DNA Extraction

Modified from "How to Extract DNA from Anything Living", University of Utah Health Sciences, Genetics Science Learning Center:
http://learn.genetics.utah.edu/content/labs/extraction/howto/

DNA exists in all living organisms. Scientists have devised methods for extracting DNA from organisms in order to study it. The following is a simplified method for extracting DNA from just about any organism using materials that you probably have at home.

The first thing to do is to decide which organism you want to extract DNA from. Your instructor may have various fresh or dried plant materials to choose from such as: dried split peas, pumpkin, soybeans, strawberries, etc.

Materials

Organism from which you plan to extract DNA
Salt
Dishwashing liquid
Powdered meat tenderizer
Distilled water
Isopropyl alcohol (chilled on ice or in the fridge)
150 ml beakers (2)
Strainer
Glass stir rod
Blender
100 ml graduated cylinder
Test Tubes (1 per person)
Glass hook or other device for winding DNA strands
Balance
Snap cap tube or other container for taking your DNA home

Method

1. Weigh out 20 g of plant material and place it in the blender along with 200 ml of distilled water and 1 g of salt. Do this as a group; later, each of you will have a chance to extract and save some DNA individually
2. Blend on high for 15 seconds and strain into a beaker. Rinse the blender for the next person to use
3. Add 5 ml of liquid dish soap to your plant homogenate. Stir gently with the glass rod; you want to mix it in but not generate a lot of bubbles. Let the mixture stand for 5-10 minutes
   *Wait, why? What does the dish soap do?*_____

4. Fill a test tube about 1/3 full with the mixture. Add 1 g of meat tenderizer and stir gently. Vigorous stirring will break the DNA strands and make them harder to remove
   What do you think this step accomplishes?
   _____

5. Tilt your test tube and *slowly* pour cold isopropyl alcohol down the side of the tube until it is about 2/3 full. The alcohol is less dense than the mixture and will float on top of it
6. Within a minute or two, you should see a ghostly white layer forming at between the alcohol layer and the mixture: this is the plant DNA*
7. Carefully wind strands of DNA around the glass hook to transfer it to a snap-cap tube or other receptacle. Cover the DNA with more isopropyl alcohol to preserve it. Label the container and clean up your area as instructed

*DNA is a long, stringy molecule. The salt that you added in step one helps it stick together. So what you see are clumps of tangled DNA molecules! DNA normally stays dissolved in water, but when salty DNA comes in contact with alcohol it becomes undissolved. This is called precipitation. The physical force of the DNA clumping together as it precipitates pulls more strands along with it as it rises into the alcohol.