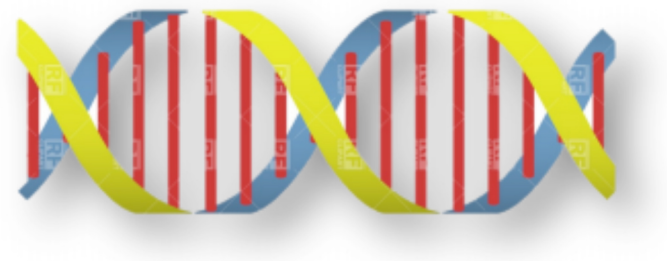
Strawberry DNA Extraction

Materials:	Amt per Trial:
Rubbing Alcohol	2 oz
Salt	½ Spoonful
Water	1/6 Cup
Dish detergent	1 spoonful
Plastic cups	1 clear cup
Plastic Spoon	1
Strawberries	2 large (3 small)
Sandwich Bag	2
Toothpick	1

Draw White Board Pictures & Discussion (~10 minutes)



***What is DNA*?**
DNA: Deoxyribonucleic acid. The blueprint for everything that happens inside the cell of an organism, and each cell has an entire copy of the same set of instructions.

What does it mean to extract DNA?
Extraction is the process of removing DNA from an organism. Because DNA resides in cells, we must find a way to take it out from those cells.

How do we extract DNA?
We can use **salt and detergent** to lyse the cells and release the DNA. **Lysing** is the process of opening up a cell to release the DNA.

Why do we use strawberries?
Firstly, because strawberries are soft and easy to squeeze with our fingers!

Strawberries are also **octoploid**, meaning that they have **8 copies** of DNA in each cell. This is four times as much as humans, who have 2 copies per cell! (***Bonus***: human cells are diploid). Hence, strawberries have four times as much DNA per cell as humans do!

Procedure: (~30 minutes)
Discuss the role of each material as you approach them in the steps of this experiment.

1. Making the **extraction liquid**: Mix **salt**, **water**, and **detergent** in a cup and set the mixture aside
2. Put the strawberries in the plastic bag and push out all the extra air. Seal tightly.
3. With your fingers, squeeze and smash the strawberry mixture for 2 minutes.
4. Using the spoon, remove any large chunks so that there is only a liquid paste left
5. Add all of the extraction liquid from Step 1 to the strawberry mixture. Mix by squeezing the mixture for 1 minute.
6. Pour the mixture from the bag into an empty cup. Remove large chunks. Make sure the mixture is only 1/3 full
7. ***SCOUTS ONLY***: Tilt the cup at a slight angle, and slowly pour alcohol. **Make sure the alcohol does not mix with the strawberry liquid. It should just sit on top.**
8. Wait a minute and watch as the DNA separates from the strawberry. It will look like transparent pink strands that are sticky.
9. Let the kids carefully touch the DNA with toothpicks. **Do not mix the solution, or the DNA will not rise again.**

How does extraction work?
Salt: Breaks down cells
Detergent (soap): Breaks down the capsules holding DNA. (Further releases DNA)
Alcohol: Makes DNA easier to see
Water: used to make a larger solution

When the extraction liquid, made of the materials above, is added to the strawberry mix, the **salt** and **detergent** will **lyse** the cell, causing the DNA to be released into the solution. The DNA can be made more visible from the rest of the solution by adding **isopropyl alcohol**. (This is because the DNA is not soluble in alcohol, much like oil in water.)