



Strawberry DNA

Background Information:

DNA is the abbreviation for Deoxyribonucleic Acid. It is found within the cells of every living thing and contains genes. Genes can be loosely viewed as the organism's "direction" or "cookbook". A strand of DNA contains genes (or ingredients), areas that regulate genes (directions), and areas that either have no function, or a function we do not yet know. DNA is organized as two complementary strands, head-to-toe, with bonds between them that can be "unzipped" like a zipper, separating the strands.



Materials:

- 1 Strawberry
- 1 teaspoon Dawn Dish soap
- 2 teaspoons Water
- A pinch of Salt
- Small beaker, clear glass, or test tube
- Isopropyl Alcohol (Rubbing Alcohol) 75% or higher concentration- chilled in freezer
- Small, heavy duty zip lock bag
- Coffee filter
- Toothpick, popsicle stick or tweezers

Procedure:

1. Place your strawberry, soap, water and salt into the zip lock bag.
2. Push as much air out of the bag as possible and seal securely.
3. Now smash and smush your strawberry for several minutes until completely mixed with the solution.
4. Carefully pour the solution into your glass, test tube or beaker.
5. Slowly pour 2 teaspoons of alcohol onto the top of the strawberry solution, forming a clear layer on top.
6. Watch as the DNA material is pulled into the alcohol layer.
7. Now you can collect the DNA with a toothpick, popsicle stick or tweezers.



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The Science Behind It:

Strawberries are soft and easy to pulverize. Strawberries have large genomes; they are octoploid, which means they have eight of each type of chromosome in each cell. Thus, strawberries are an exceptional fruit to use in DNA extraction labs. The soap helps to dissolve the phospholipid bilayers of the cell membrane and organelles. The salt is used to break up protein chains that bind around the nucleic acids. DNA is not soluble in alcohol. The colder the alcohol, the less soluble the DNA will be in it. So, make sure to keep the alcohol in the freezer or on ice.

Try This:

Try different concentrations of alcohol. Does this affect the outcome? Try different types of soap. Try to extract DNA from a banana. What do you notice or observe? What conclusions can you make? What can you do differently next time?

Standards Covered:

Ohio Standards:

LS.K.1: Living things are different from nonliving things.

K.LS.2: Living things have physical traits and behaviors, which influence their survival.

LS.8.3.2: The characteristics of an organism are a result of inherited traits received from parent(s).

Pennsylvania Standards:

3.1.PK.A1: Recognize the difference between living and non-living things.

4.1.PK.A: Identify living and nonliving things in the immediate and surrounding environment.

3.1.3.B1: Understand that plants and animals closely resemble their parents.