

# MARKETPLACE EXTRACTION

9<sup>TH</sup> – 12<sup>TH</sup> GRADE

## Welcome to Marketplace DNA Extraction!

Because DNA is the blueprint for life, it can be found in all living things. This means that any meat, veggie, or fruit you pick up in the grocery store or grow on your farm contains DNA.

Through this exercise, you will learn how to extract DNA from fruits or vegetables. After you complete this extraction, you can try different vegetables or meats to see which ones allow easier extraction or yield more DNA.

### Materials

- Fresh vegetable or fruit
- Table salt
- Meat tenderizer
- Liquid dishwashing detergent
- Rubbing alcohol (70 to 95% isopropyl alcohol)
- 6 Test tubes
- 2-cup glass or plastic container
- Wooden skewer
- Small strainer
- Blender

# Marketplace DNA Extraction | Instructions

## Step 1. Choose your fruit or vegetable

1. Peruse the produce section of your local grocery store (or raid your parents' garden).
2. Select a fruit or vegetable.  
NOTE: Try to find a fruit or veggie that has a less hard exterior and is more fleshy, like a strawberry. Also, look for a fruit or veggie that doesn't contain a lot of water, such as a bean or leafy green.

## Step 2. Separate the cells of your plant: Table Salt

1. Measure out approximately  $\frac{1}{2}$  cup of your plant.
2. Place your plant in a blender.
3. Add  $\frac{1}{8}$  tablespoon of table salt.
4. Add 1 cup of cold water.
5. Blend all of the contents together on high for 15 seconds.

## Step 3. Break apart the cell membranes: Detergent

1. Strain your veggie (or fruit) mixture from the blender through a strainer into a 2-cup glass or plastic container.
2. Add 2 tablespoons of liquid dishwashing detergent.
3. Swirl the mixture.
4. Allow the mixture to sit for 5 to 10 minutes.
5. Pour the mixture into the test tubes, only filling each of them approximately a  $\frac{1}{3}$  filled.

## Step 4. Unwind the DNA: Meat Tenderizer

1. Add approximately  $\frac{1}{4}$  teaspoon of meat tenderizer to the veggie (or fruit) mixture.
2. Stir the mixture very gently

## Step 5. Separate the DNA from the mixture: Rubbing Alcohol

1. Hold the test tube of the veggie (or fruit) mixture and tilt it approximately  $45^\circ$ .
2. Slowly pour the rubbing alcohol into the test tube until the test tube contains an equal amount of mixture and rubbing alcohol.
3. Place the test tube back in the upright position.
4. Watch the DNA (which will look like stringy white gunk) float to the alcohol layer on top of the mixture.
5. Use a wooden skewer to pull more DNA from the bottom mixture into the alcohol layer.  
NOTE: If you would like to store your DNA, fill a small, empty, sealable container with rubbing alcohol and use the wooden skewer to transfer the DNA from your solution into the new container holding rubbing alcohol.