Create a 3D Model of DNA

Students should work in groups of 2-4.

REQUIRED MATERIALS:

- Toothpicks (wood or plastic)
- Bag of multicolored soft candy (Gumdrops, gummy bears, or marshmallows work well. Must have four colors)
- Bag of licorice sticks
- Digital Camera or Cell Phone (optional)

PROCEDURE:

1. If students intend to eat the candy after the experiment, be sure they thoroughly clean their hands before creating the model. Plastic wrap or aluminum foil can be placed over desktops to create a clean surface.

2. Each group will receive the following items in a plastic bag:

    a. Four colors of gummy candy represent the nucleotide bases. Each group should receive at least six candies of each color. Assign a nucleotide to each of the four colors of gummy candy.

        i. Adenine =_____

        ii. Thymine =_____

        iii. Cytosine =_____

        iv. Guanine =_____

    b. Licorice sticks represent the sugar-phosphate backbone. Each group should receive two.

    c. Toothpicks represent the base pairing interactions between nucleotides. Each group should receive at least toothpicks.

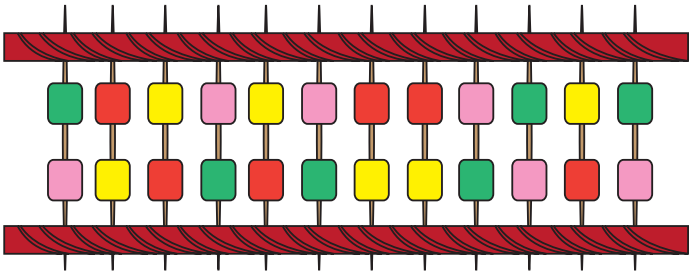
3. Using a toothpick, skewer two of the gummy candies. Be sure to follow base pairing rules (A=T, G=C). Repeat until all of the gummy candy is used.

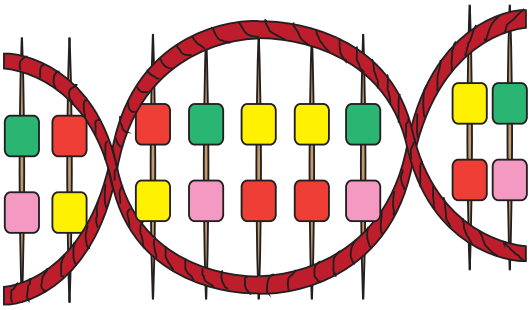
4. Attach one piece of licorice to each side of the toothpick. The base pair toothpicks should be added to the licorice in random order. The resulting DNA duplex should look like a ladder, with the licorice as the rails and the nucleotides as the rungs.

5. Pick up the ladder at each end. Carefully twist the DNA model so that it forms a double helix.

ASSESSMENT:

The instructor should evaluate each DNA model before the students consume the candy. Alternatively, students photograph their final products for submission. The photo is printed, the component parts of DNA are labeled, and the photo is entered into the student's lab notebook.





DISCUSSION QUESTION:

Record the base pair sequence of your DNA molecule. Why is the order of the nucleotides important?