes you have used to release the DNA?**

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**Stage 3.**

The DNA is in the filtrate, however, it cannot be seen yet. This stage allows you to see the DNA, it is called precipitating the DNA.

1. Add 5cm<sup>3</sup> of the filtered liquid to a test tube.
2. Measure out 5cm<sup>3</sup> of cold ethanol into a measuring cylinder.
3. Gently add a layer of cold ethanol on top of the filtrate. Use a pipette to run the ethanol slowly down the walls of the test tube so that it sits in a layer on top of the filtered liquid. It is very important that the lower layer is not disrupted.
4. Place the test tube into a test tube rack. Observe what happens at the area where the ethanol and filtrate layers meet.
5. Leave the solution to sit for two minutes. A white precipitate (a thick cloudy layer) will form in the alcohol layer. This is the DNA.

Answer this question whilst you are waiting for the DNA to appear

**Q2. Observations: what is happening where the ethanol and filtrate layers meet?**

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#### Interpreting your observations

Q3. Match the following questions to the appropriate answers. Draw lines to match each question on the left hand column to an appropriate answer on the right hand column.

Why did you place the solution in a hot water bath?

It precipitated out the DNA.

You separated the DNA by putting it through filter paper, what does this tell you about DNA?

It evaporates at room temperature and is highly flammable.

The cell lysis solution contains detergent and salt, what do you think these did to the cell?

Deoxyribonucleic acid.

Why does the ethanol have to be kept cool?

It increased the rate of reaction.

Why did you mash up the kiwi fruit first?

It physically broke up the cell membranes.

What do you think the ethanol did while sitting on top of the filtrate?

It is very small.

What do the initials DNA stand for?

It chemically broke up the cell membranes.