Name: **Date:** **Period:**

DNA Unit: DNA Webquest

Part 1 – History, DNA Structure, DNA Replication

DNA History

http://www.dnaftb.org/dnaftb/1/concept/index.html

Read the text and answer the following questions.

1. What have people wondered since the beginning of human history? _____
2. Who discovered that individual traits are passed on from one generation to the next? In what year?_____

On the menu at the right click on number 15 "*DNA & proteins are key ….*"

3. When was DNA discovered as a major chemical of the nucleus of cells? _____
4. In the early 1900s what molecule was considered to be a better candidate to transmit hereditary information from one generation to the next? _____.
5. Why was protein considered to be a better candidate as the hereditary molecule than DNA?

_____

_____

On the menu at the right click on number 16 *"one gene makes one protein"*

6. What was the conclusion make by Beadle & Tatum? What year was this?

_____

On the menu at the right click on number 17 *"a gene is made of DNA"*

7. What did Oswald Avery's team of scientists conclude from their experiments? In what years?

_____

On the menu at the right click on number 19 *"The DNA is shaped like a twisted ladder"*

8. What did earlier work on DNA show?_____

_____

9. Who won the race to show the 3-dimensional structure of DNA? _____
10. What year was this? _____

Click on animation at the bottom of your screen (step through the animation and answer the following questions

11. What makes up a nucleotide? _____
12. How could DNA be an "intelligent molecule" (carry hereditary information)?

_____

13. What was Erwin Chargaff's contribution to the DNA puzzle?

_____

14. What important tool did Linus Pauling use to determine the structure (shape) of proteins?

_____

15 How was this tool used to help discover the shape of DNA?

_____

16. Name the two scientists that made the x-ray diffraction patterns that Watson & Crick used?

_____

17. The distinctive "X" meant the DNA had what pattern? _____

Go to the DNAi website: http://www.dnai.org/a/index.html
Click on "Finding the Structure" at the bottom of the page, then click on "putting it together" at the top of the new page. Click on the picture next to "base pairing interactive". Go through the steps to determine how the nitrogen bases pair, and how the sugar phosphate backbone is formed. Draw your results in the box below using the diagram at the end of the module.

DNA Replication
Go to http://www.stolaf.edu/people/giannini/flashanimat/molgenetics/dna-rna2.swf
Answer the following questions as you move through the animation of DNA replication.
Before clicking
1. What class of proteins are the molecules with –ase endings? _____
2. Draw a portion of the DNA molecule on the screen.

Click on the large arrow *once. (total of one click)*
3. Draw the portion of DNA that has "unzipped"

More DNA Replication
Click on the large arrow again (total of 2 clicks).
4. What begins to happen on one of the "unzipped" strands?
_____
_____
Click several more times slowly and study what happens.

4. What do you think the molecules are with the –ase endings on them?

_____

5. Can you hypothesize what function they could have in this process?

_____

6. Explain in your own words & draw a diagram of the process of DNA replication (include what you start and end with & what happens in between)

Explanation

_____

_____

_____

_____

_____

_____

Go to the DNAi website: **http://www.dnai.org/a/index.html**

Click on "Copying the Code" at the bottom of the page, then click on "putting it together" at the top of the new page. Select "replication". Watch the animation

1. What is the job of the blue helicase enzyme? _____

_____

2. How fast does it unwind DNA? _____

Part 2 – RNA, Transcription, Translation

RNA

Go to http://www.dnaftb.org/dnaftb/21/concept/index.html

Read the text and answer the following questions

1. Where is RNA commonly found? _____
2. Describe what is meant by the "central dogma" in biology.

_____

_____

_____

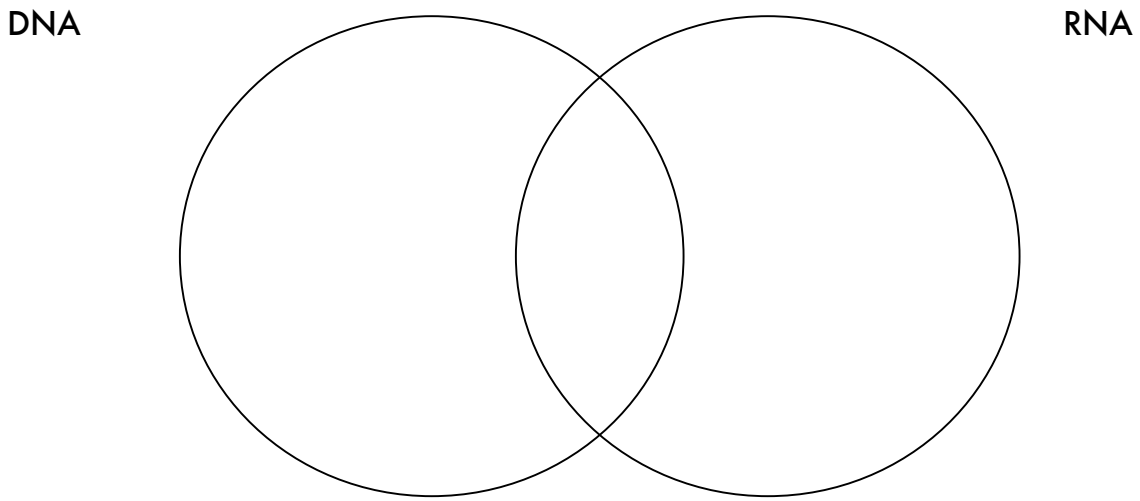
3. Name the 3 types of RNA and the general roles they play in the making of protein.

_____

_____

_____

Click on the animation button below. Step through the animation and compare and contrast the structure of RNA to DNA. Use the Venn diagram to compare and contrast. Then do a sketch of an RNA molecule (at least 10 nucleotides long using the all the appropriate bases at least twice).



RNA Sketch (at least 10 nucleotides long with appropriate nitrogen bases)

Transcription (DNA → RNA)

Go to http://www.stolaf.edu/people/giannini/flashanimat/molgenetics/transcription.swf

Answer the following questions as you move through the animation of Transcription

Before clicking

1. The diagram represents what type of molecule? _____

Click once

2. What type of molecule is the RNA polymerase? _____

Click again

3. What function does the RNA polymerase have? _____
4. Where in the cell do you think this is taking place? _____
5. Explain how the mRNA molecule forms.

_____

_____

_____

_____

Go to the DNAi website: http://www.dnai.org/a/index.html

Click on "Copying the Code" at the bottom of the page, then click on "putting it together" at the top of the new page. Select "transcription". Watch the animation

1. What does the blue molecule do? _____
2. What is the yellow chain? _____
3. What is T replaced with in RNA? _____

Translation (mRNA → protein)

Go to http://www.stolaf.edu/people/giannini/flashanimat/molgenetics/translation.swf

Answer the following questions as you move through the animation of Translation

Before clicking

1. The diagram represents what type of molecule? _____

Click once

2. Where in cell in this taking place? _____

Click again

3. What type of molecule is the tRNA (transfer RNA) bringing to the mRNA? _____
4. Explain (in terms of nitrogen bases) how the tRNA docks on the mRNA ?

_____

Click until the end watching the process of translation

5. As the tRNAs dock on the mRNA bringing amino acids with them what type of molecule is created

_____

Start the animation over

6. What are the 3 nitrogen bases on the tRNA carrying the amino acid "Met"? _____
7. What are the 3 nitrogen bases on the mRNA that the "Met"-tRNA docks upon? _____
8. Check out the next tRNA with its 3 nitrogen bases and see where it docks on the mRNA. Can you detect a pattern. If there are 20 amino acids then what is the minimum number of tRNAs that must exist.

_____

Go to the DNAi website: http://www.dnai.org/a/index.html

Click on "Reading the Code" at the bottom of the page, then click on "putting it together" at the top of the new page. Select "interactive".

9. Practice translation using the computer animation, and write down the final amino acid sequence here:

_____