

# Extract Banana DNA

Teacher Notes for Years 7-10



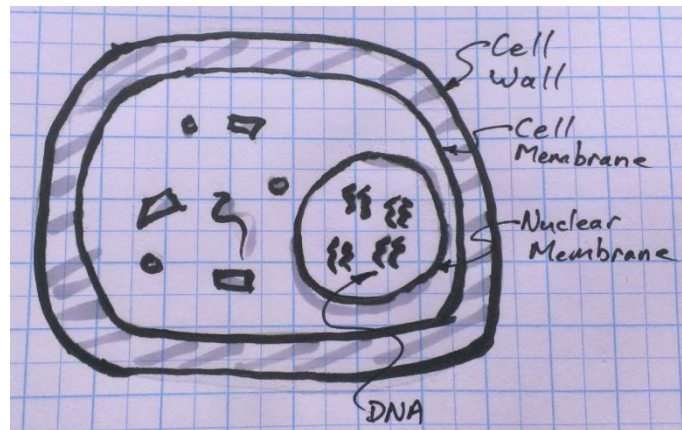
**DNA is the molecule that holds all the information to make a cell function. Using some chemistry, we can extract DNA from a banana.**

## Video Summary

The DNA is within the cells that make up the banana. To extract the DNA, the three layers around the DNA need to be broken (figure 1).

Ollie begins the extraction by peeling and chopping up the banana and putting it in a blender with 120mL of water and a teaspoon of salt. This action breaks through the cell wall. To the banana and salty water mixture Ollie adds a teaspoon of detergent, and mixed for five minutes. The detergent breaks apart the fat that makes up the plasma membranes (cell membrane and nuclear membrane) liberating the DNA. To separate the denser material in the mixture, Ollie seals it in a jar and put that into the toe of a stocking. Spinning the stocking for a few minutes forces the denser material to the bottom of the jar. More of the chunky materials and foam is later removed using a strainer.

The DNA is dissolved somewhere within the resulting solution. Alcohol (such as ethanol, methylated spirits, or isopropyl) is carefully layered over the top (figure 2). The DNA begins to precipitate out of the solution, and appears as cloudy threads at the interface between the two solutions.



**Figure 1: A plant cell.** To release the DNA we need to get through three barriers: the cell wall, the cell membrane, and the nuclear membrane.

## Science Understanding (Year 8 & 10)

### Biological Sciences

*Cells are the basic units of living things and have specialised structures and functions. (Year 8)*

The same process from this video could be used to extract DNA from other things like strawberries, onions, or even your own cells. The result are large clumps of DNA. The DNA in each cell from a single organism is exactly the same, but different genes are active depending of the function of the cell.

*The transmission of heritable characteristics from one generation to the next involves DNA and genes. (Year 10)*

The DNA from a single human cell is around two metres long. To fit inside a cell, DNA must be wound very tightly into packages called chromosomes. Sequences along the length of the DNA are known as genes. Particular genes or groups of genes are what give a cell its characteristics, and these can be passed to the next generation.

## Science as Human Endeavour (Year 9 & 10)

### Nature and development of science

*Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries. (Year 9 & 10)*

We can extract DNA into a form we can see by knowing the chemistry of DNA and the cell. Further understanding of how DNA is manipulated inside the cell allows technology to be developed where we can directly manipulate genes. This understanding is the core foundation of modern genetic modification and research.



**Figure 2: Layering alcohol.** The last step in the DNA extraction. It is very important not to mix the alcohol, but rather to layer it across the top of the solution.

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