Genomics – Reading What We Can’t See By 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

**Units**

1. Mendelian Genetics

2. FFA

3. DNA  
4. Proteins  
5. Ag Genetics  
6. Biotechnology  
7. Genomics  
8. PCR  
9. Southern Blotting  
10. Cloning  
11. Stem Cells   
 **Weekly Schedule: See Board and record**   
Mon  
  
  
  
Tues  
  
  
  
Wed  
  
  
  
  
Thurs  
  
  
  
  
Fri

If you had to ‘read’ DNA, what would you have to do before you could even begin to analyze the DNA?

If DNA is too small to be seen, how can scientists read DNA?

Would every cell in the body have the same DNA? Explain:

Does it matter what cells we use? Explain:

When a scientist “reads” DNA, what part of the DNA are they actually reading?

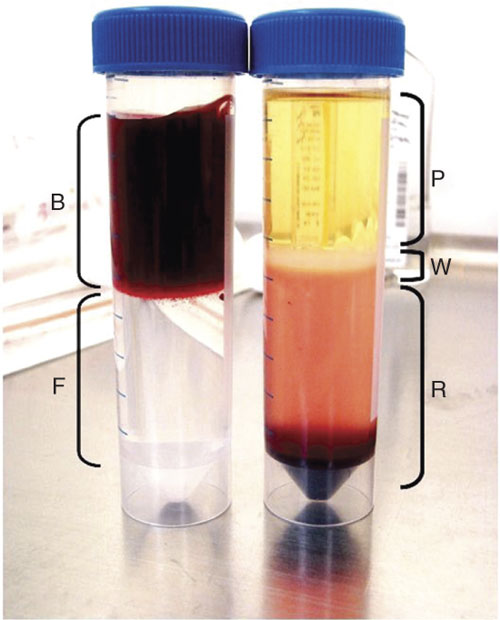
Circle one: *I have learned some of this material in previous classes.* Definitely – Yes – Sort of - No

Circle one: *I need to review my notes & practice before the quiz.* Definitely – Yes – Sort of - No

Circle one: *I have never seen or heard of some of these concepts.* Definitely – Yes – Sort of - No

Circle one: *This may be a challenging unit for me personally.* Definitely – Yes – Sort of - No

**Directions**: Use the accompanying PowerPoint (<http://bit.ly/genomics-ppt>) 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. To study DNA, scientists must first
2. When taking a blood sample, scientists or doctors would use the because they, like most cells, each contain your entire genome.
3. The first step is to   
   1. This means to put it into a machine that
   2. This causes the denser, heavier portions of the blood to
   3. The lighter components will
4. The work of Dr. pioneered much of this kind of work.
5. Label each of the following portions of the blood sample to the right:   
     
   A.  
     
   B.  
     
   C.

A

B

C

1. After centrifuging and removing the white blood cells, they are
2. The sample is then again to separate the   
     
    from the rest of the cell.
3. Next, we have to break open the to get to the   
   1. The nuclei can be broken open using a mild like
4. Special enzymes are added to
5. After the ‘cleaning’ process is done, is added   
   1. DNA is not in alcohol, so it and to the top
6. Write the six steps of DNA isolation below:
7. The is what we use if we want to
8. The Sanger Method works by   
     
      
   1. Each copied strand of is coded.
   2. This is determined by the .
   3. By lining up the stretches of DNA to we can read   
        
      the colors and translate them into a
9. The same gene copied many times, but each time the copying was stopped at
10. The first step of the Sanger Method is to   
    1. These chunks are created using a
    2. A restriction enzyme is sort of like a scissors that only cuts DNA   
         
       when it sees a
11. Once we’ve cut out the gene we’re interested in, we can put it into a   
    1. The bacterial cell will divide, its DNA and the inserted gene over and over again.
12. In the third step, DNA is removed from the bacterial cells and   
    1. The DNA is also so that it can be
    2. Denatured means to become
13. In Step 4, are added to tell the polymerase where to add   
    1. The primers are sort of like and tell polymerase where to start
14. Once the DNA has been , we can add the
15. A ddNTP is a
16. ddNTPs are just like regular nucleotides, but with one crucial difference –
17. A ddNTP will also be ‘tagged’ with a , and each base has a
18. Once the ddNTPs are finished, we put all of the copies of that gene into a
19. We run through the gel, and the DNA will move towards the   
      
     end of the current (because DNA is charged. )  
    1. As it moves through the gel, the smaller fragments will move than the large fragments
20. Each gene will end with the color of the
21. A computer will then read each color and record the
22. The computer isn’t looking at just *one* individual nucleotide, but a collection of
23. Each stretch of DNA is dyed the same color corresponding to
24. A problem we face when reading DNA is that
25. Introns are genes for – they aren’t used to create
26. On the other hands, exons are genes that
27. Exons have an or ORF  
    1. An ORF means that
28. A computer can be programmed to look for that would tell us that a gene is an intron
29. If none are found, we know that the stretch of DNA is a
30. Since its completion in 2003 (2 years ahead of schedule), the Human Genome Project has found over genes for human disease have been discovered
31. Over proven tests now exist for genetic diseases as a direct result
32. Genomics Review Concepts – Can you answer each of the following? Rank yourself for each item:
    * + ✓ - To sequence DNA, what kind of cells would we normally use?
    * + ✓ - What does it mean to centrifuge a blood sample?
    * + ✓ - How do we get to the nuclei from inside of cells? What must we do to the cells?
    * + ✓ - How are nuclei separated from the rest of the cell?
    * + ✓ - How is the DNA removed from the nucleus?
    * + ✓ - How is the DNA separated from the rest of the cell contents?
    * + ✓ - What method reads DNA letter by letter?
    * + ✓ - What do we use to break up the DNA into manageable chunks?
    * + ✓ - What do we use to make copies of the DNA?
    * + ✓ - What does it mean to denature DNA?
    * + ✓ - What does a primer do for DNA?
    * + ✓ - Why is polymerase added to the DNA?
    * + ✓ - What is a ddNTP? Why is it important for this process?
    * + ✓ - Why is a gel needed for this process? What does it do for the DNA?
    * + ✓ - How does a computer determine the base sequence from the DNA in the gel?
    * + ✓ - What is the difference between an intron and an exon?
    * + ✓ - How does a scientist tell the difference between an intron and exon?
    * + ✓ - Why was the Human Genome Project important for science?

Unit Wrap-up C. Kohn, Agricultural Sciences - Waterford WI

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, so be entirely honest with yourself when completing 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