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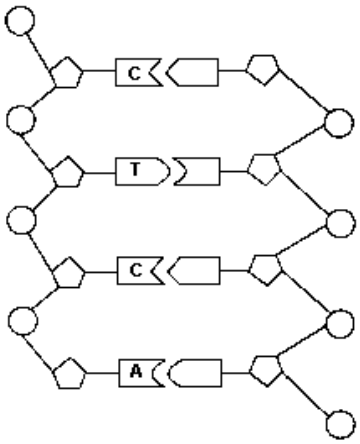
Unit 3 - DNA & Protein Synthesis
Unit Test Review
Honors Biology

ATTENTION - This review packet does not contain review questions for biotechnology and genetic engineering. **You are still responsible for knowing that information.** Use your notes & virtual labs to study that material.

Use the picture below to answer questions #1-4.



1. In the picture, what do the circles represent?

_____

2. In the picture, what do the pentagons represent?

_____

3. In the picture, what part of the DNA molecule do the G, T, C, and A represent? _____

4. What does a pentagon, circle and A(or G,C,T) together represent?

_____

5. What is the shape of a DNA molecule?

_____

6. What type of bond holds the rungs together in the middle of the DNA molecule? _____

7. Which nitrogen containing bases pair up together? _____with _____, and _____ with _____

8. DNA is found in the _____ of the cell and its function is _____

9. Who discovered the structure of DNA? _____

10. If 10% of the DNA in a cell is thymine, what percentage of the DNA is guanine?

11. Why does DNA replicate? _____

12. During replication, what enzyme breaks DNA into two separate pieces? _____

    What bond is broken during this process? _____

13. Is the new DNA molecule made up of new or old DNA? Or both? Explain using the term that describes this. Draw a picture to help explain this if needed!

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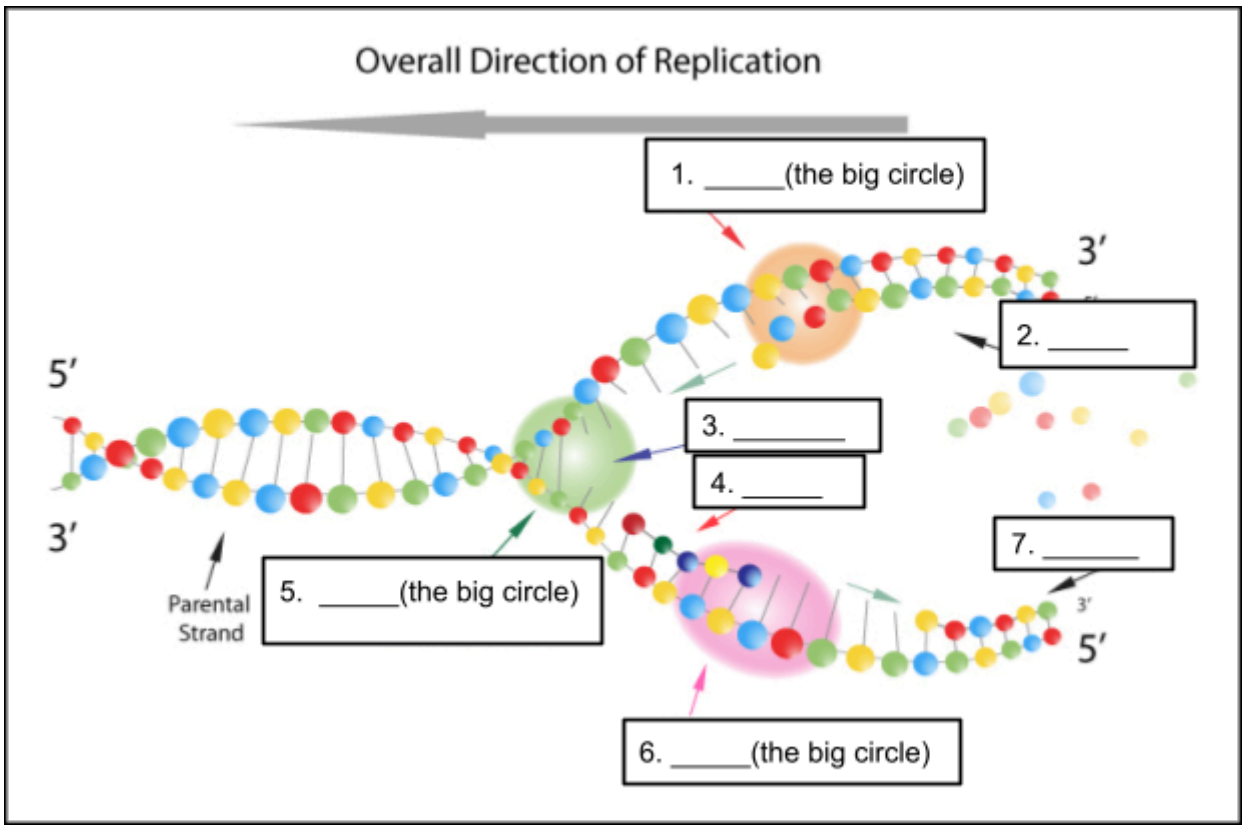
14. Label each number with the correct name, use the following:

a. Lagging strand	d. Helicase	g. Replication fork
b. Leading strand	e. Primase	
c. DNA polymerase	f. Primer	



15. During replication, DNA polymerase cannot just begin adding nucleotides because it doesn't know where to start. What enzyme helps DNA polymerase locate where to start and what is this enzymes function?

16. DNA polymerase has 2 specific jobs, what are they?

17. What stage of the cell cycle does DNA replication take place? _____

18. What are the two main steps of protein synthesis? Where does each step take place?

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19. List the three different types of RNA and explain what they do.

    a.

    b.

    c.

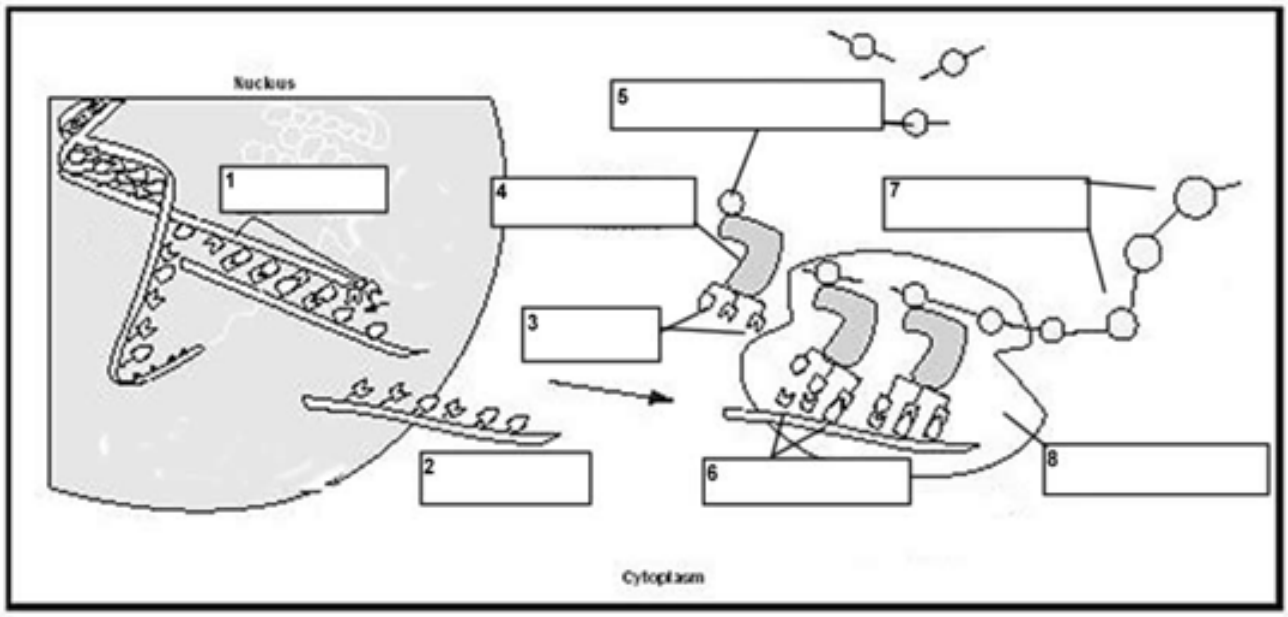
20. Explain what takes place during transcription. BE DESCRIPTIVE - WRITE IN COMPLETE SENTENCES

21. What is a codon? What does it code for? What type of RNA has codons?

22. What is an anticodon? What type of RNA has anticodons?

23. Explain what takes place during translation. What molecules and organelles are involved? What is the end product?

24. Label the picture of protein synthesis shown below with the following terms: **Amino Acid, Protein, Codon, Anticodon, Gene/DNA, tRNA, mRNA, & Ribosome.**



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25. Find the original DNA strand by using the tRNA sequence (Hint: first change the tRNA into mRNA, then turn the mRNA into DNA):

    tRNA: ACGGCGAUCUAGUCA

26. Using the DNA sequence below, find the tRNA sequence of codons (hint: first change the DNA to mRNA, then change the mRNA into tRNA):

    DNA: AGTTCAGTGCTAA

27. List the amino acids the following mRNA strand would code for:

    mRNA: AGUCCAUGCCGUACG

28. Transcribe and translate the following DNA strand: GTTCAGATCCCA

29. What is a point mutation?

    a. What is a silent mutation?

    b. What is a missense mutation?

    c. What is a nonsense mutation?

30. What is a frameshift mutation? Explain what a deletion is. Explain what an insertion is.

31. Which is worse? A substitution mutation or a frameshift mutation? Why?

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32. Using mRNA: AGUCCAUGCCGUACG describe what mutation took place in the following mRNA strand, then explain how the amino acid sequence would be affected:

    mRNA: AGUCAUGCCGUACG

33. Using mRNA: AGUCCAUGCCGUACG, describe what mutation took place in the following mRNA strand, then explain how the amino acid sequence would be affected:

    mRNA: AGCCCAUGCCGUACG