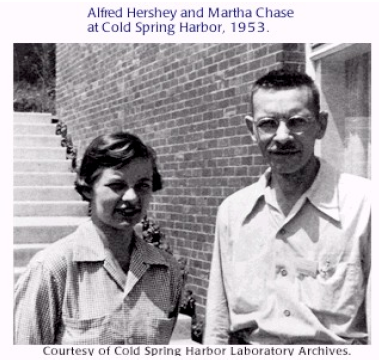
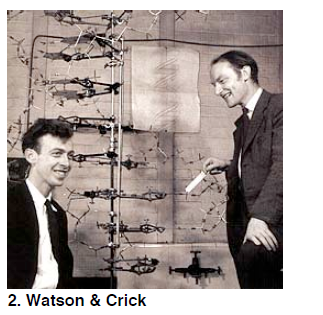
DNA and Protein synthesis Review

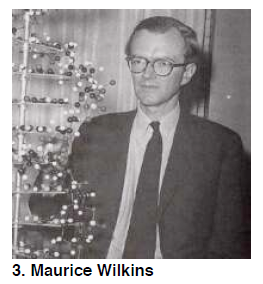
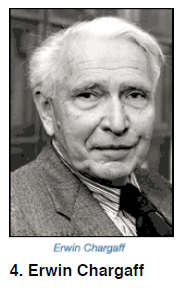
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DNA Scientists: Answer the following questions about the following scientists experiments.

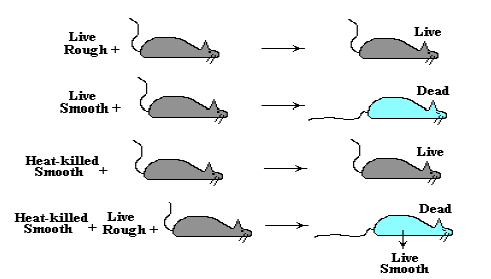
1. Hershey and Chase 2. Watson and Crick

|  |  |
| --- | --- |
| 1. Which two molecules was the possible genetic material of chromosomes? \_\_proteins and DNA\_\_\_\_\_\_\_\_\_\_\_\_\_ | a. What did Watson and Crick discover? \_\_\_\_\_\_\_\_\_\_\_\_DNA shape\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 1. From their experiment what conclusion was made? DNA is genetic material | b. What is the shape of DNA?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_helix\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 1. What two organisms did they use to determine DNA was the genetic material? Bacteria and bacteriophage |  |

3. Maurice Wilkins 4. Erwin Chargaff

|  |  |
| --- | --- |
| a. What did Maurice Wilkins give Watson and Crick?  A picture of DNA | a. What is Chargaff’s rule? Amounts of A= T and amounts of C=G in a sample of DNA |
| b. Who did he work closely with? Rosalind Franklin |  |



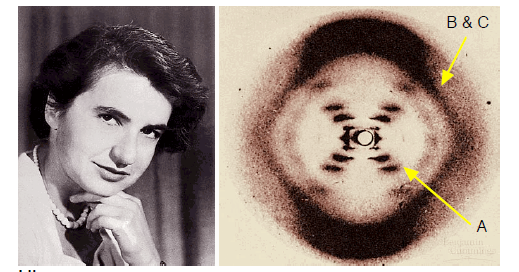
5. Fredrick Griffith’s Experiment

a. What type of bacteria did Griffith work with? \_\_\_Streptococcus pnemonia\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. What strain was virulent (harmful)? \_\_\_\_\_\_\_smooth strain\_\_\_\_

c. What strain was harmless? \_rough strain\_\_\_\_\_\_\_\_

d. What term did he phrase that means bacteria takes in outside DNA and genetically change? \_\_\_\_\_\_\_\_\_transformation\_\_\_\_\_\_\_\_\_\_



6. Rosalind Franklin

a. What did Franklin do with DNA? \_took pictures of it\_\_\_\_\_\_\_

b. What type of technology did she use to take pictures of DNA? \_\_\_\_\_\_\_\_\_\_X-ray crystallography\_\_\_\_

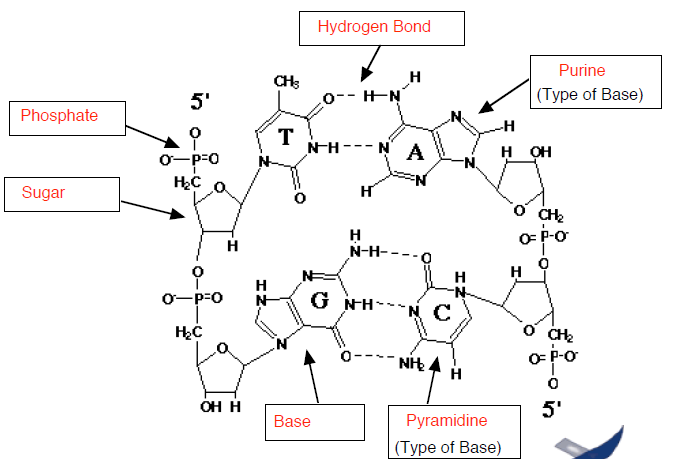
c. What does the picture above show about DNA? \_\_\_\_\_\_\_\_\_shape of DNA\_\_\_\_\_\_\_

d. What are the structures labeled A? Bases\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e. What are the structures labeled B and C? phosphate and sugars\_\_\_\_\_\_\_

The structure of DNA:

7. Label the diagram



8. What type of sugar is found in DNA? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Deoxyribose\_\_\_\_\_\_\_\_

9. What type of bonds hold the bases of DNA together? \_\_\_\_\_\_hydrogen\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. Which two molecules form the back bone of DNA? \_\_\_\_\_\_sugar and phosphate\_\_\_\_\_\_\_\_\_\_\_

11. What is the monomer of DNA? \_\_\_\_\_nucleotide\_\_\_\_\_\_\_

12. What does DNA stand for? \_\_\_\_\_\_\_deoxyribonucleic acid.

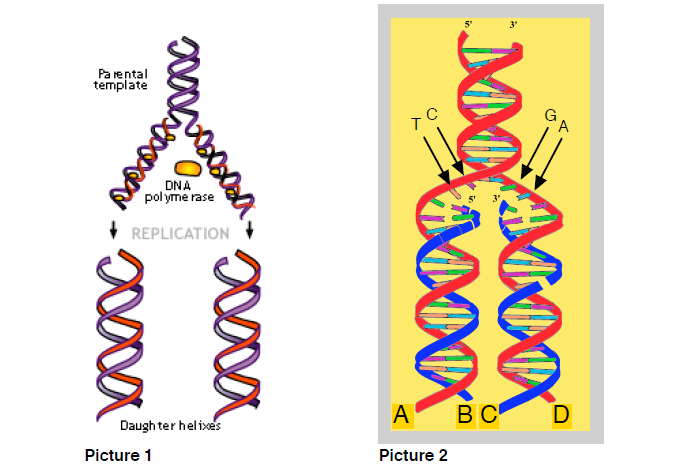
13. Looking at the diagram, what is the difference between a purine and pyramidine? \_\_\_\_\_\_\_\_\_they should put that a pyramidine is a single ring and purine is a double ring\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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14. Which two bases are purines? \_\_\_\_\_\_guanine and adenine\_\_\_\_\_\_\_\_\_\_\_\_\_

15. Which two bases are pyramidines? \_\_\_thymine and cytosine\_\_\_\_\_\_



16. What is the first step of Replication? \_\_\_\_\_DNA molecule unzips\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. Which enzyme helps with the question above? \_\_\_\_helicase\_\_\_\_\_\_\_\_\_\_\_

18. Which enzyme matches up free floating nucleotides to the parent strand? DNA polymerase

19. Why is replication called semiconservative? Because an old strand bonds with a new one

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20. Where does DNA replication occur? \_\_\_\_\_\_\_nucleus\_\_\_\_\_\_\_\_\_\_\_\_\_

21. Why does DNA replication occur? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_so a cell can go through cell division\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Honors only

22. Explain why Okasaki fragments occur on the lagging strand. \_\_\_\_because replication has to proceed 5’ to 3’ and the other strand has to go in the other direction.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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22. Which enzyme is used to fill in spaces in the new DNA strand? \_\_\_\_\_\_\_\_\_\_ligase\_\_\_\_\_\_

DNA v.s. DNA: identify the following characteristics as DNA or RNA.

23. \_\_\_DNA\_\_\_\_\_\_\_\_\_\_\_ contains deoxyribose 24. \_\_\_\_\_\_DNA\_\_\_\_\_\_\_\_\_ contains A, T, C and G

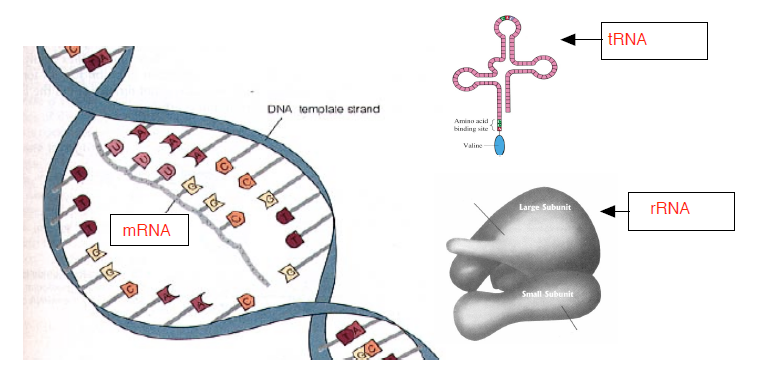
25. \_\_\_RNA\_\_\_\_\_\_\_\_\_\_\_ single stranded molecule 26. \_\_\_\_\_\_\_\_\_\_DNA\_\_\_\_\_ double helix

27. \_\_\_\_\_RNA\_\_\_\_\_\_\_\_\_ contains ribose 28. \_\_\_RNA\_\_\_\_\_\_\_\_\_\_\_ Contains A, U, C and G

29. \_\_\_\_DNA\_\_\_\_\_\_\_\_\_\_ found only in the nucleus 30. \_\_\_\_\_\_RNA\_\_\_ found in nucleus and cytoplasm

31. \_\_\_RNA\_\_\_\_\_\_\_\_\_\_\_ 3 different types

32. Label the diagram below



33. What process makes mRNA \_\_\_\_\_\_\_\_\_\_Translation\_\_\_\_\_\_\_\_\_\_\_\_?

34. What type of RNA makes up the ribosome? \_\_\_\_\_\_\_rRNA\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

35. What type of RNA carries amino acids to the ribosome? \_\_tRNA\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

36. What does the “m” in mRNA stand for? \_\_\_\_\_\_\_\_\_messenger\_\_\_\_\_\_

37. Where in the cell is mRNA made? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Nucleus\_\_\_\_\_\_\_\_\_\_\_\_

38. Where does mRNA go after it leaves the nucleus? \_\_\_\_\_\_\_\_\_\_cytoplasm to ribosome\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

39. What does the “t” in tRNA stand for? \_\_\_\_\_\_\_\_\_transfer\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

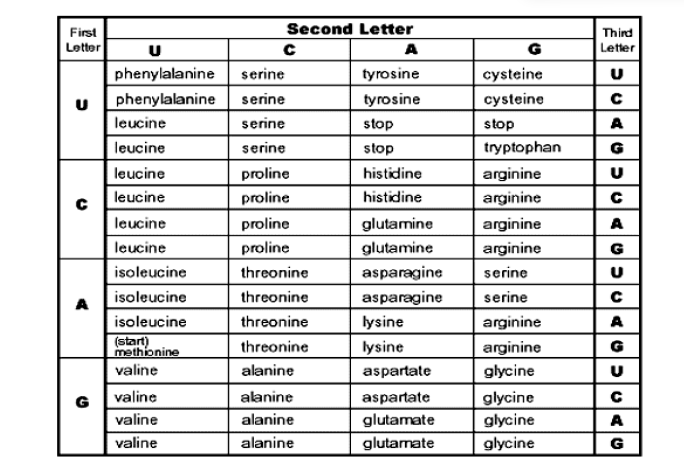
40. What process occurs at the ribosome? \_\_\_\_\_\_\_\_\_\_\_\_\_\_transcription\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

41. What would be the mRNA for the following DNA strand?

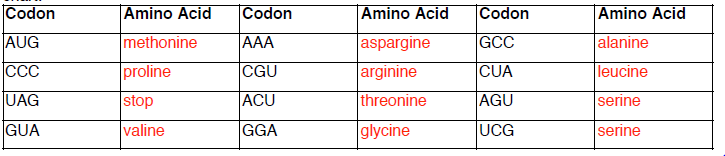
DNA: T A C G G C A T C G T A G C T A

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

Genetic code: Use the chart below to answer the following questions:



42. Indicate the following amino acids that are represented by the codons in the chart.



43. What Amino acid must every protein begin with?\_\_\_\_\_\_\_\_Methionine\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

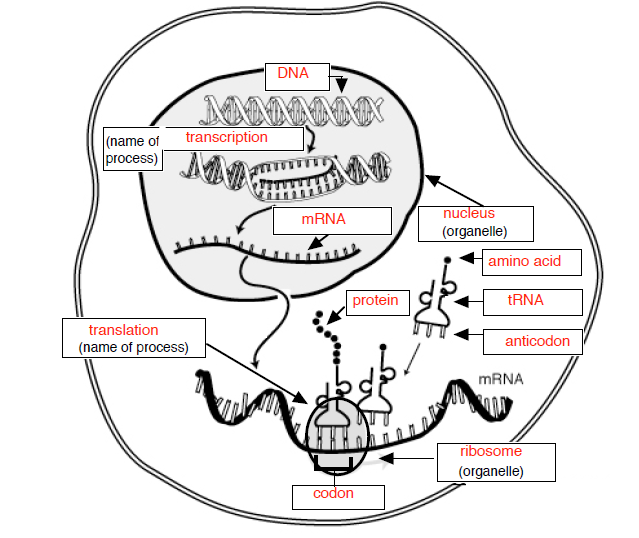
44. Which codon codes for the above question? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_AUG\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

45. What would happen if a transcribed mRNA did not have the codon in question 44? \_\_\_\_\_\_\_translation would not proceed\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

46. What must every protein end with? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_stop\_\_\_\_\_\_

47. Which three codons code for question 46? \_\_\_\_\_\_\_\_\_\_\_\_\_UAA, UAG & UGA\_\_\_\_\_\_\_

48. Label the diagram below.



49. What is the term for the 3 bases on the tRNA that matches with the three bases on the mRNA? \_\_\_\_\_Anticodon

50. What occurs during translation? \_\_\_\_\_\_protein is made\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

51. What occurs during transcription \_\_\_\_\_\_\_\_\_mRNA molecule is made\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

52. How are transcription and translation different? \_\_\_\_\_\_\_\_Transcription occurs in nucleus and makes the message of DNA, translation occurs in the cytoplasm and takes the message of mRNA and makes a protein

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

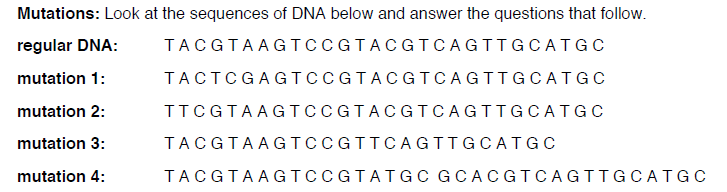
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

53. What does the tRNA carry to the ribosome? \_\_\_amino acid\_\_\_\_\_\_\_\_\_\_

54. What are the bonds between amino acids called? \_\_\_\_peptide\_\_\_\_\_\_\_

55. Which organelle is involved in translation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mutations: use the notes, workbook or textbook to answer the questions below



56. What type of mutation is shown in mutation 1? \_\_\_\_\_\_\_\_\_\_\_\_substitution\_\_\_\_\_\_\_\_\_\_\_\_

57. What type of mutation is shown in mutation 2? \_\_\_\_\_\_\_\_\_\_\_\_point mutation\_\_\_\_\_\_\_\_

58. What type of mutation is shown in mutation 3? \_\_\_\_\_\_\_\_deletion\_\_\_\_\_\_\_

59. What type of mutation is shown in mutation 4? \_\_\_\_\_\_\_addition\_\_\_\_\_\_\_