BIOTECHNOLOGY

Study Guide

Name: _____ Date: _____

BIOTECHNOLOGY STUDY GUIDE

Gel Electrophoresis

Figure 1

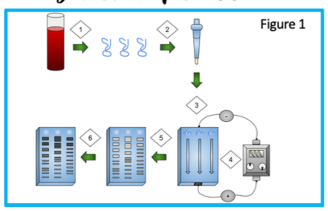
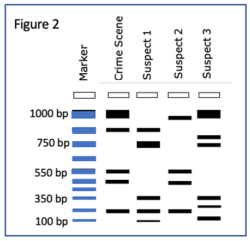


Figure 2



1. The above diagram(s) represents the process of _____.

2. Steps A-E are described below. Put steps A-E in order as they pertain to steps 1-6 of Figure 1. The first one has been done for you: C,_____

A. An electric current is applied to the gel from a power source.
B. Negatively charged DNA moves toward the positive side.
C. A DNA sample is collected.
D. The DNA sample is mixed with restriction enzymes and added to a pipette.
E. Larger fragments move slower and are located near the top whereas smaller fragments move faster and are near the bottom.
F. The mixture of DNA fragments is added into the wells of the agarose gel.

3. According to figure B, which suspect is most likely linked to the crime? _____

4. DNA fragments are read/measured in _____ _____.

5. Why is electrical current required to separate the DNA? _____

6. The size of the DNA fragments plays a role in gel electrophoresis. Not all sizes migrate across the gel equally. Explain how the DNA separates/travels across the gel: _____

7. Figure 2 represents a specialized gel electrophoresis used in forensics, known as _____.

Name one other use/application of gel electrophoresis: _____

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gene that codes for insulin | DNA to open the plasmid and insert the gene of interest | and produce recombinant DNA. | diabetics.

12. Using the diagram above, provide definitions in the table below:

COMPONENET OF PLASMID TRANSFORMATION	DEFINITION/USE
Plasmid	
Gene of Interest	
Restriction Enzymes	
DNA Ligase	

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22. *How* does gene therapy treat an individual's genetic condition? _____

23. Someone from the class next door overheard our class talking about CRISSPR. It sounds familiar to them, but they aren't sure what is is. How would you describe CRISPR to them in 5 sentences or fewer: _____

Wrap

For each ter
Transformat
term.

_____ 24. D
_____ 25. C
_____ 26. vi
_____ 27. re
_____ 28. U
_____ 29. In

30. For num
the terms ar

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13. **Summarize** plasmid based transformation in your own words: _____

14. Summarize how bacteria are selected to ensure transformation has taken place: _____



Bt corn is the most popular genetically modified corn; it contains a gene from bacteria that makes a special protein toxic to pests. The Bt gene is from a bacteria species known as *Bacillus thuringiensis*. However, in order to get this gene into the corn cell, scientists rely on a second bacteria, *Agrobacterium tumefaciens*.

The gene is transformed from the Bt bacteria into a plasmid of the *A. tumefaciens* via plasmid transformation. *A. tumefaciens* causes tumors in plants by inserting DNA into plant cells. Scientists are able to manipulate the *A. tumefaciens* strain so that the Bt gene is added to embryonic plant cells instead. The corn embryos grow to contain the Bt gene, and produce proteins that are toxic to pests.

15. In the case of Bt corn, what is the desired protein that the gene of interest expresses? _____

16. Why is this an example of plasmid transformation? _____

17. Why is Bt corn a GMO, and what is the benefit of modifying the corn? _____

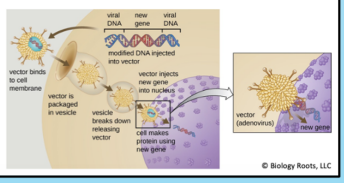
Gene Therapy

18. Which individuals would be a candidate for gene therapy? _____

19. What is the goal of gene therapy? _____

20. What is the role of viral vectors in gene therapy? _____

21. How does ex-vivo gene therapy differ from in-vivo gene therapy? _____



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Editable study guide; answer key included

3 pages covers gel electrophoresis, plasmid transformation, and gene therapy

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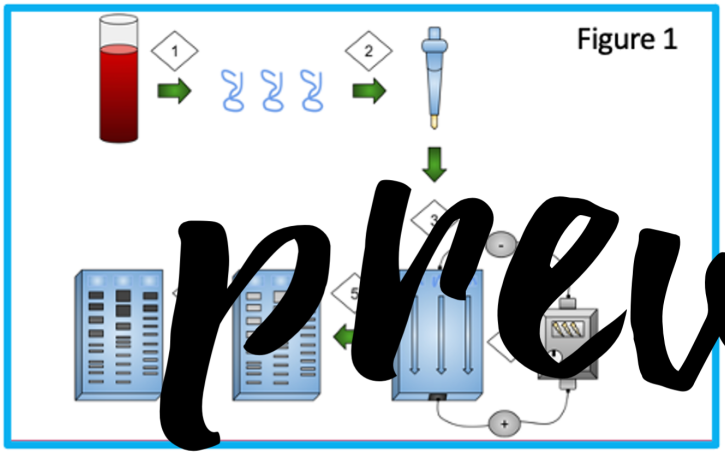
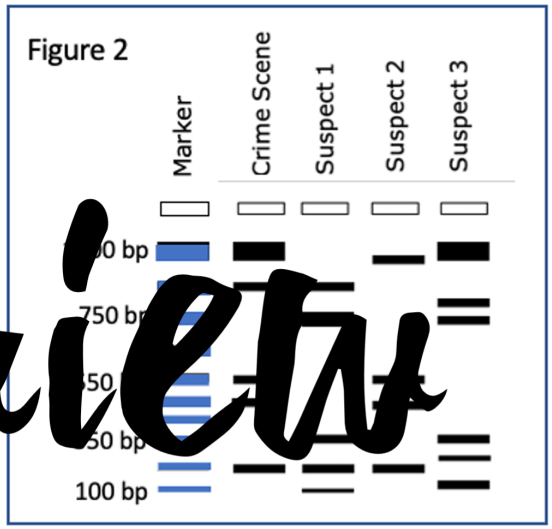
Gel Electrophoresis





preview

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4 pages; 30 questions.
Editable if you need to add more content or remove certain topics.