DNA Extraction

Goal: Visualize the physical nature of DNA

Materials:

- .9% NaCl (saline)
- Dixie cups
- 10 ml graduated cylinder
- Test tube and rack
- 25% soapy water solution
- Ethanol (in a squeeze bottle)
- Toothpicks
- Strawberries and Kiwis
- Ziploc baggies
- Table salt (dry NaCl)
- Gauze to filter smushed fruit mix
- Funnels
- Scissors

Step One – Cheek Cell DNA Extraction *(Complete this stage before moving on!)* Procedure:

☐ Vigorously swish 10ml of .9% saline solution (9 grams of dry NaCl in 1 liter of water) in your mouth for 30-60 seconds. The Dixie cups have 10ml of saline solution in them already.

✎🕮 Think & Write about this: Why did you use saline instead of plain water?

☐ Gently spit the saline/spit mix into your cup.

☐ Select a test tube. Note the number _____. You'll use this test tube again.

☐ Carefully pour the saline/spit mix into your clean test tube and place it in a test tube rack.

☐ Measure 5 ml of soapy water and carefully pour into the test tube.

→ Hint: use the graduated cylinder that's marked for soap so you don't have to wash it.

✎🕮 Think & Write about this: Why did you use soap?

☐ Place your thumb over the test tube opening and gently tilt the test tube back and forth several times (10 times works well) to mix well.

☐ Using a squeeze bottle, run about 1/2" of chilled ethanol down the inside edge of the test tube – be careful so the two liquids don't mix. You're trying to create two separate layers.

☐ You should observe (see) a white stringy substance forming at the place where the two layers meet. Don't be alarmed if some of the material rises to the top of the ethanol – that's okay.

☐ Twirl a toothpick or wooden stirrer in the DNA to extract the DNA. The "strings" will wind around the toothpick/stirrer. Cool, hunh?

✎🕮 Think & Write about this: What are you seeing? What does it look like?

☐ Wash your test tube and take it with you to the next station (there's more work to be done!).

Step Two – Fruit DNA Extraction (using Strawberries and Kiwi) Procedure:

☐ Select a piece of fruit (always a good place to start).

> Hint: Strawberries work really well because most of them are octoploid. This means that they have eight (***octo*** *means eight*) copies of each chromosome. In comparison, humans are diploid (***di*** *means two*), having two copies of each chromosome.

☐ Place a small (1-inch cube) piece of the chosen fruit into a Ziploc baggie Press the air out and seal the bag. Mash the bagged fruit **really well** with your fingers.

✎🕮 Think & Write about this: Why are you mashing the fruit? 

☐ Add 10ml of the 25 % soap solution and a pinch of salt to the baggie. Press the air out and seal the bag. Mash the fruit, soap and salt for another minute.

☐ Place a gauze or filter-lined funnel into your test tube while it's still in the test tube rack.

☐ Use scissors to cut a corner of the baggie and squeeze the fruit/soap/salt mixture into a gauze or filter-lined funnel, collecting the liquid in your test tube.

☐ Throw away the fruit pulp and filter in the trash or provided container.

☐ Slowly drip about a 1/2" of chilled ethanol along the side of the test tube using the squeeze bottle. Remember: the goal is to form a new layer of ethanol on top of the liquid.

☐ You should observe a white filamentous (stringy) substance forming at the place where the two layers meet. Did you get more DNA material this time? Why/why not, do you think?

☐ Twirl a toothpick/wooden stirrer in the DNA to extract the DNA. The "strings" will wind around the toothpick. Still cool, hunh?

☐ Wash your test tube!

✎🕮 Think & Write about this: Did your cheek cell DNA extraction look like the fruit DNA? Why do you think it looked the same and/or different?