Nashwaaksis Middle School Science Club Lesson Plan
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Timetable

3:00 - 3:15	Introductions and Ice Breaker
3:15 - 3:25	DNA Questions and Answers (Mini Lesson)
3:25 - 3:35	DNA Double Helix Craft
3:35 - 3:40	Groups (Base pairs with all four bases; ~4/group)
3:40 - 4:20	Banana DNA Extraction
4:20 - 4:30	Discussion

Curriculum Outcome: Recognize that the nucleus of a cell contains genetic information and determines cellular processes (305-1; Cellular processes, grade 9)

Introductions/Icebreaker

Purpose: To make students feel comfortable with us and with one another before experimenting. This activity will also help to establish a solid group dynamic that will be important for the rest of the session.

Description: We will begin our session by introducing ourselves, having the students introduce themselves. We will also have everyone make nametags. We will then proceed to an ice breaker called "The Human Knot". Students will stand in a circle and join hands with two different people other than the students on either side of them. The goal of the activity is to have students work collaboratively to untangle themselves without releasing anyone's hand. The analogy, of course, is that of DNA which is highly twisted and intertwined.

DNA Questions and Answers (Mini Lesson)

Purpose: To provide some background information on DNA and genetic material before conducting an experiment.

Materials Needed: Powerpoint presentation

DNA Double Helix Craft

Purpose: To provide a visual representation of base pairing, and how the double helix twists.

Materials Needed: Each student should be given 1 piece of licorice cut in half, 6 toothpicks, and 12 gummy bears (pair them according to base pairs; white with green and yellow with red)

Description: Each student will construct their own DNA double helix using the materials listed above. White and green gummy bears will be paired together on a toothpick as well as yellow and red, representing the AT and CG base pairs, respectively. A ladder-like figure will then be constructed by placing the two pieces of licorice vertically and sticking each toothpick horizontally between them. This will form a 3D model simply by twisting it.

Groups

Instructions: Divide students into groups of two using the paper base pairs provided. To re-emphasize base pairing, each student will find his/her base pair (A with T, C with G). Each group will then be lead through the experiment with directions (see procedure) given on the board/on paper.

Banana DNA Extraction

Purpose: To expose the students to concept of DNA and to make them curious about genetic material.

Materials Needed: (Per Group)

½ banana	½ c water	1/4 to 1/2 c rubbing alcohol
1 resealable plastic bag	1 pinch of salt	
3 drops dish soap	1 small clear plastic cups	
1 skewer	1 plastic spoon	

Procedure:

1. First you will need to put the ½ banana and a pinch of salt in the plastic bag, seal the bag and mash to make a slurry.
2. Fill the small plastic cup half full with water.
3. Squeeze banana slurry into the cup of water.
4. Add 3 drops of dishsoap and stir gently (without forming bubbles). Let sit for 5 minutes.
5. Slowly add ½ to ¼ cup of rubbing alcohol to the banana water mixture down the side of the cup.
6. Wait a few minutes and watch what happens.
7. If you wish to keep the DNA, remove it using a skewer or toothpick (a twirling motion works best).
8. Take a look at the DNA under the microscope!

Discussion

To assess what students have learned from this experiment, the following questions will be posed to promote a short discussion:

What is DNA? Where is it found?
What does DNA look like?
Why did the DNA float to the top when you added rubbing alcohol?
What did you like about this experiment?
What did you learn that you didn't already know about DNA?

References:

www.rhfleet.org
http://ghr.nlm.nih.gov/handbook/basics/dna
http://www.genome.gov/25520880
http://captain-nitrogen.tumblr.com/post/7575563042/getting-life-right
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