Genetic Testing 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. Genetic testing is
2. What are some examples of substances that can be analyzed using genetic testing?
3. Name five things that genetic testing would enable a scientist to do:
4. Summarize each of the following using the space available:   
     
   Genomics:   
     
   PCR:   
     
   Gel Electrophoresis:   
     
      
     
   Southern Blotting:   
     
      
     
   ELISA:
5. PCR is a technique in which   
     
   is to create of a specific   
     
   \_ (called the ).
6. When DNA is replicated in a cell, what opens the DNA?   
     
   What adds bases to duplicate the strand?   
     
   In PCR, what opens the DNA? What is this process called?
7. What is a primer?
8. Summarize two reasons for why primers are important for PCR:
9. How does a primer affect where polymerase begins adding bases?
10. How many primers are needed for PCR each time? Why?
11. What is a thermal cycler?
12. Why can’t regular polymerase be used for PCR?
13. What is Taq polymerase?
14. Where was it discovered?
15. How is the replication/amplification of DNA in PCR differ from the Sanger method?
16. PCR alone does not   
      
    - it only
17. To acquire information from this target sequence, the DNA must be   
      
    and .
18. What is used to cut up DNA? Which is sort of like a   
      
     for
19. For the following DNA sequence, show how EcoRI would cut it: G G T A T G G A A T T C A A G C T T A G C   
     C C A T A C C T T A A G T T C G A A T C G
20. For the following DNA sequence, show how HindIII would cut it: G G T A T G G A A T T C A A G C T T A G C   
     C C A T A C C T T A A G T T C G A A T C G
21. Once the DNA target sequences has been using   
      
    the cut DNA can be into   
      
    using a .
22. What is gel electrophoresis?
23. How is DNA moved through the gel? Why does the DNA move?
24. As DNA moves through the gel towards the positive electrode, the smaller fragments of DNA will move   
      
     than
25. This will create a specific to the   
      
    from whom
26. If most living organisms have similar genomes, explain how each individual of each species has a unique genetic fingerprint. Be sure to include the following: *intron, exon, protein, STR.*
27. What is an STR?
28. What is a microsatellite?
29. The number of STRs an individual has at different genetic locations will be mostly   
      
    than what has at
30. What is the likelihood that two unrelated people would have the same   
    number of STRs at a dozen different genetic locations? in
31. What is DNA Fingerprinting?
32. Summarize how PCR-Electrophoresis and DNA Fingerprinting could be used for crime scene investigation.
33. Which the suspect had DNA at the scene of the crime in the PowerPoint?
34. Does this mean that this suspect committed the crime? Explain:
35. Summarize how PCR-Electrophoresis and DNA Fingerprinting could be used to diagnose a genetic disease.
36. Based on the electrophoresis gel on this slide, which individual(s) has the genetic disease?   
    *Hint: whose gel matches the mutated control?*
37. Summarize how PCR-Electrophoresis and DNA Fingerprinting could be used to determine paternity.
38. Based on the electrophoresis gel on this slide, is this the child’s biological father? Explain:   
      
       
      
       
    *Hint: do all of the child’s alleles come from either the mother or the father?*
39. Summarize how PCR-Electrophoresis and DNA Fingerprinting could be used to improve agriculture.
40. Summarize how PCR-Electrophoresis and DNA Fingerprinting could be used to protect or understand ecology.
41. What is Southern Blotting?
42. Southern Blotting allows a scientist to determine if a   
      
    has a specific without having to go through the   
      
    \_ or of running the
43. It provides the of the at the cost and   
      
    ease of .
44. Summarize the four steps of Southern Blotting:
45. Why bother using a complicated test to determine a genetic disease? Why not just look for symptoms?
46. Is Southern Blotting only used to find damaged mutated genes? Explain:
47. What is ELISA?
48. Why is ELISA needed? Why not just use Southern Blotting to test for disease?
49. What does ELISA look for?
50. What are antibodies?
51. What are antigens?
52. Antigen is short for
53. Antibodies and antigens are like Explain what   
      
    this means:
54. If an individual has a disease, their blood should
55. Draw an antigen and antibody in the space below:
56. Summarize the two ways in which ELISA is performed:   
      
    A   
      
       
      
       
      
       
      
    B
57. Draw the steps of ELISA below:   
      
    The well of a plate is coated with an antigen for a disease:   
      
      
      
    Blood that may have antibodies for the disease is added:  
      
      
      
    A second colored antigen is added to the wells:  
      
      
      
    The wells containing samples of blood infected with the disease change color:
58. For each of the following, indicate which would be used: Sanger, PCR-Electrophoresis, Southern Blotting, ELISA  
    1. You want to determine if a suspect was at the scene of the crime:
    2. You want to identify if a crop has received a spliced gene:
    3. You want to read the entire genome of a cow:
    4. You want to see if a pig has been infected with PEDv:

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: *My instructor is cool & I want to pay dues to be in their fan club.* Definitely – Yes – Sort of - No