

DNA Candy Model

WebQuest Description: In this activity students will engage in a fun and creative project that introduces them into Genetics. Students are required to create a DNA candy model and label it in representation of the real DNA structure. At the end of the project students can eat it too!

Grade Level: 6-8

Curriculum: Science

Keywords: Science, Genetics, DNA, Double Helix, Chemical Bases

Published On:

Last Modified: 2013-07-26 18:39:26

WebQuest URL: <http://zunal.com/webquest.php?w=205719>

Introduction

When isolated from a cell and stretched out, DNA looks like a twisted ladder. This shape is called a double helix. The sides of the DNA ladder are called the backbone and the steps (also called rungs) of the ladder are pairs of small chemicals called bases. There are four types of chemical bases in DNA: Adenine (A), Cytosine (C), Guanine (G), and Thymine (T). They form pairs in very specific ways: Adenine (A) always pairs with Thymine (T) and Cytosine (C) always pairs with Guanine (G). Can you construct a DNA model and then eat it too?

Tasks

Your task is to construct an edible model of DNA using licorice and marshmallows. When you are finished, use toothpicks and tape to label one of each of the chemical bases.

Process

You will need: 2 pieces of licorice, 12 toothpicks, 9 pink marshmallows, 9 yellow marshmallows, 9 green marshmallows, 9 orange marshmallows, Masking Tape. You'll be assigned to a team of 4 students. Enter the link and see the video on the web page. `javascript:nicTemp();`

Step 1: Choose one of the sequences below. Sequence 1: T A C G T A T G A A C
Sequence 2: T G G T T T A G A A T

Step 2: Assemble one side of your DNA molecule. A piece of licorice will form the backbone and marshmallows will be the chemical bases. Place a marshmallow on the end of a toothpick so that the point of the toothpick goes all the way through. Anchor the toothpick into the licorice backbone. Refer to the table above to choose the correct color marshmallow to represent the chemical bases in your sequence.

Step 3: Label the backbone. With a marker or pen and masking tape, label your licorice backbone "DNA- 1" or "DNA-2" depending on which sequence you used. Write the label on the left end of the licorice.

Step 4: Match the chemical base pairs. Place the color marshmallow for the matching chemical base on the other end of each toothpick. Remember that A always pairs with T and C always pairs with G.

Step 5: Complete your DNA model. Attach the other backbone so your model looks like a ladder.

Step 6: Twist your DNA model. Carefully twist your DNA molecule so that it looks like a double helix.

Step 7: Label your model. Make tags to label the parts of your DNA out of paper clips and tape. Label one of each of the following: Adenine, Thymine, Cytosine, Guanine, and Backbone. Make sure your chemical base pairs are correct!

Evaluation

Category and Score	Poor	Developing	Very Good	Exemplary	Score
3-D DNA Model	No Labels, Not Standing, Not All Bases Pair	Some Labels, Bases Pairing, Helical Shape, Standing, Most Bases Pair	Most Labels, Bases Pairing, Helical Shape, Free Standing, Bases Pair,	Deoxyribose, Sugar, Phosphate, Hydrogen Bond, Nitrogenous, Bases Pairing, Helical Shape, Free Standing, Base Pairs (all)	25

Category and Score	Poor	Developing	Very Good	Exemplary	Score
Key	No Name, Labels Misplaced, Wrong Pairs	Name, Some Labels, Some Bases Paired Correctly	Name, Most Labels, Correctly Placed Pairs	Your Name, Deoxyribose Sugar, Phosphate, Hydrogen Bond, Adenine, Thymine, Cytosine, Guanine	25
Neatness	Not Legible, No Key Points, Not Sturdy	Legible, Some Key Points, Somewhat Sturdy	Legible, Most Key Points, Sturdy	Legible, Key Points, Sturdy	25
Creativity	Materials Missing	Some Materials Used	Most Materials Used	Used All Materials	25
				Total Score	100

Conclusion

Learning Objectives

- Students will be able to describe the structure of the DNA molecule.
- Students will be able to explain the rules of base pairing.
- Students will understand that information is stored within the DNA molecule in the form of a sequence of chemical bases, each referred to by the first letter of its name (A, T, C and G).

Teacher Page

Timeline

- Day before activity:
 - Make photocopies of the student handouts.
 - Gather licorice sticks, colored marshmallows, toothpicks, paperclips, and masking tape.
 - Snip holes in the bag(s) of marshmallows and allow them to dry slightly. This makes the marshmallows easier to pierce with a toothpick.
 - Optional: Prepare a self-closing plastic bag for each student or group containing their activity supplies (see Detailed Materials List).
- Day of activity:
 - Discuss the structure of the DNA molecule and how specific features, such as the sequence of chemical bases and the rules of base pairing, allow the molecule to carry and pass on information related to the inheritance of traits.
 - Have students build an edible model of DNA with a given sequence of chemical bases.

Standards

U.S. National Science Education Standards

Grades 5-8:

- Content Standard C: Life Science - Reproduction and Heredity; every organism requires a set of instructions for specifying its traits; hereditary information is contained in genes, located in the chromosomes of each cell; a human cell contains many thousands of different genes.

Credits

Thanks to the Teach Genetics website posted by The University of Utah.

Other