

SEE YOUR OWN DNA
DNA Exhibition

Visitors will use a simple extraction technique to isolate their own genetic material. Cheek cells are collected with purified water and placed into a soap and saline solution. The soap breaks open the cells to release the DNA, and the salt changes the polarity in order to isolate the DNA. When alcohol is added, the genetic material precipitates from the solution. In this way visitors will actually see the material that is the focus of one of the museum's major exhibitions. (Visitors may put their genetic material into a small vial that can be worn as a necklace.)

Activity

Part 1: Preparation

1. Prepare the saline soap solution.
 - a. Pour 200mL of **distilled** water into the beaker (use the squirt bottle to transport the water)
 - b. Place **3 teaspoons of salt** in the beaker
 - c. Place **3 teaspoons of clear liquid soap** in the beaker
 - d. Stir until well mixed
 - e. Replenish a complete solution as needed
2. Meanwhile, transfer isopropyl alcohol into **3 small glass containers** and cool them down in the bucket of ice throughout the day. [This helps extract more DNA.]
3. Have clean test tubes and tops ready.
4. Have the following receptacles ready:
 - a. A receptacle for disposal of paper cups and tongue depressors, lined with a plastic trash bag.
 - b. A container for disposal of used, sealed test tubes. Use two plastic bags to line this trash receptacle.
5. Put on latex gloves.

Part 2: Preparing Participants

1. Inform the participants that DNA is the genetic material found in most cells of living things from bacteria to plants to animals. By participating in this experiment, they will be able to see their own DNA.

2. Additionally, they will see a simplified approach for isolating DNA for each of the applications they will see (or have seen) as they explore the museum's DNA exhibition.

Part 3: Extracting DNA

1. Collect cheek cells.
 - a. Pour 10 mL of distilled drinking water (a small amount) into a paper cup for each participant.
 - b. Have the participant rub their gums and the inside of their cheeks with a tongue depressor to loosen the cells. The better job done here, the more DNA is collected. Have the participant throw out their own tongue depressor.
 - c. Have the participant put the water in their mouth and swirl around to collect the cells.
 - d. Have the participant **slowly and easily** relinquish the "mouthwash" solution back into the paper cup and carefully pour into their personal test tube.
2. Release and isolate the DNA.
 - a. Explain that the soap in the solution breaks open the cells to release their DNA, and the saline (the salt) in the solution changes the property of the solution so that the DNA is isolated from the rest of the cellular contents.
 - b. Add **one (1) full dropper** of the saline soap solution to the test tube with the mouthwash.
 - c. Have the participant cover the test tube with a lid (**MAKE SURE THE LID IS ON TIGHT!**), hold his/her thumb over the lid, and **vigorously shake and mix** the contents by inverting the container ten or more times.
3. Precipitate the DNA.
 - a. Explain that the alcohol will not mix with the solution already in the test tube and that the alcohol will allow them to see the DNA present in the test tube by precipitating it and bringing it to the surface.
 - b. Place **one (1) full dropper** of cooled isopropyl alcohol into each container. **Make sure to pour it at an angle down the side of the test tube**, ensuring not to make any sudden movements of the solution.
 - c. Place the container on the cart and wait about 3-5 minutes for the DNA to precipitate and float to the surface. It will most likely appear white and cloudy or thread-like during this period. Look for bubbles in the alcohol if you are not sure you have found the DNA.

Part 4: Take Home Message

1. State that the DNA that is now visible is the basis for the applications of the technologies found in the DNA exhibit of the museum.
2. Ensure that one of the small, plastic vials is available.
3. Press the bulb of a medicine dropper so it is ready to extract fluid.

4. Insert the tip of the medicine dropper in the top layer of alcohol near the DNA.
5. Release the medicine dropper bulb, thereby allowing the DNA to enter the medicine dropper.
6. Transfer the DNA and alcohol into the take-home vial by pressing on the bulb of the medicine dropper. Snap the lid closed.
7. Loop a string or yarn through the eye of the flip cap so it can be used as a necklace.

Part 5: Disposal

1. After each experiment, have the participant make sure that the cap is securely placed on their personal test tube. Have them dispose of the entire container in the appropriate trash receptacle.
2. When the liquid waste receptacle becomes about 1/2 full. Each of the plastic bags should be knotted, sealing one bag inside the other. The bags should then be lifted and checked for leaks. Then, they should be carefully carried and disposed of in the museum's main trash receptacle. Latex gloves must be worn throughout this process.

Part 6: Clean-up!

1. After you are finished with your shift, ensure that all materials are returned to their bins.
2. Ensure that all additional trash is placed inside trash bags and that the bags are taken to the trash disposal point.
3. Check the supply inventory sheet and alert Peter Schultz if any materials need to be re-supplied. You will receive more information about this process later.
4. If at the end of the day, return tables and supply bins to designated storage facility.

Materials Needed:

Containers (plastic or otherwise)	Latex gloves
Container Lids	Take-home vials
Salt	String
Soap	Plastic teaspoons
Distilled Water	Test tubes
Paper Cups	Test tube caps
Medicine Droppers	Squire bottles
Isopropyl Alcohol	
Tongue Depressors	
Beakers	