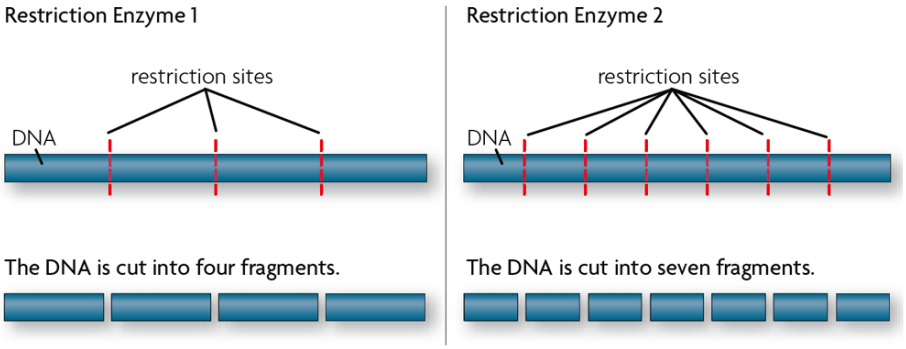
Study Guide: Unit 7 Test

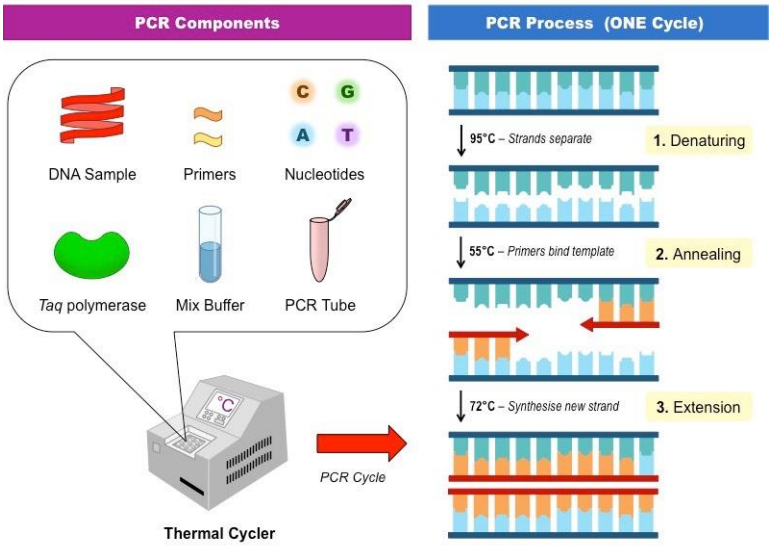
HONORS BIOLOGY: GENETIC ENGINEERING

***Directions**: The list below identifies topics, terms, and concepts that will be addressed on your Unit 7 Test. This list should help you focus your review. This is <u>not</u> a homework assignment you will turn into me.*

Manipulating DNA

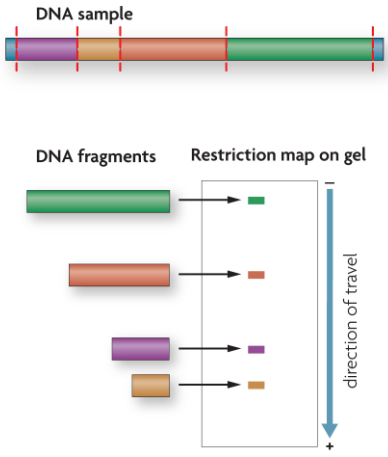
- Tools used to study DNA?
- Restriction Enzymes
  - Come from bacteria
  - Combat viruses
  - Cut DNA at specific sites
- Gel electrophoresis
  - Describe process
  - Creates Restriction Maps
- Polymerase chain reaction (PCR)
  - Purpose?
  - PCR uses just <u>four</u> materials
    - DNA to be copied
    - DNA polymerases (enzymes)
    - DNA nucleotides
    - 2 primers
- DNA fingerprint
  - Type of restriction map
  - Purpose?

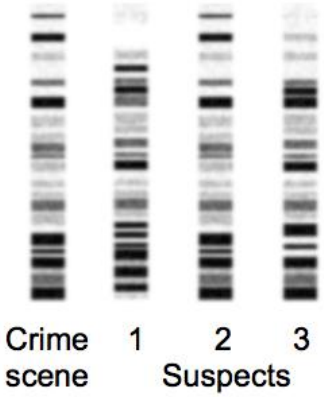




Genetic Engineering

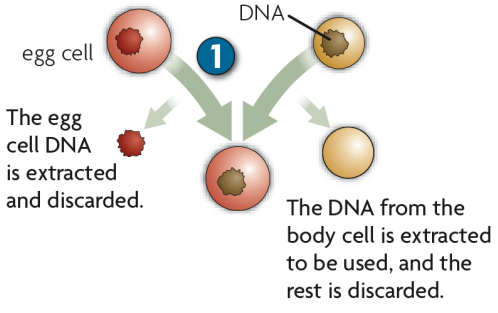
- Cloning
  - Process?
  - Result of cloning
- Genetic Engineering
  - changing of an organisms DNA to give new trait
  - Based on use of Recombinant DNA technology
  - Used by scientist to make medicines, vitamins, vaccines, etc.
- Transgenic organisms
  - Transgenic plants
  - Transgenic animals
  - Ethical concerns
  - Environmental concerns





Genomics and Bioinformatics

- Genomics
  - Study of genomes
    - Study of genes, gene functions, and entire genomes
    - begin with gene sequencing
  - Human Genome Project



        - Results?
    - Bioformatics
    - Proteomics

Genetic Screening and Gene Therapy

- Genetic screening
    - Process of testing DNA to determine risk of having or passing on a genetic disorder.
- Gene therapy
    - Can replace defective gene or add new gene
    - Has great potential
- **CRISPR** -Clustered regularly interspaced short palindromic repeats
    - **CRISPR-Cas9 system**
        - Used to edit genome
        - Uses 2 key molecules
            - An **enzyme** called **Cas9**
                - ‘Molecular scissors’
            - A piece of **RNA** called **guide RNA (gRNA)**.
                - Makes sure that the Cas9 enzyme cuts at the right point in the genome.
        - Applications and implications
            - Tool for treating a range of medical conditions
            - Editing genome (somatic and germline cells)