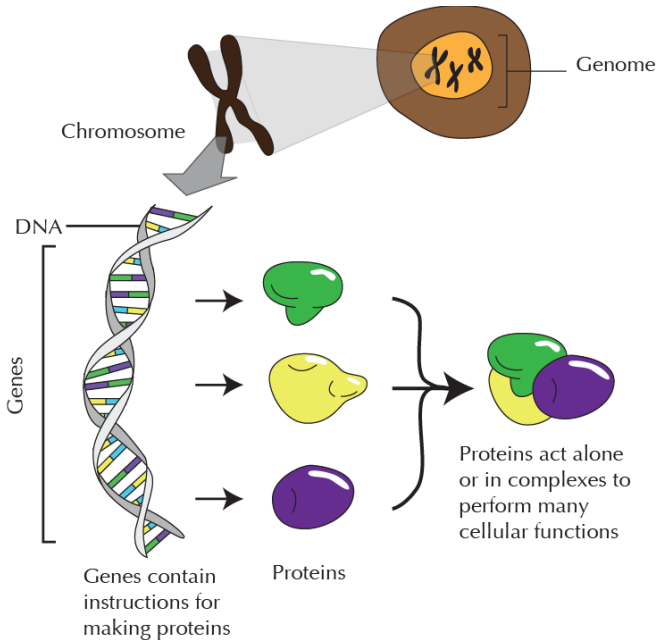
The Genetic Code

Activity

You have learned that nucleic acids, such as DNA and RNA, exhibit an ordered pattern. You also found that it was important to correctly match each nucleotide with its corresponding base pair, A–T and C–G. Now let us examine why base pair sequences are so important.

People often refer to genes as if they cause something to happen—a gene for eye color, a gene for sickle cell, etc. This is somewhat misleading as genes themselves do not take direct action. A gene is a segment of DNA that acts as a blueprint for a particular protein. Proteins are responsible for the traits of an organism. In addition, proteins are the essential building blocks for life activities. Hormones, enzymes, and various cell structures are all made of proteins. You may recall that proteins are made of amino acids, and the combination of amino acids determines the shape and function of a protein. This is where nitrogenous base pairs are important.



The flow of genetic information is DNA to RNA, RNA to amino acid sequence, to protein. In this way, DNA specifies expressed traits.

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Activity, continued

You will work in groups to research different proteins produced by human cells and the functions carried out by them.

Procedure:

Your teacher will assign your group a disorder that is caused by abnormal or missing proteins seen in humans. In your group research and take notes on the following in your lab nootebook:

1. Provide a description of your assigned disease (be sure to include a description of the disease and which protein is affected).
2. Provide a description of how the protein functions under normal conditions.
3. Provide a description of the effects that the abnormal or missing protein has on the body.
4. Report the causes of the protein production mistakes.
5. Write a scientific explanation to support the claim that DNA carries the code for all essential functions of life.

   Claim:
   Evidence:
   Reasoning:

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Rubric for writing a scientific explanation

Points Awarded	2	1	0
Claim	Not applicable.	Answers the question and is accurate based on data.	No claim or does not answer the question.
Evidence	Cites data and patterns within the data. Uses labels accurately.	Cites data from the data source, but not within the context of the prompt.	No evidence, or cites changes, but does not use data from data source.
Reasoning	Cites the scientifically accurate reason using correct vocabulary and connects this to the claim. Shows accurate understanding of the concept.	Cites a reason, but it is inaccurate or does not support the claim. Reasoning does not use scientific terminology or uses it inaccurately.	No reasoning or restates the claim, but offers no reasoning.
Rebuttal	Rebuttal provides reasons for different data or outliers in the data. Can also provide relevance to the real world or other uses for the findings.	Rebuttal is not connected to the data or is not accurate.	Does not offer a rebuttal.