

Genetic Sequencing Notesheet

C. Kohn, Waterford WI



Name: _____ Hour _____ Date: _____

Date Assignment is due: _____ Why late? _____ Score: + ✓ -
Day of Week Date If your project was late, describe why

Directions: Use the accompanying PowerPoint (*available online*) to complete this sheet. This sheet will be due upon the completion of the PowerPoint in class. These assignments are graded on a +/✓/- scale.

1. Gene sequencing is a process in which _____

2. A gene is _____ that _____ for how to _____

3. A genome is _____

4. Briefly summarize how genetic sequencing has improved each of the following:

a. Medicine: _____

b. Agriculture: _____

c. Evolutionary Biology: _____

d. Environmental Science: _____

5. What had made genetic sequencing exceptionally difficult is that DNA is _____

6. DNA is only _____ wide; a nanometer is _____

7. A human hair is _____.

8. T or F: DNA is smaller than a wavelength of light. _____

9. Summarize how a sample of DNA is acquired by summarizing what you need to know about how each of the following is performed:

Breakdown of the cellular membrane: _____

Separation of the cellular components: _____

Breakdown of the nuclear membrane: _____

Separation of the DNA from the rest of the cellular components: _____

10. What is the first step of the Sanger Method? _____

How is this accomplished? _____

How can bacteria be used to replicate DNA? _____

11. After the DNA has been replicated, it has to be denatured. What does this mean? _____

Why is this necessary? _____

12. After the sample of DNA has been replicated and denatured, explain the role that each of the following play:

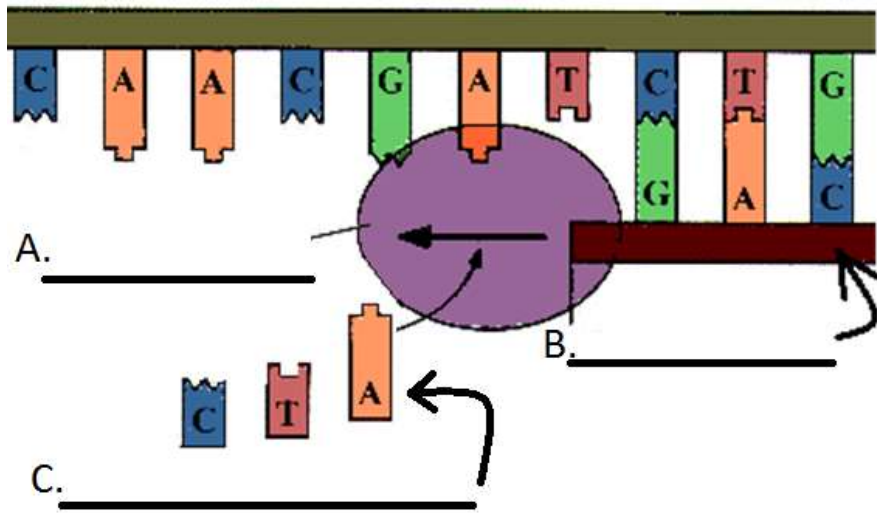
Polymerase: _____

Primer: _____

Nucleotide Bases: _____

ddNTP: _____

13. Label each of the following in the image below:



14. A primer is like _____ . How so? _____

15. In what major ways is a ddNTP different from a nucleotide?

16. How do these differences between ddNTPs and nucleotides enable the Sanger Method to read DNA? Explain by summarizing how the Sanger Method works. Use all of the space provided.

17. Draw how the Sanger Method functions in the space below.

18. Create a timeline of the Human Genome Project by explaining the significant steps that occurred for each year:

1970s: _____

1990: _____

1998: _____

1999: _____

2001: _____

Both reports found that there are about _____ genes in the human body and that human DNA is _____% identical from person to person.

2003: _____

19. The Human Genome Project was completed over _____ of schedule and _____ budget.

20. How significant was the Human Genome Project as an accomplishment? Explain: _____

21. T or F: Now that the human genome has been sequenced, this work is complete. _____ Explain: _____

-----*BREAK*-----

22. T or F: Next Generation Sequencing is one specific method for sequencing DNA. _____

23. NGS is a _____ term for all of the _____ of reading genes and genomes that are _____ than the Sanger Method.

24. How does pyrosequencing differ from the Sanger Method? _____

25. How can pyrosequencing be used to determine the order of bases in a sample of DNA? _____

26. Summarize how each of the following functions in order to enable the sequence of bases in a sample of DNA to be read:

454-Roche Pyrosequencing: _____

Illumina Bridge Sequencing: _____

Ion-Torrent Sequencing: _____

Nanopore Sequencing: _____

27. T or F: most of the DNA in an organism like a human, a dog, or a cow does not code for anything. _____

28. What is an intron? _____

29. What is an exon? _____

30. What is an Open Reading Frame? _____

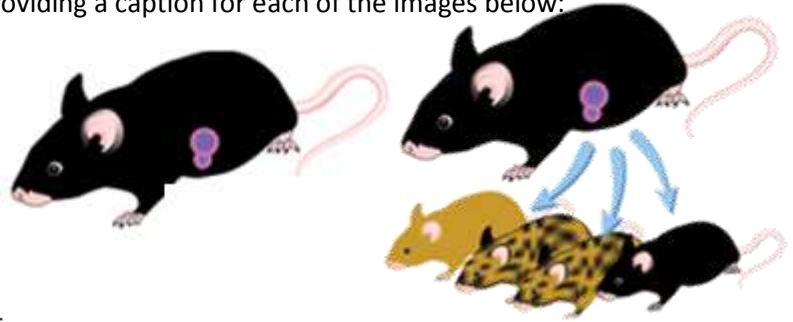
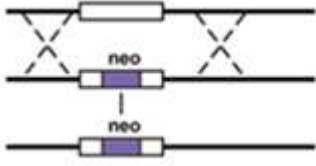
31. How can an ORF be used to tell an intron from an exon? _____

32. Once an exon has been identified, a researcher only knows _____

33. One of the most widely-used methods to determine the function of a gene is called _____

34. What is a knockout mouse? _____

35. Summarize how a knockout mouse is made by providing a caption for each of the images below:



36. A knockout mouse is a chimera. What does this mean? _____

37. Why is it necessary for a knockout mouse to be a chimera? Why not replace the unknown gene in all of the cells?

38. What is BLAST? _____

39. How can BLAST be used to determine gene function? _____



This page is designed to help raise your grade while enabling you to develop skills you will need for after high school. You will need to complete every question and blank in order to receive full credit for your notes. Note: if you cannot come up with a strategy to remember a difficult concept on your own, see your instructor for help.

1. What is a topic or concept from this unit that you found to be more challenging? Write or describe below:

In the space below, create a mnemonic, rhyme, analogy, or other strategy to help you remember this particular concept:

2. What is a 2nd topic or concept from this unit that you found to be more challenging? Write or describe below:

In the space below, create a mnemonic, rhyme, analogy, or other strategy to help you remember this particular concept:

3. What is a 3rd topic or concept from this unit that you found to be more challenging? Write or describe below:

In the space below, create a mnemonic, rhyme, analogy, or other strategy to help you remember this particular concept:

4. Circle the most appropriate response. You will only be graded on whether or not you completed this section.

Circle one: I used my notes outside of class to prepare for the quiz. Definitely – Yes – Sort of - No

Circle one: I took extra notes in the margins for very difficult concepts. Definitely – Yes – Sort of - No

Circle one: I created a personal strategy for at least three difficult items. Definitely – Yes – Sort of - No

Circle one: I was very involved and actively studying during the quiz review. Definitely – Yes – Sort of - No

Circle one: I think I will be satisfied with the quiz grade I received this week. Definitely – Yes – Sort of - No

Circle one: I might need to meet with the instructor outside of class. Definitely – Yes – Sort of - No