

Name:

Date:

Period:

DNA Unit: DNA Webquest

Part 1 - History, DNA Structure, DNA Replication

DNA History

<http://www.dnafb.org/dnafb/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 made 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?

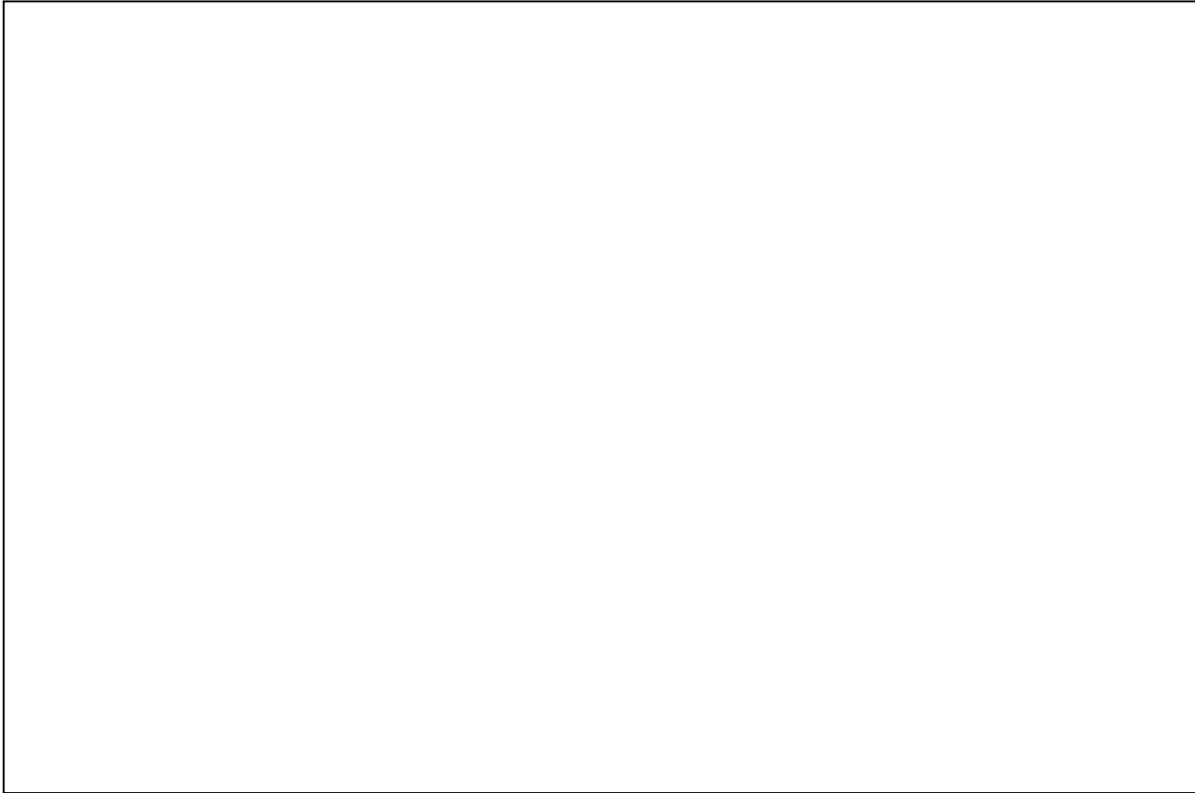
17. The distinctive "X" meant the DNA had what pattern? _____

18. Scroll through the rest of the animation and **summarize** the rest of the story.

DNA Structure

Go to <http://openlearn.open.ac.uk/file.php/2360/formats/print.htm>

Draw figure 2, a DNA molecule 8 base pairs long, and draw its complementary side in the box below (remember to match the nitrogen bases correctly!).



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.

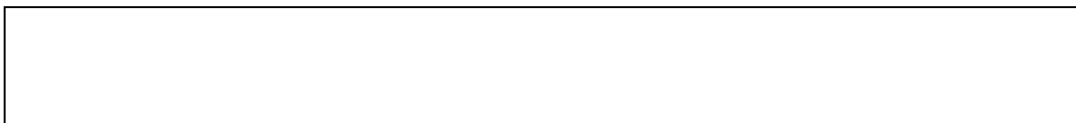
Before clicking

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).

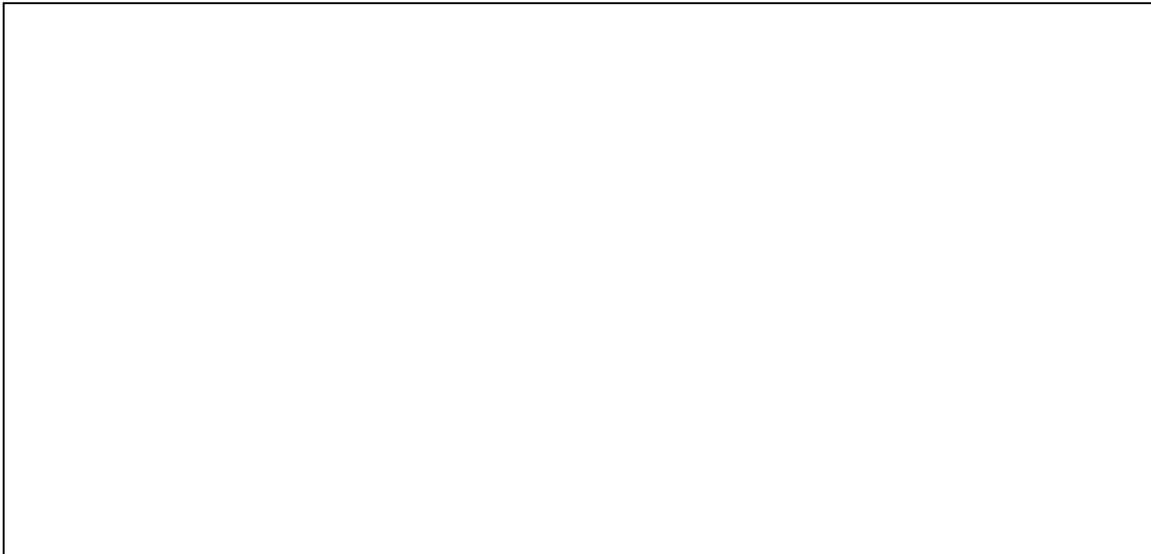
4. What begins to happen on one of the "unzipped" strands?

Click several more times slowly and study what happens.

5. What do you think the molecules are with the -ase endings on them?

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

7. 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

Part 2 - RNA, Transcription, Translation

RNA

Go to <http://www.dnafb.org/dnafb/21/concept/index.html>

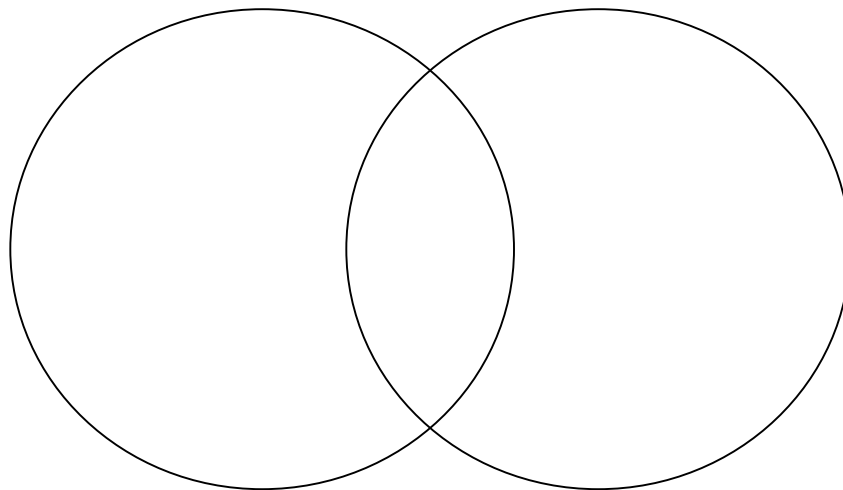
Read the text and answer the following questions

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 nitrogen bases at least twice).

DNA



RNA

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.

6. What nitrogen base replaces thymine on the RNA molecule? _____

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. _____

9. Write a summary of translation using words and a sketch