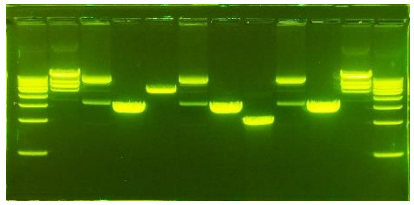
Fold along the line and glue this side down in your Biology Interactive Learning Log (BILL)

Unit 8a: Genetic Engineering

Learning goals: Genetic engineering allows scientists to manipulate the genomes of living things. Scientists can use bacteria to insert the DNA of one organism into another organism. Recombinant DNA has application for agriculture, industry, medicine, and forensics. At the same time, there are ethical, legal, safety, and social issues surrounding the use of genetic engineering.



Key concepts:

selective breeding	recombinant DNA	GMOs
gel electrophoresis	cloning	transgenic organisms
gene therapy	PCR	

Can you show what you know?

Essential Questions:

1. How do people use selective breeding to alter genetic variation?
2. How is recombinant DNA used to improve human health?
3. How can genes from one organism be inserted into another organism?
4. How can genetic engineering benefit agriculture and industry?
5. How is DNA used to identify individuals and establish relationships?
6. What are the ethical impacts involved in manipulating DNA?

Vocabulary:

(**+**) = Can explain it; (**-**) = Only heard it; **0** = No idea

Term	Pre	Post	Memory Clue
1. selective breeding			
2. polymerase chain reaction			
3. gel electrophoresis			
4. DNA fingerprint			
5. restriction enzyme			
6. recombinant DNA			
7. plasmid			
8. transgenic			
9. cloning			
10. nuclear transfer			
11. gene therapy			
12. GMO			

Learning Goals –

What I Need to Know/Be able to do:

A. **Explain** how people use selective breeding to achieve specific phenotypes.
B. **Describe** the technique of gel electrophoresis and how it is used to study genotype, paternity, and evolutionary relationships.
C. **Know** the charge of the DNA molecule and how this determines the direction DNA moves on a gel.
D. **Explain** how a restriction enzyme cuts DNA.
E. **Describe** the importance of recombinant DNA and **give examples** of how it is used to enhance human health.
F. **Explain** how a restriction enzyme cuts DNA.
G. **Describe** how a recombinant bacterial plasmid is constructed.
H. **Evaluate** the benefits and dangers of developing and using transgenic organisms.
I. **Summarize** the main steps in cloning.
J. **Explain** the production, use, benefits, and controversy of genetically modified foods.
K. **Describe** the benefits of genetic engineering as they relate to agriculture and industry.