***Biology I***

***DNA, RNA & Gene Expression Virtual Investigation - INSTRUCTIONS***

**Access the Online Textbook**

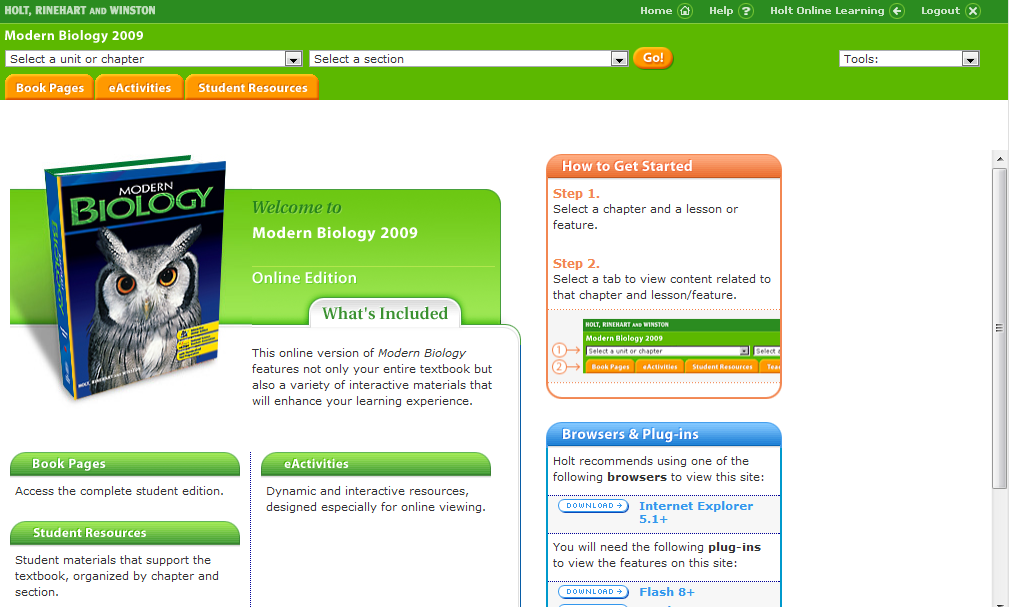
* Holt’s *Modern Biology is accessible by going to the following website and using the log-in information listed.*

*See login and password information below*

Go to: my.hrw.com

Login: astudents90

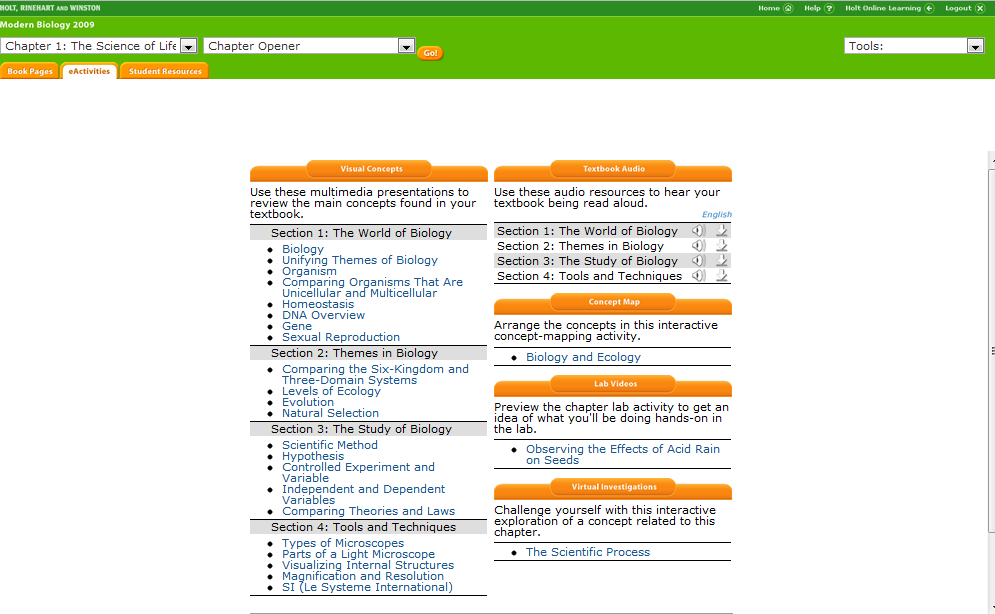
Password: a7k7



From the dropdown menu, select “Chapter 10:

DNA, RNA & Protein Synthesis” then click the “eActivities”

tab.

Click on the “[DNA, RNA, and Gene Expression](javascript:loadPopupVI('/sh2/sh07_10/student/flash/virtual_investigations/hx/hxdna_vi.html');)” link

under the “Virtual Investigations” heading.

**Biology I** Name:

***DNA, RNA & Gene Expression*** Name:

***Virtual Investigation*** Hour:

Navigate through the virtual investigation titled “DNA, RNA & Gene Expression” on the Holt website. Answer these questions as you proceed. This should serve as a refresher on the scientific method. Remember, for full credit you must use complete sentences.

**Part 1 of 5**

Look at the diagram in this part of the investigation. Draw and label a diagram showing the interaction between the following terms/molecules: “DNA”, “replication fork”, “DNA helicase” & “DNA polymerase”

**Part 2 of 5**

Unwind and replicate the DNA strand given. Record the sequence of the two new DNA molecules below.

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Part 3 of 5**

What enzyme is responsible for completing the process in this section?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

Record the sequence of nucleotides in the mRNA molecule you construct in this step.

**Part 4 of 5**

Look at the diagram in this part of the investigation. Draw and label a diagram showing the interaction between the following terms/molecules: “ribosome”, “mRNA”, “tRNA”, “polypeptide” & “amino acid”

List the 6 codons used to build the polypeptide in this step.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Part 5 of 5**

What protein are you synthesizing in this step? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Record the nucleotide sequence in the DNA molecule used in this step.

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

Record the nucleotide sequence in the mRNA molecule used in this step.

Record the sequence of codons used in this step.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |

In people affected by sickle-cell anemia, the amino acid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is replaced by

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in their hemoglobin. This causes the red blood cells to be misshaped.

**On Your Own**

(Answers not found on the website)

What is the start codon? Give its sequence and the amino acid that it codes for.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

List the three stop codons.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is a mutation? How do mutations affect protein?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**EXTRA CREDIT: Parts 4 & 5 of 5**

Use the genetic code to translate the 6 codons used in part 4 & 5 into amino acids. Record your answers below:

|  |  |
| --- | --- |
| Part 4 of 5 amino acids | Part 5 of 5 amino acids |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |