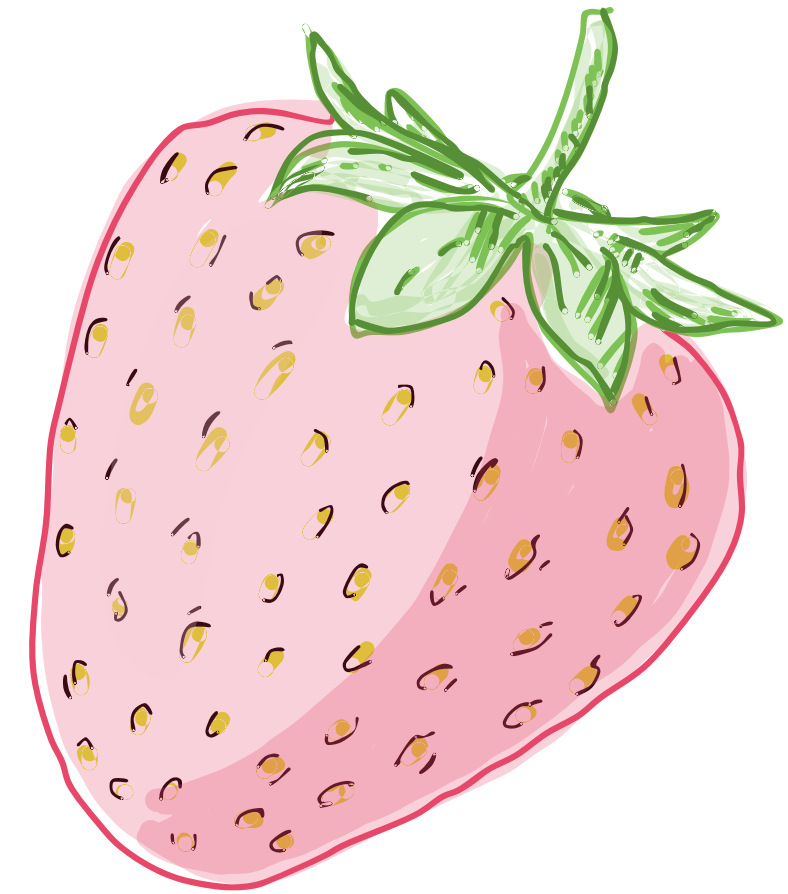


Strawberry DNA Extraction

Lab Activity

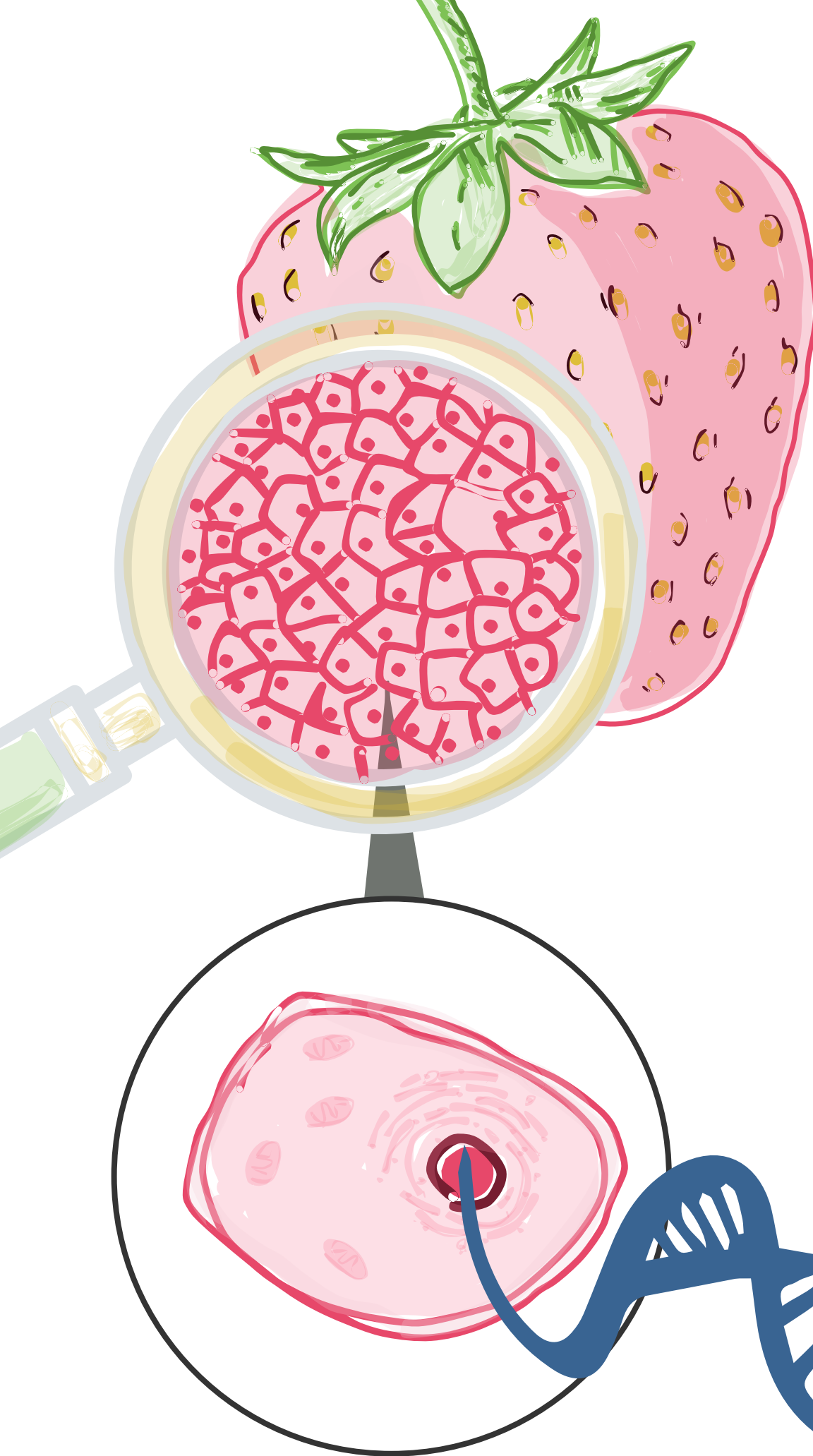
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An Overview

In today's activity you'll learn about the complex structures within the cells of a popular fruit, strawberries. Using a simple mixture of household solutions, you'll be able to extract the DNA from the cells, making microscopic molecules visible with the naked eye.

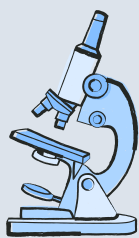


A single strawberry is made of nearly 1 million cells! Each cell contains a complete set of DNA that is tightly coiled and packaged within the cell's nucleus.

If you were to remove all the DNA and stretch it out completely, it would be thousands of feet long! To give you a better idea, a single DNA strand from a human cell, when stretched out, is about 2 meters (6.5 feet) long.



Learning Objectives

-  Understanding that all living things have DNA
-  Learning basic Lab techniques
-  Observe real DNA with the naked eye
-  Practice following scientific procedures

Materials Needed

- 2-3 Strawberries (previously frozen and thawed are best)
- Small Plastic Baggie
- 2 Wooden Coffee Stirrer
- Coffee Filter
- 2 Beakers or plastic cups
- Isopropyl Alcohol (very cold, put in the freezer for 30 mins)
- Dish Soap
- Table Salt
- Measuring Spoons

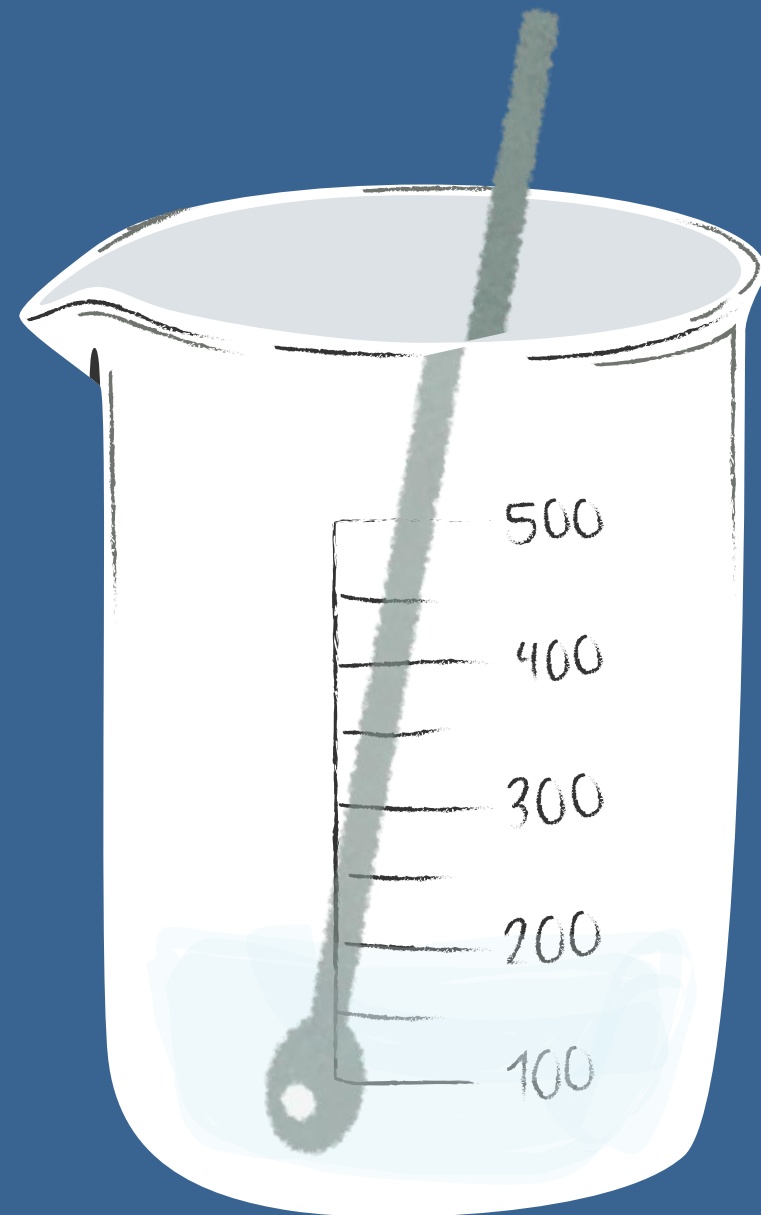
Additional Safety equipment

- Eye protection
- gloves



STEP 1:

Make Buffer Solution



First, you need to make the extraction solution. The purpose of this solution is to break down the cell membranes, while maintaining the integrity of the DNA. In a large beaker, add:

- 1/3 of a cup of water
- 1/2 tsp (2.5 g) salt
- 2 tsp (10 mL) soap

Use the stirrer to mix the solution until the salt dissolves, after about 1 minute. Set this aside until step 3.

*Soap breaks open cell membranes

* Salt helps DNA strands stick together

STEP 2:

Mash up the Strawberries

- Obtain 2-3 previously frozen strawberries in your plastic baggies and zip it shut. These should be soft and squishy, but likely still cold.
- Using your fingers, mash them up inside the bag. Don't get too aggressive, or you'll pop the bag open and need to start again.
- Keep mashing until the strawberries are mostly liquified.



STEP 3:

Mix Extraction solution & Strawberry

- Pour 50 mL of the extraction solution directly into your bag of mashed strawberries, and reseal it.
- Begin mashing again, being sure to distribute the extraction solution throughout.
- As the extraction solution comes in contact with the exposed cells, they break down the cell walls and membranes, including the ones surrounding nuclei, freeing the DNA.



STEP 4: Filter Strawberry Solution

- Set the coffee filter over the clean beaker; fold it over the edges. make sure you get help to hold it.
- with someone holding the filter you will pour the strawberry extraction mixture from the bag into the filter. This will filter out the larger pieces, but allow the 2 nm thick DNA to pass through to the beaker.



STEP 5: Prepare Test Tube

- Fill the second beaker with the strained, strawberry liquid. Set the remaining solution aside.
- Pour 5–10 mL of cold isopropyl alcohol into the beaker. You should see 2 or 3 distinct layers start to form as the hydrophobic DNA molecules repel the alcohol.

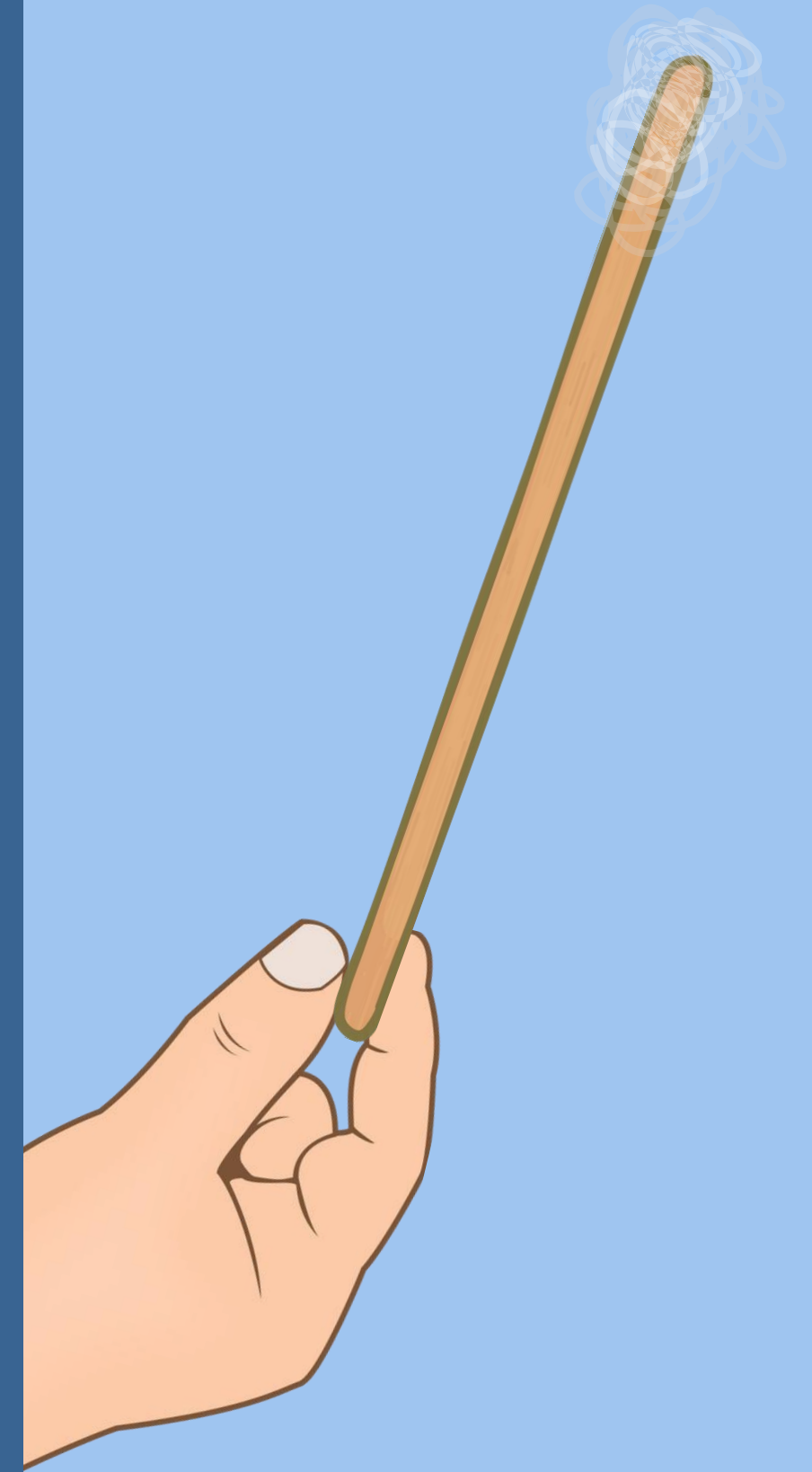
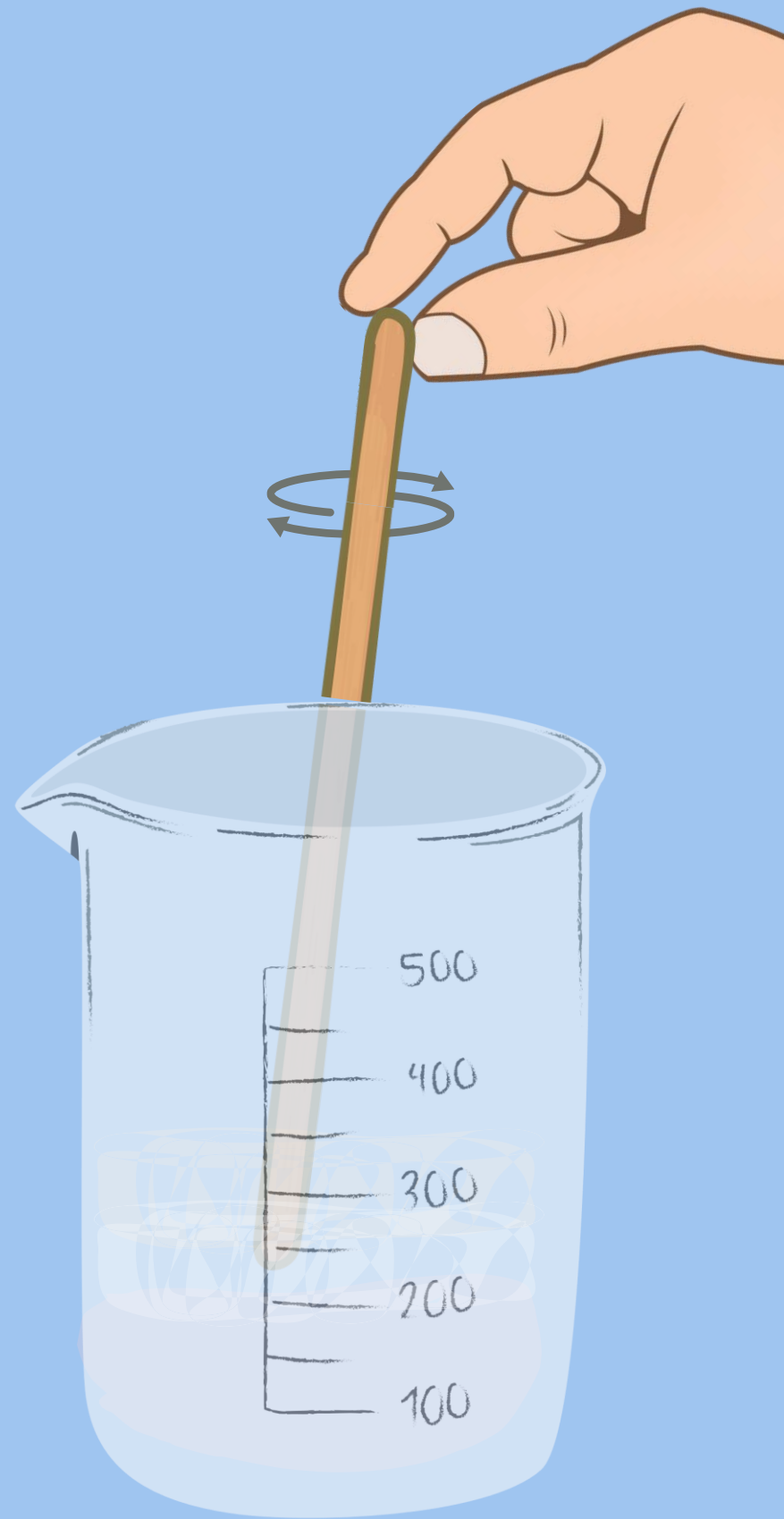
* Cold alcohol makes DNA visible

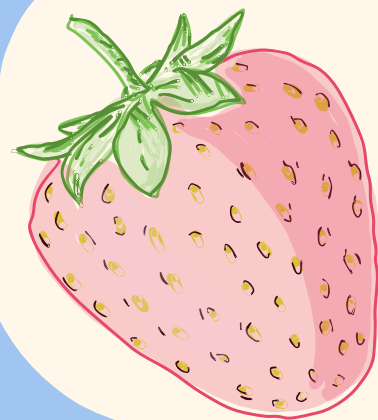
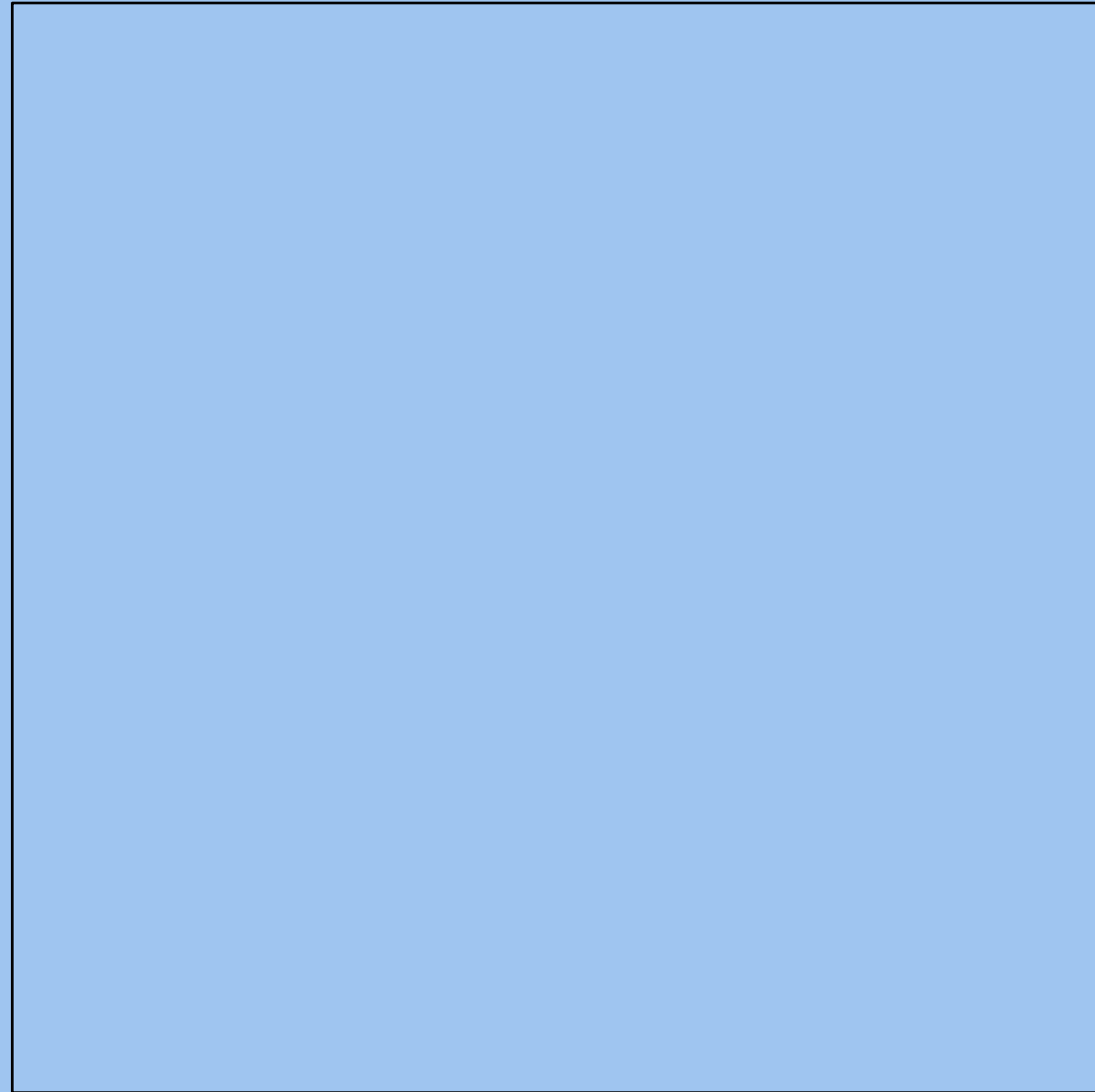
STEP 6:

Remove DNA from Beaker

- Take the wooden stirrer and insert it into the beaker, allowing the bottom of the stick to hover at the interface between the two layers of liquid.
- Gently twirl the stick. This will help the DNA strands to aggregate and collect on the stick, similar to how spaghetti cling to a fork.
- After 30 seconds or so of twirling, remove the wooden stick to reveal the DNA.

*Real DNA looks like white, stringy cotton





**Take a picture of the DNA
you collected, and upload
it in the frame above.**

Making Observations

Touch and look at the DNA. Describe what you see and feel in the space below. What have you learned from this lab experience?

A large, empty rectangular box with a green border, intended for writing observations.

STEP 7:

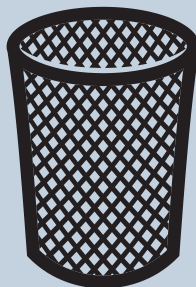
Clean up Protocol



- Liquids
Pour liquids down the drain with plenty of water



- Materials
Rinse all materials thoroughly



- Disposal
Dispose of the filter and fruits in the bin.



- Surfaces
Wipe and clean all surfaces.

