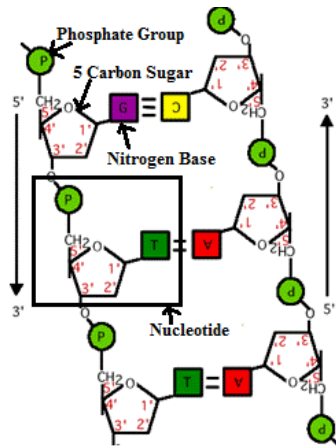


Candy DNA Model Lab



A molecule of DNA (Deoxyribonucleic Acid) is composed of nucleotides. Each nucleotide is made of a phosphate, a deoxyribose sugar and a nitrogenous base. These nucleotides bond together to create the double stranded DNA. 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 nitrogen 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).

BEFORE YOU GET YOUR SUPPLIES FILL IN THE COMPLEMENTARY STRAND SO YOU KNOW HOW MANY MARSHMALLOWS YOU WILL NEED.

DNA CODE: A T A C G T - Template Strand
 _____ - Complementary Strand

DNA Base Pair Rule

Adenine (A) and Thymine (T) always pair together
 * ATT (phone company)
 * straight letters pair together
Cytosine (C) and Guanine (G) always pair together
 * GnC (nutrition store)
 * curved letters pair together

SUPPLIES

- 1 – Red Twizzler
- 1 – Black Twizzler
- _____ Pink Marshmallow
- _____ Green Marshmallow
- _____ Yellow Marshmallow
- _____ Orange Marshmallow
- 12 Toothpicks
- 12 Small pieces of wire

Key for DNA Model

- Red Twizzler - _____
- Black Twizzler - _____
- Marshmallows - _____
 - Pink marshmallow _____
 - Green marshmallow _____
 - Yellow marshmallow _____
 - Orange marshmallow _____
- Toothpicks _____

PROCEDURES and QUESTIONS:

1. PREDICTION

- a. Look at your DNA code and answer - You will create _____ nucleotides based on your DNA code.

2. NUCLEOTIDE ASSEMBLY

- a. Place a RED twizzler (deoxyribose) through the long end of the wire.
- b. Place a BLACK twizzler (phosphate group) next.
- c. On the short end of the wire attach the nitrogen base (marshmallow). The nitrogen base (marshmallow) should be next to the sugar (red twizzler).
- d. Using a different wire assemble another nucleotide until all your supplies are used up. Place inside the nucleus (paper plate)
- e. Count your nucleotides. **How many nucleotides did you assemble?** _____ **Was your prediction correct?** _____

QUESTION 1: What is the name for the building block of DNA? _____

QUESTION 2: What are the three parts of a nucleotide?

a. _____ b. _____ c. _____

QUESTION 3: If this was a bacterial cell, where would the nucleotides be found? _____

3. TEMPLATE DNA STRAND ASSEMBLY

- a. The nucleotides within ONE DNA strand will be bonded at the sugar of one nucleotide to the phosphate of another nucleotide. Connect the nucleotides based on the DNA Template strand listed on front page.

4. COMPLEMENTARY DNA STRAND ASSEMBLY

- a. Find the nucleotide with the complementary base. Remember, the bases pair together a specific way. The base pair rules states:
Adenine (A) pairs with _____ (T)
Guanine (G) pairs with _____ (C)
- b. When you positioning your complementary bases next to each, you need make sure the nucleotides are flipped. This means if your template strand started with a red, start the complement off with a black. This is because DNA strands run **anti-parallel**. This means if one strand starts with 5' phosphate end then the other strand will start with a 3' sugar end.

5. CONNECTING THE TWO DNA STRANDS

- a. Stick the toothpicks through its complementary base. The part of the toothpick you see represents a hydrogen bond that holds the two complementary bases together so Adenine (Pink) will be connected to Thymine (green) and Cytosine (Orange) will always be next to Guanine (yellow).

QUESTION 4: What does anti-parallel mean? _____

QUESTION 5: In a DNA strand, where will you find a hydrogen bond? _____

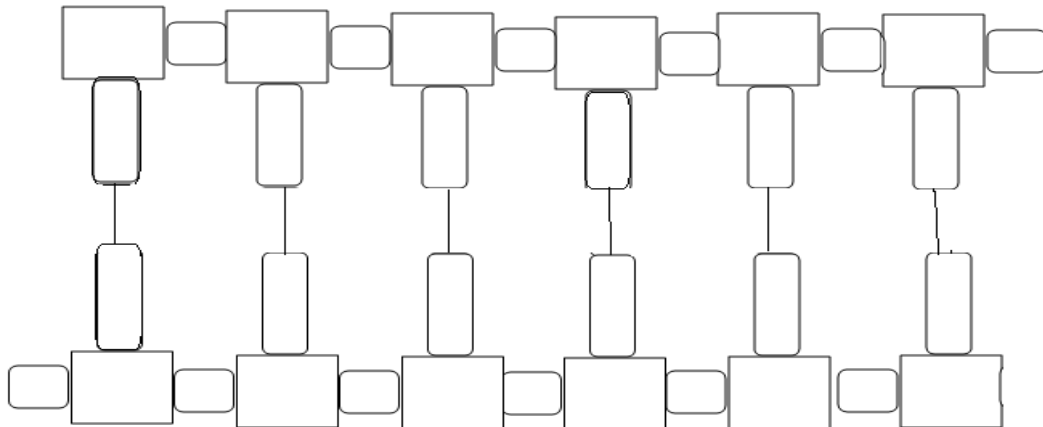
6. Show the double helix shape of DNA.

- a. Twist your DNA to make the double helix shape of DNA. Viola!!!! A DNA strand. Snapchat it 😊 For clean up, I need the wire back. Any product that does not end up in your stomach needs to wind up in the trash.

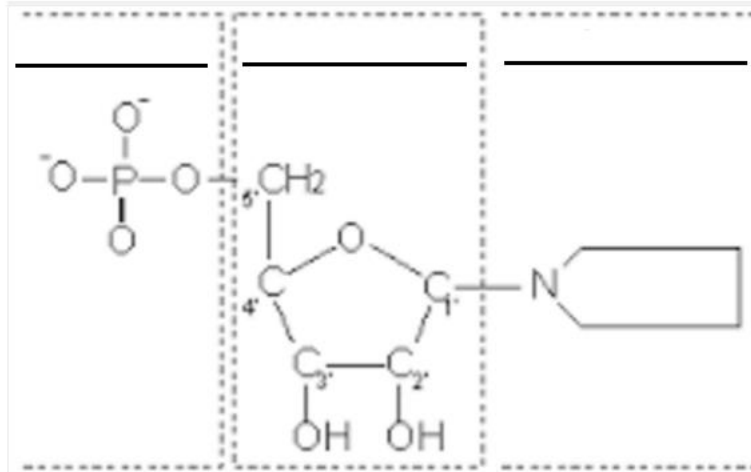
CONCLUSION QUESTIONS

Use your lab handout (introduction and procedures) and model to help answer the questions

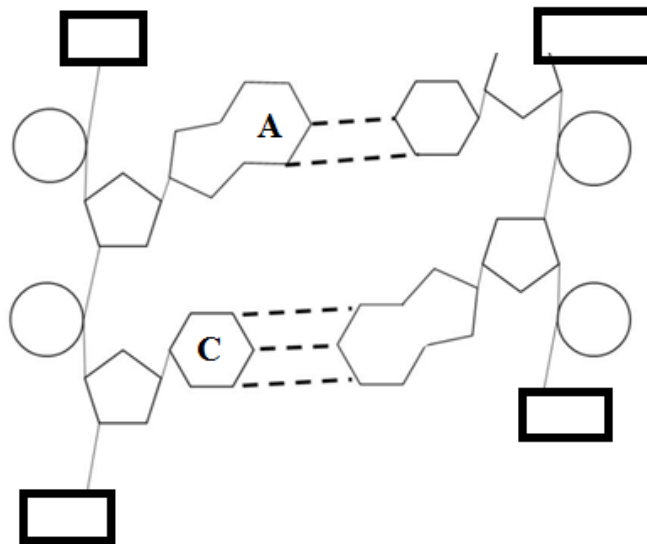
1. The figure below represents your DNA model. Label the diagram based on your model. Use S for sugar, P for phosphate and A, T, C & G for your bases. Draw an arrow pointing to a hydrogen bond and label it.

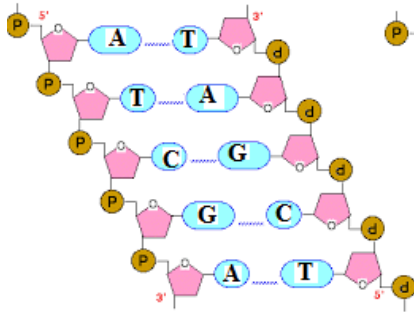


2. What figure is shown below? _____ . On the line, label the three parts.

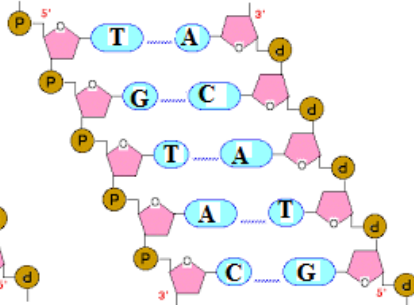


3. On the structure above, is the phosphate bonded to the 5' Carbon or the 3' Carbon? _____
4. In a DNA strand, what holds the bases together? _____
5. What structure on the backbone are bases connected to? _____
6. Complete the picture of DNA by doing the following:
- Draw a box around ONE nucleotide.
 - Complete the complementary DNA strand.
 - In the box, fill in the missing 5' and 3' end.
 - On the picture, label the phosphate group, 5 carbon sugar, nitrogen base, and hydrogen bond.

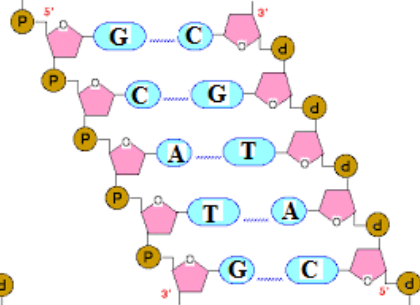




**Guinea Pig DNA sequence
for protein that
produces white coat**



**Bacteria DNA sequence
for protein that
breaks down lactose**



**Rose Bush DNA sequence
for protein that produces
red flowers**

Examine the DNA sequences shown above to answer the following questions.

7. Describe four similarities between the DNA sequences of a Guinea Pig, Bacteria, and a Rose Bush.

Similarity ONE - _____

Similarity TWO - _____

Similarity THREE - _____

Similarity FOUR - _____

8. Describe a difference in the DNA of a Guinea Pig, Bacteria, and a Rose Bush.

9. You have heard the saying that "DNA determines your traits," but based on the Figure what biomolecule does the DNA sequence code for that then determines your trait. _____

10. Below is a portion of a DNA molecule. Circle the portion that determines the traits of the organism and label what you circled in the box.

