

Enzymes that manipulate DNA	Notes/Answers
Define DNA replication	
Describe the role of DNA helicase	
Describe the role of DNA polymerase	
Define a primer and briefly describe the role of the primase enzyme	
Define an Okazaki fragment	
Differentiate between DNA polymerase and RNA polymerase	
What is Taq Polymerase? Where is it found?	
Describe the role of ligase	
Define restriction endonucleases	
Define a restriction site	
Draw a bacteria and explain how restriction endonucleases are a natural defense against bacteriophages.	
How is the recognition site a palindrome?	
Draw detailed pictures and explain how restriction endonucleases cut and how they are specific	

What questions do you still have?	
CRSIPR-Cas9	
Define Cas9	
How is Cas9 different from other endonucleases?	
What does CRISPR stand for?	
What are spacer regions?	
What is guide RNA?	
What does CRSIPR-Cas9 do and how is it useful for cutting DNA?	
Briefly describe how scientists are editing genes using CRISPR-Cas9.	
What questions do you still have?	
The polymerase chain reaction	Notes/Answers
Define amplification	
What is the purpose of PCR?	
Briefly outline how the region of interest is bracketed.	
What are primers? How are they made and what are they used for?	
What is a thermocycler?	

List all of the materials required for PCR and briefly describe their purpose	
Outline the process and include the specific temperatures of the 3 steps.	
Explain why repeating the steps is important.	
What questions do you still have?	
Gel electrophoresis	Notes/Answers
What is the purpose of gel electrophoresis?	
List the steps required to run a DNA sample on a gel.	
What is the purpose of the agarose gel?	
What is the purpose of the buffer in gel electrophoresis?	
What is the purpose of the loading dye?	
Draw the set-up of the electrophoresis gel and include the positive and negative charge.	

Explain which direction the DNA will move and why.	
Explain ways that the DNA can be seen.	
Briefly describe why the results look like they do	
Explain a molecular weight ladder.	
What is a negative control? Explain how it is set up.	
Briefly describe how gel runs are interpreted	
Define STR and briefly explain how it is used in criminal profiling OR parentage testing	
What questions do you still have?	
Recombination and transformation	Notes/Answers
How are blunt ends different to sticky enzymes in terms of restriction enzymes?	
What is a plasmid?	
How do scientists get the Restriction enzymes that they need?	
How is an appropriate plasmid chosen?	

Why is it necessary to cut the target DNA and the plasmid with the same restriction enzyme?	
Will all plasmids become recombinant? Why/why not? Draw the desired outcome of combining the human gene and plasmid with the restriction enzyme. A recombinant plasmid.	
Explain what has to happen for a bacterial cell to be considered to be 'Transformed'	
Describe how transformed bacteria are identified.	
Briefly describe the process of making transformed bacteria carrying the recombinant plasmid	
What role does β -galactosidase play in human insulin production?	
What questions do you still have?	
Genetic engineering	Notes/Answers
Explain the difference between GMO and TGO how are these similar and different.	
What is transgene?	

Explain why a Flavr Savr tomato or a knockout mouse are not TGOs	
Outline one example of a TGO	
Explain how Farmers can use GMOs to increase productivity	
Discuss one example of a GMO in medicine	
Discuss one example of a GMO in industry	
What are some of the issues in relation to the use of GMOs in animals?	
What are some of the issues in relation to the loss of genetic diversity?	
What questions do you still have?	

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