

# Unraveling the Code: Extracting DNA from Fruit!

## Materials Needed:

- 1/2 Ripe Fruit (strawberry, banana, kiwi work well)
- Small Ziploc bag
- Measuring spoons (teaspoon, tablespoon)
- Small clear glass or jar
- Small sieve or coffee filter
- Funnel (optional, helps with filtering)
- Water
- Table Salt
- Liquid dish soap (like Dawn)
- Ice-cold Isopropyl Alcohol (70% or higher, keep in freezer beforehand)
- Wooden skewer or toothpick
- Short reading material on DNA structure and function (prepare beforehand or use reliable online sources)

## Lesson Procedure (50 Minutes):

### 1. Introduction & Reading (15 minutes):

- Begin by asking: "What do you know about DNA? Where is it found? Why is it sometimes called the 'blueprint of life'?"
- Provide the student with the prepared reading material about DNA. Focus on: What is DNA? What is its basic structure (double helix, nucleotides)? Where is it located inside cells (nucleus)? Why is it important?
- Discuss the reading briefly to ensure comprehension.
- Explain the goal: Today, we're going to actually \*see\* DNA by extracting it from fruit!

### 2. Lab Setup - Making the Extraction Buffer (5 minutes):

- In a small cup, mix: 2 teaspoons of liquid dish soap, 1 teaspoon of salt, and 1/2 cup of water. Stir gently until the salt dissolves. This is your extraction buffer.
- Explain the roles: Soap helps break open the cell and nuclear membranes (which are made of fats). Salt helps the DNA strands clump together.

### 3. Lab Activity - Extracting the DNA (20 minutes):

- Place the chosen fruit (e.g., one large strawberry or half a banana) into the Ziploc bag.
- Seal the bag, removing most of the air.
- Thoroughly mash the fruit with your hands for about 2 minutes until it's a smooth pulp. (This breaks the cell walls).
- Add 3 tablespoons of the prepared extraction buffer to the bag.
- Reseal the bag and gently mix/squish the contents for another minute. Avoid making too many bubbles.
- Set up the filtering apparatus: Place the sieve or coffee filter (supported by a funnel if needed) over the clear glass or jar.
- Carefully pour the fruit mixture into the filter. Let the liquid drip through into the glass. You only need about 2-3 tablespoons of filtered liquid (filtrate). You can gently squeeze the filter to get more liquid, but try not to break it. Discard the pulp/filter.
- Tilt the glass containing the filtrate slightly. VERY slowly pour about 1/4 cup of ice-cold isopropyl alcohol down the side of the glass so it forms a distinct layer on top of the fruit liquid.

Do not mix!

#### **4. Observation & Discussion (10 minutes):**

- Watch closely where the alcohol layer meets the fruit liquid layer. You should see white, stringy, cloudy stuff forming – that's the DNA! DNA is not soluble in cold alcohol, so it precipitates out.
- Wait a few minutes for more DNA to become visible.
- Gently use the wooden skewer or toothpick to spool (wind up) the DNA strands. Carefully lift it out to observe.
- Discuss observations: What does it look like? Feel like (if you touch it - it's safe)? Why did we need cold alcohol? Where did this DNA come from?
- Connect back to the reading: This substance holds all the instructions for making a strawberry (or banana, etc.).
- Clean up the materials.

**Extension (Optional):** Research different methods of DNA extraction or famous scientists involved in discovering DNA's structure (Watson, Crick, Franklin, Wilkins).