DNA WebQuest   NAME_____ Period

Topic: Replication and Protein Synthesis
A. Go to: http://www.pbs.org/wgbh/aso/tryit/dna/shockwave.html

Click: "DNA replication" (upper left) and then click "unzip" Read the script, answer the questions below, and then, click "OK".

1.   In a real cell, what does the DNA molecule do before it unzips?

2.   What molecules break the rungs (bases) apart?

Drag the correct bases over to "synthesize" the new DNA halves.
Read script, answer questions, and then click "OK".

3.   How many base pairs are in the real human genome?

Click "protein synthesis" (upper right).   Click "upzip".

4.   How much of the DNA molecule actually unzips in a real cell?

Base pair the nucleotides for just one half of the DNA.
Read the script, answer the questions, and click "OK".

5.   About how many bases would a real mRNA molecule have?

6.   Where does the mRNA go now?

Match the tRNA molecules to their base pair nucleotides on the mRNA.   Answer the questions.

7.   Which molecule has the codons?

8.   Which molecule has the anticodons?

9.   What molecules are attached to the tRNAs?

Click "OK" and continue matching the tRNAs.   Read the script, answer questions, and click "OK".

10.   Where does the first tRNA go?

Continue matching and answer questions.

11.   How long will a real polypeptide chain get to be?

12.   When does translation of the mRNA end?

Topic: Protein Synthesis
B.   Go to: http://learn.genetics.utah.edu/content/molecules/transcribe/

Click the button that says "click here to begin"
Use the keyboard to type the bases that would form the mRNA.
Follow the instructions to determine the order of the amino acids.

13.   List the order of your amino acids.

14.   How did the process know to end?

Read the script on the right side of the webpage.

15.   Describe the process of transcription.

16.   Describe the process of translation.

C.   Go to: http://www.wisc-online.com/objects/index_tj.asp?objid=AP1302
Read the animation page by page – just click the "next" button when you are ready to move on.

17.   How does the mRNA leave the nucleus?

18.   Is just one mRNA molecule made? Explain.

19.   How many amino acids does each codon code for?

20.   Describe the structure of a tRNA molecule.

21.   Where does the energy to form the peptide bond between two amino acids come from?

22.   Can a single mRNA be read more than once? Explain.

Topic: Overview
D.   Go to: http://learn.genetics.utah.edu/content/molecules/
Click on "What is DNA?" at the top and go through the animation.   Answer the questions.

23.   The complete set of instructions for making a human being is found where?

24.   What do genes tell the cell to make?

http://learn.genetics.utah.edu/content/basics/
Click on "What is a gene?" at the top and go through the animation. Answer the questions.

25.   What is the function of the protein hemoglobin?

26.   How is sickle-cell anemia caused?

27.   What are some other proteins that genes code for?

<u>Click</u> on "What is a chromosome?" at the top and go through the animation. Answer the questions.

28.   How long would the DNA in one human cell be?

29.   How is DNA packaged to fit into the small space of a cell nucleus?

30.   How many chromosomes are in a human cell?

31.   Why are there "pairs" of chromosomes?   Where do they come from?

32.   Describe the sex chromosomes.

<u>Click</u> on "What is a protein?" at the top and go through the animation. Answer the questions.
33.   What is the role of proteins in transmitting pain messages?

34.   Describe structural proteins.

35.   "There are proteins involved in the making of proteins." Explain this sentence.

<u>Click</u> on "What is heredity?" at the top and go through the animation. Answer the questions.

36.   Give an example of the environment acting on the expression of a genetic trait.

37.   Where do we get our traits?

38.   Explain how each child born to the same parents will have a different combination of chromosomes.

<u>Click</u> on "What is a trait?" at the top and go through the animation. Answer the questions.

39.   What are the different types of traits that can be inherited?

40.   Give an example of a physical trait that can be influenced by the environment.

41.   Give an example of a behavioral trait that can be influenced by the environment.

42.   Give an example of a predisposition to a medical condition that can be influenced by the environment.

43.   How can two parents WITHOUT hitchhiker's thumb have a child who DOES have hitchhiker's thumb?

44.   What is the definition of complex traits?

Topic: Mutations

F. Go to: http://ghr.nlm.nih.gov/handbook/mutationsanddisorders/possiblemutations

Read the information and fill out the table below:

Type of mutation	Description	Effect on resulting protein
Substitution (Missense)		
Insertion		
Deletion		
Frameshift		

Topic: Replication

G. Go to: http://nobelprize.org/educational_games/medicine/dna_double_helix/

Click on "Play DNA Game"; Click "next" and reading each page, continue to click next until you come to the game.;   Click on organism #1 and match the base pairs as fast as you can!   It is hard.
Click Next and then click on each organism until you identify the one that belongs to chromosome #1;   continue playing the game with the other two chromosomes, filling in the chart below.
Be careful, other teams may get different results.

Chromosome #	How many chromosomes?	How many base pairs?	How many genes?	What is the organism?
1				
2				
3				