

Children's Story Book

Directions to the Student:

Your assignment is to put together a storybook that explains the details of how DNA specifies the sequence of amino acids in proteins of that organism and how it can be changed through genetic engineering. You are a molecular biologist teaching at a prestigious University and a huge publishing company has found that you are one of the best teachers and they want you break down the information for our children.



Your storybook needs to explain the following phenomenon:

- a) Describe the general structures and functions of DNA, RNA, and protein.
- b) Show how base-pairing rules explain accurate copying of DNA during semi-conservative replication
- c) Show how base-pairing rules explain transcription of information from DNA into mRNA.
- d) The general pathway by which ribosomes make proteins, using tRNA's to translate genetic information in mRNA.
- e) Show how the genetic coding rules predict the sequence (order) of amino acids from a sequence of codons in mRNA.
- f) Explain how mutations in the DNA sequence of a gene may or may not affect the gene expression, or the sequence of amino acids in an encoded protein.
- g) Specialization of cells in multicellular organisms is usually due to different patterns of gene expression rather than to differences of the gene themselves.
- h) Proteins can differ from one another in the number and sequence of amino acids.
- i) How genetic engineering (biotechnology) is used to produce new biomedical and agricultural products.

In order to do the assignment well you should take the following steps:

1. Add a "Test your Knowledge" section: For example, you might want to ask them to transcribe mRNA from DNA and then ask them to translate it to a protein.
2. Add a section on the ethical question:

3. Put together a blank booklet from the construction paper provided by the teacher. (You may also use your own materials if you wish.)

4. On a blank sheet of paper, write a plan for how you will put your storybook together. You should write down all the page numbers and write what diagrams you will put on those pages, and what you will write on each page. You should arrange the diagrams in order that will help you explain a) to i). Don't forget to include pages for your title, your dedication, your introduction and a summary.

5. Glue the diagrams into the book where you want them. Remember to leave room to write your story on gene expression. Write your story on the pages you left blank. This story must explain a) to i) in detail, and must use the pictures to explain what happens in DNA replication, gene expression, and genetic engineering. For example, you might write, "The diagram on the left show that..."

Clear Expectations for Performance:

Your book needs to include:

- A decorated cover with Title ,Author, Class, Period, Date;
- A Dedication Page;
- Diagrams are included and explained;
- Labels on all of the diagrams;
- An original story that uses diagrams to explain a) to i) using at least the following vocabulary terms:

DNA RNA DNA	Codon Nucleotide	Phosphate Group	Protein Genetic
Replication Base	Base Adenine	Double Helix	code rule Amino
pairing rules	Guanine	Complementary	acid
Semi-	Cytosine	Base pair	Mutation genes
Conservative	Uracil	Genetic	Specialized cell
Replication	Thymine	Engineering	Novel biomedical
tRNA	Deoxyribose sugar	Restriction	Products (insulin)
mRNA	Hydrogen Bonds	enzyme Sticky	Novel
Ribosome	Ribose sugar	end Recombinant	agricultural-
Nucleus	Transcription	DNA	Products
Cytoplasm	Translation	Plasmid Gene	Cloning
		expression	

*A paragraph at the end summarizing your entire story. It should be a short review of your story and include a nice conclusion.

Grading Rubric

Use the grading rubric to help you determine whether or not you have done everything that is required to get a good grade.

	Description	Earned Points	Possible Points
	Cover, Title, Author, Period, Date		5
	Dedication page		5
	Diagrams are included and explained, and labels on all of the diagrams		10
A	Describe the general structures and functions of DNA, RNA, and protein		10
B	Show how base-pairing rules explain accurate copying of DNA during semi conservative replication		10
C	Show how base-pairing rules explain transcription of information from DNA into mRNA		10
D	Explain how mutations in the DNA sequence of a gene may or may not affect the gene expression, or the sequence of amino acids in an encoded protein		15
E	Show the pathway by which ribosomes make proteins		15
F	Show how genetic coding rules predict the order of amino acids from a string of codons in mRNA		15
G	Specialization of cells in multicellular organisms is usually due to different patterns of gene expression rather than to differences of the gene themselves.		15
H	Proteins can differ from one another in the number and sequence of amino acids		15
I	How genetic engineering (biotechnology) is used to produce new biomedical and agricultural products		15
J	Test your knowledge page		10
	Total Points		150

Extra Credit * A paragraph at the end summarizing your entire story. It should be a short review of your story and include a nice conclusion.