

DNA in our Food? Extracting DNA from Strawberry Student Guide

Introduction:

DNA extraction is a fundamental procedure used in a lab that is simple and effective. Extracting enough DNA to spool onto a rod is a fun activity allowing students to “see” the DNA they isolate. In this activity, ripe strawberries are the source for DNA extraction. Strawberries range from being diploid to polyploid (up to 10 ploidy – that means lots of copies of chromosomes) so their DNA is easy to extract. Strawberries are also, by nature, very easy to squish and break down as they contain cellulase and pectinase that break down cell walls.

Learning objectives:

1. Understand the process of DNA extraction; why certain chemicals are used to obtain nuclear DNA.
2. Observe the extracted DNA
3. Know different reasons to why scientists extract DNA from various organisms.
4. Learn how to read a procedure or protocol.
5. Steps to reading procedures: 1) Read through the whole procedure first; 2) ask clarifying questions; 3) follow procedure, and read ahead if there is down time!

Getting Ready: The teacher may make the extraction buffer as a demonstration so students can see the reagents that go into the buffer. You will need...

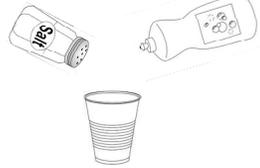
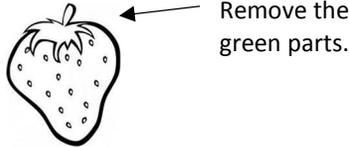
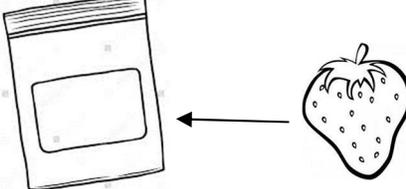
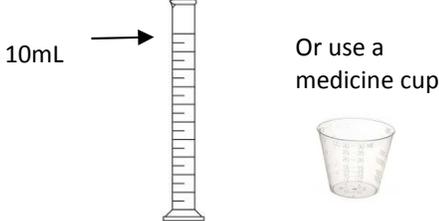
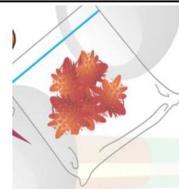
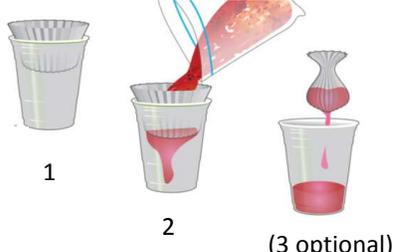
For the extraction buffer:	Items:
<ul style="list-style-type: none"> <input type="checkbox"/> A Cup <input type="checkbox"/> Salt <input type="checkbox"/> Dish soap <input type="checkbox"/> Spoon 	

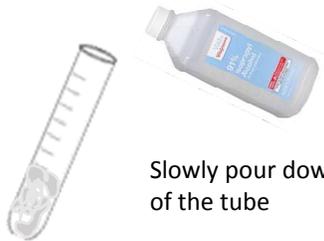
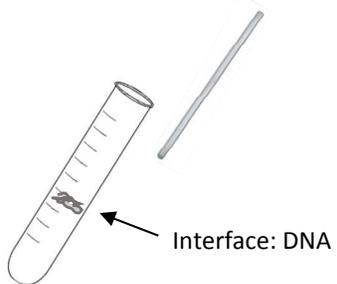
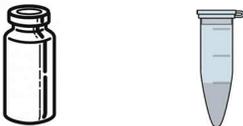
For the activity:	Items:
<ul style="list-style-type: none"> <input type="checkbox"/> A Ziploc Bag <input type="checkbox"/> One Strawberry <input type="checkbox"/> Extraction Buffer <input type="checkbox"/> One Test Tube <input type="checkbox"/> A Stirring Rod <input type="checkbox"/> Alcohol <input type="checkbox"/> Cheesecloth or Coffee Filter <input type="checkbox"/> Funnel (if available) 	

Name: _____

Period: _____

**DNA in our Food? Strawberry DNA Extraction
Lab Activity**

<p>Step 1</p> <p>Observe your teacher making the EXTRACTION BUFFER.</p> <ul style="list-style-type: none">• In a plastic cup or beaker: 2 tsp of salt and 10ml of dish soap in 100ml of water (or ½ C of water)• Mix by stirring	
<p>Step 2</p> <p>Remove any green leaves from the strawberries</p>	
<p>Step 3</p> <p>Put the strawberry in a plastic bag and gently squish the strawberry with your fingers for 2 minutes</p> <p><i>What does the squishing do to the strawberry?</i></p>	
<p>Step 4</p> <p>Add 10 mL of the Extraction Buffer to the bag, remove the air and close the bag</p> <p><i>What does the extraction do to the strawberry?</i></p>	
<p>Step 5</p> <p>Squeeze, massage and squish gently, mixing for 1 minute.</p>	
<p>Step 6</p> <p>Pour the extract onto the cheesecloth in the funnel and let it drip into the beaker</p> <p>Squeeze to speed up the process</p> <p><i>Why do you need to filter it through the cheesecloth?</i></p>	

<p>Step 7</p> <p>Add 4 ml filtered strawberry mush to a test tube, or about 1/4 full in the test tube.</p>	
<p>Step 8</p> <p>Slowly add 4ml (or an equal volume) of alcohol down the side of the test tube. Let sit about 2 minutes while observing the interface between alcohol and strawberry solution.</p> <p><i>What happens when you add the alcohol? What do you notice?</i></p>	 <p>Slowly pour down side of the tube</p>
<p>Step 9</p> <p>Dip the rod into the tube at the interface between the alcohol and strawberry layers; begin spooling the DNA</p>	 <p>Interface: DNA</p>
<p>Step 10</p> <p>Store the DNA in a small tube filled with water</p>	
<p>Optional: Repeat your steps, but omit a reagent when making your extraction buffer or change the amount of salt, detergent, alcohol used. Use math to proportion out your reagent to make 10mL.</p>	
<p>Last Step</p> <p>Put away items, clean up area and wash hands.</p>	

DNA in our Food? Vocabulary Knowledge Rating

Name: _____

Period: _____

Date: _____

Vocabulary Knowledge Rating: For each term, please mark your level of familiarity with a ✓. Then provide a definition.

Terms	Know it. I can define this!	Seen it. Maybe it means...	New to me. Totally guessing here.	Definition in your own words
Dissolve				
Salt				
Alcohol				
Attract/repel				
Positive/Negative charge				
Neutral charge				
Polar/non-polar				
Interface				
Lyse				
Charge of DNA				
Precipitate				
Cell membrane				
Nuclear membrane				

6. Now match the procedure with what it is doing to help isolate the DNA from the other materials in the cell.

- | | |
|--|---|
| _____ a. Squish the fruit to slush | A. Break apart large plant cells to allow the extraction buffer to work. |
| _____ b. Mix in a detergent | B. Precipitate the DNA (allow the DNA to clump together) |
| _____ c. Add the salt | C. Separate large cell parts, broken cell wall and membranes from proteins, carbohydrates and DNA |
| _____ d. Filter your extract through cheesecloth | D. Neutralize the DNA so it has no charge |
| _____ e. Layer cold alcohol over the extract | E. Dissolve cell membranes |