Polymerase Chain Reaction (PCR)

* PCR is a used to amplify (make many copies) a particular piece of DNA
* It is a in vitro version of DNA replication in cells

Steps in PCR

1. Denature DNA by using heat. The heat mimics helicase in DNA replication. This separates the DNA into two separate pieces.
2. Primers anneal. Synthetic primers, complementary to selected segment are exposed to separated DNA strands, and bind to complement.
3. Primer extension using TAQ polymerase. TAQ Poly. Is a heat-stable version of DNA polymerase extends the strands to make new DNA.

PCR Questions

PCR is used to:

1. Rid a cell of mitochondria
2. Amplify a particular piece of DNA
3. Unwind a double-helix
4. Amplify a particular piece of RNA

DNA is denatured at what temperature?

1. 95 degrees
2. 40-65 degrees
3. 20 degrees
4. 80 degrees

What happens when primers anneal?

1. Primers bind to their complementary sequences on the single strands of DNA
2. Primers break off their complementary sequences
3. Primers bind to completely different complementary sequences
4. Primers stay where they are

DNA Polymerase;

1. Increase in the rate at which PCR happens
2. Makes the DNA chain shorter
3. Extends the DNA chain
4. Destroys the cells DNA

Essay Questions

* Compare and contrast DNA Replication and PCR
* What are the steps of PCR

Essay Key

Essay 1: DNA uses helicase to unwind double helix, and binding proteins keeps strands separated whereas PCR uses heat as a means to denature the strands of DNA. DNA replication also uses Topoisomerase to relive the strain from unwinding the DNA. PCR uses annealing primers that bind to complements, and then primers extend with the help of TAQ polymerase. DNA Replication requires the enzyme RNA primase in order for the DNA Polymerase to come and extend the chain and replicate the DNA.

Essay 2: Denature DNA with heat, Primers anneal to DNA strands, Primers extend with the help of TAQ Polymerase.