

Biology 12 – Review Sheet

PLO – B4 #10-18, B5, B6, B7, B8

Name: Key.

1. What are the monomers of nucleic acids? What are these monomers composed of?

nucleotides. phosphate, sugar, base

2. Compare and contrast the nucleic acids, DNA and RNA.

double helix single
ATCG AUCG
deoxyribose ribose

3. What is the importance of hydrogen bonds in the explanation of the DNA model?

↑ weak bond between bases - so it can unzip to replicate

4. Define complimentary base pairing and its significance with respect to DNA

A → T
C → G = a template to make a copy.

5. What are the basic steps involved in DNA replication?

6. Where are the master instructions for protein synthesis located in a cell?

Nucleus.

7. DNA is described as a zipper and a corkscrew. Unwound, it looks like a ladder. Of what substances are the rails and rungs composed?

rails = phosphate / sugar
rungs = bases.

8. What are the four possible combinations in the base pairing?

A-T C-G
T-A G-C

9. What is the significance of the complementary base pairing?

→ helps DNA make a perfect copy of itself.

10. What is the function of DNA in the cell?

to give info for replication + protein synthesis

11. If a DNA molecule is composed of 35% guanine, what is the percentage of adenine?

35% cytosine ↑ 15%

12. What is a cell undergoing DNA replication preparing to do?

divide

13. During DNA replication, what is the step in which nucleotides are joined?

↳ complimentary base pairing

14. During DNA replication, which bonds are broken? Which bonds are kept intact?

15. Explain the term semi-conservative with respect to DNA replication.

1/2 old (parent) 1/2 new (daughter)

16. What is recombinant DNA?

DNA combined from 2 different sources.

17. Describe three uses for recombinant DNA

1. cloning genes
2. makes vaccines, hormones (insulin)
3. gene therapy

18. What is the name for process of copying genetic information from DNA to RNA?

transcription

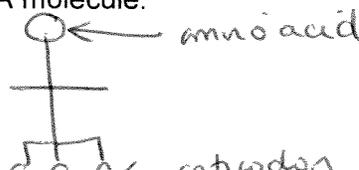
19. What is the function of the endoplasmic reticulum?

↳ ribosomes - protein synthesis - make proteins.

20. Name the building blocks of protein.

amino acids.

21. Draw a simplified model of the tRNA molecule.



22. What is the function of tRNA? *to carry amino acids to the mRNA @ the ribosome*
anticodon matches with codon
23. Explain the roles of the codon and anticodon.
mRNA binds (hydrogen bond) to tRNA
24. How many nucleotides are needed to make a protein of 30 amino acids? Explain.
3 nucleotides per codon - so $3 \times 30 = 90$ + 3 for stop codon = 93
25. If a tRNA molecule had the anticodon GCU, which amino acid would it be carrying?
CGA - arginine
26. If the sequence on the DNA molecule is AGC, what would be the anticodon of the corresponding tRNA molecule?
UCG mRNA
AGC - anticodon
27. Distinguish between transcription and translation in terms of substances involved, main events occurring, and location *nucleus* , *ribosome*.

28. Transcribe the following sequence of DNA into mRNA and then translate into a polypeptide chain (protein).

DNA: TACCCGAAAGCTGCTTATTATGGGCGC

mRNA: AUG GGC UUU CGA CGA AUA AUA CCC GCG

Protein:

meth. glyc. phenyl arg. arg. iso iso pro. ala.

29. What are the roles of the following in protein synthesis: tRNA, mRNA, nucleolus - *makes rRNA*

30. Match each of the following descriptions to the step they belong to:

- a) Ribosome moving along a mRNA *elongation*
- b) Adenine bonding to thymine *DNA replication*
- c) An amino acid bonding to a specific tRNA *for protein synthesis - initiation + elongation*
carry amino acid in amino acid *message for DNA* *→ to make protein*
- d) Forming of peptide bonds *between amino acids*

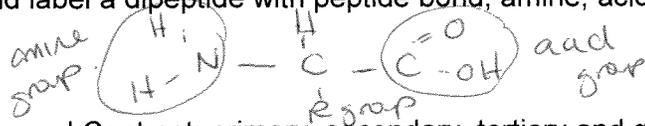
31. Describe the difference between a point mutation and a frameshift mutation. Which one will alter the sequence of amino acids more?

frameshift *one base switched for another* *due to addition or subtraction (deletion)*

32. What are some examples of mutagens?

UV light, X rays, radioactive elements, pesticides, cigarette smoke

33. Draw and label a dipeptide with peptide bond, amine, acid and R groups.



34. Compare and Contrast: primary, secondary, tertiary and quaternary structure.

primary - chain of amino acids peptide bond

secondary - alpha helix or pleated sheet due to hydrogen bond

tertiary - folded - due to ionic + covalent bonding between R groups

quaternary - 2 tertiary protein combined - all form of bonding