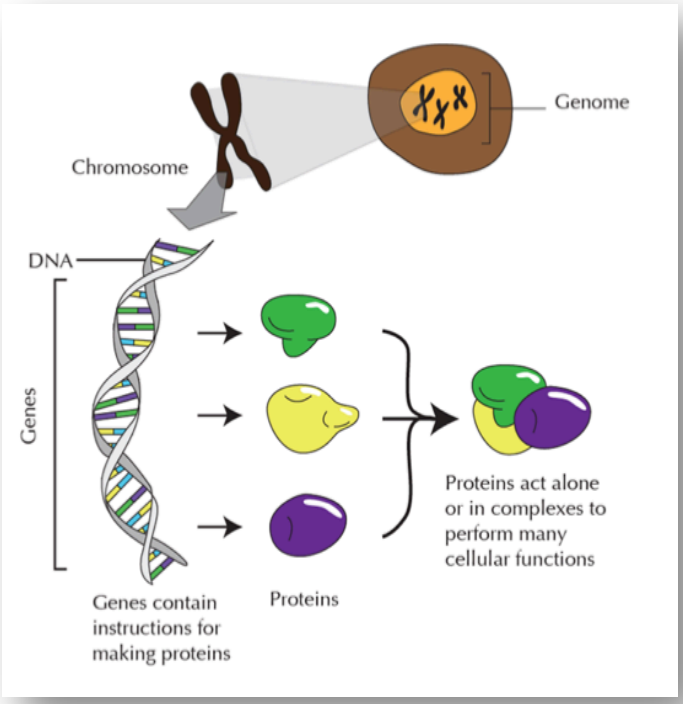
Twizzler™ DNA, the DNA Code, Protein Animation

Activity

The central dogma of biology is the synthesis of protein from DNA. The flow of information from the genes determines the protein composition and thereby the functions of the cell. Each cell has a complete set of instructions, called your genome in the nucleus, about how to make more of that cell. The instructions are found in your chromosomes, which are made of tightly wound DNA. DNA contains different segments of nucleotides, called genes, that codes for a specific trait. DNA itself is made of small building blocks called nucleotides. A nucleotide is made of a phosphate, a five-sided sugar and a nitrogenous base. There can be millions of nucleotides needed to make a single strand of DNA. Adenine pairs with thymine and guanine pairs with cytosine. The order of the nitrogenous bases determines the traits an organism will have.



Part 1: Twizzler™ DNA Instructions

1. The Twizzler™ must represent your sugar/phosphate backbone.
2. The toothpicks must represent your bonds from the backbone to the base pair. Before building your DNA molecule, snap your toothpicks into halves, creating 10 available bonds.
3. The Dots™ candy must represent your base pairs:
   _____ color Dot = Adenine (A)
   _____ color Dot = Thymine (T)
   _____ color Dot = Guanine (G)
   _____ color Dot = Cytosine (C)
4. The paper towel must be used for your DNA production site (workspace).
5. Use the guidelines, the image on page 2, and your materials to create your DNA molecule.
6. When your DNA molecule is constructed with five base pairs, call your instructor over to check your molecule. If done correctly, you will get to consume your molecule. If done incorrectly, you must correct your DNA molecule and have it rechecked.
7. Cleanup: Throw paper towel and any unused or unwanted material away in the appropriate place.
8. You may continue with Part 2 on page 3.

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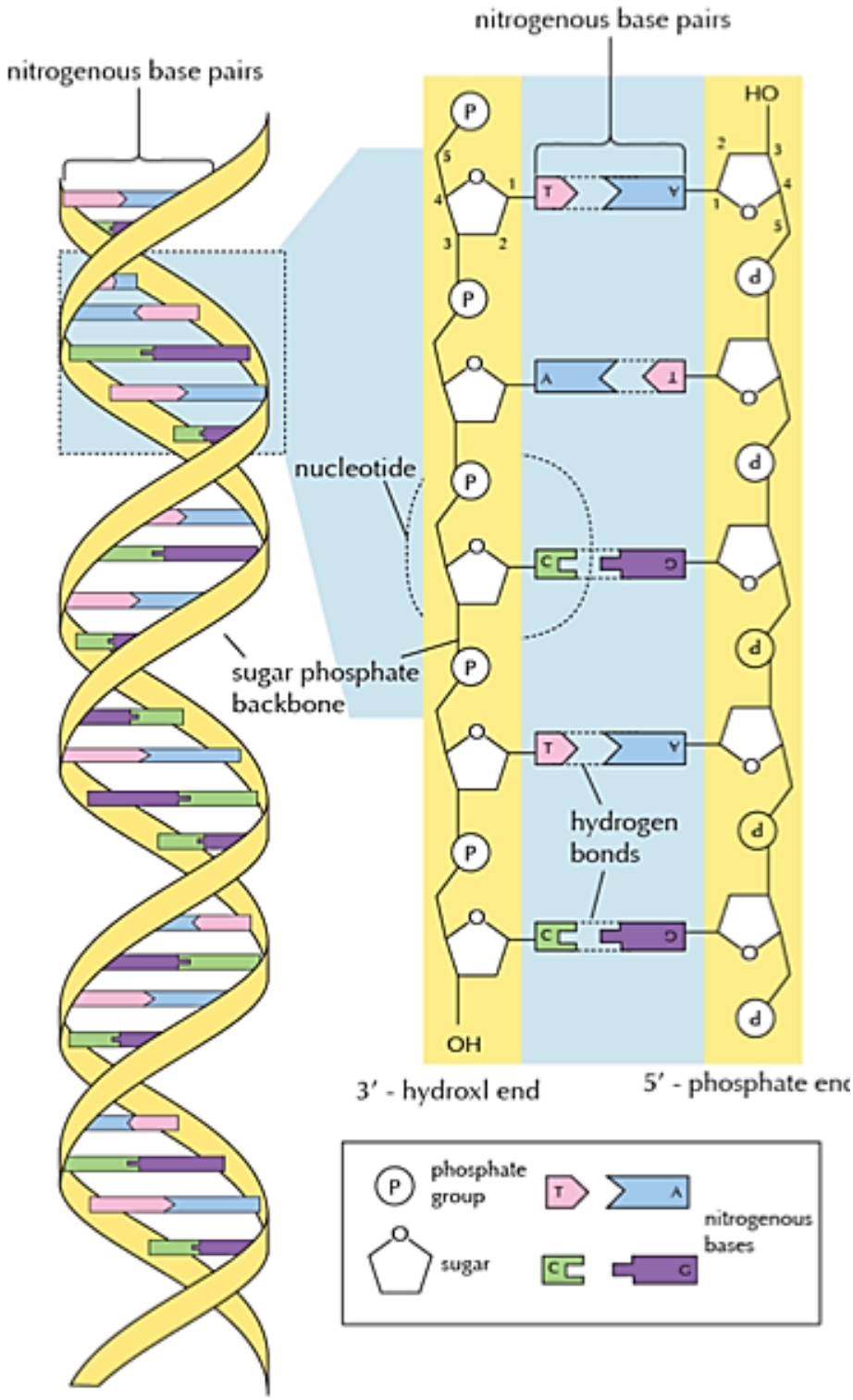
Activity, continued



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Activity, continued

Part 2: DNA Code Instructions

Directions: Complete index card as follows:

1. Name:
2. Message number ____

Translate your message onto your index card to form a sentence using the DNA alphabet code below:

A – GCT	J – ATC	S - TCA
B – GCA	K – AAG	T – ACT
C – TGC	L – CTC	U – ACG
D – GAT	M – ATG	V – GTC
E – GAG	N – GAC	W – TGG
F – TTT	O – GAA	X – GTA
G – GGG	P – CCC	Y – TAC
H – CAT	Q – GAG	Z – TAT
I – ATA	R – CGT	

Part 3: Protein Animation Instructions

After watching the animation(s) on protein synthesis, in groups of two, answer the following questions in your lab journal:

1. How many different nucleotides are in DNA?
2. Which nucleotides bond together (Chargaff's Rule)?
3. The sequence of the DNA makes up a gene. What is the function of a gene?
4. How many different genes are there?
5. What is the relationship between DNA and proteins?
6. How do genes help in the process of accomplishing the essential life functions in the body?