1. Who was Fredrick Griffith? What did he do? What did he discover?

**Review Packet: DNA Test**

Scientist that discovered transformation. He did this by testing mice.

1. Draw a basic nucleotide. Label all three parts.



1. Describe the structure of DNA.

A phosphate group is connected to the 5’ carbon. The sugar has five carbons and is a deoxyribose sugar. The nitrogen base has one of two groupings. A purine or pyrimidine. The base can be an A, G, C or T.

1. How do nucleotides fit together?

They are bonded together in the sugar phosphate backbone and they are bonded together by hydrogen bonds between the bases.

1. What are the different nitrogen bases in DNA? How do they pair together? What are the different nitrogen bases in RNA? How do they pair together?

G – C

A – T

RNA – A - U

1. What is DNA replication?

Process of doubling DNA

1. What does it mean to make complementary strands?

Complementary strands are sections of DNA that will connect to each other. An example would be the section ACCA. It would have a complementary strand of TGGT.

1. What enzymes are used during DNA replication?

DNA polymerase, helicase, ligase

1. Give a brief description of the process of DNA replication from start to finish.

DNA replication starts at points of origin. At these points helicase binds and starts to remove the hydrogen bonds that hold together the strands of DNA. Then DNA polymerase will attach base pairs and proofread n the 5’ – 3’ direction. In the 3’ to 5’ direction, DNA polymerase will attach smaller sections called Okazaki fragments which DNA ligase will attach together.

1. Define protein synthesis.

The process of going from DNA to protein.

1. Define transcription.

The process of going from DNA to mRNA.

1. Define translation.

The process of going from mRNA to protein.

1. Protein synthesis starts as DNA and ends as protein. Define all of the different stages that the information will become. (ex: DNA, AA, mRNA, etc)

Information will start as DNA and then get transcribed to mRNA. mRNA has codons that hold the code for a tRNA anticodon to attach to. tRNA anticodons drop off amino acids that form longer proteins.

1. What enzymes are used during transcription?

RNA polymerase

1. Give a brief description of the process of transcription from start to finish.

RNA polymerase will bind at a promoter. Then it will copy one strand of DNA by attaching As to Ts, Cs to Gs, Gs to Cs and Us to As. This RNA will then undergo RNA splicing and be edited. Introns will be removed and exons will be kept to come up with a completed mRNA. This then leaves the nucleus.

1. Give a brief description of the process of translation from start to finish.

mRNA from the nucleus binds to the small subunit of a ribosome. The large subunit of the ribosome then binds the mRNA and the small subunit. tRNA then fills the P site and drops off its amino acid. During this time the A site is filled by the next tRNA that matches up with the next mRNA codon. The P site vacates and the tRNA from the A site attaches its amino acid off at the P site. This process continues until the ribosome hits a stop codon. Finally the completed protein detaches.

1. Define mutation.

A mutation is a change in the structure (A,G, T, C sequence) of DNA

1. What is a substitution (point) mutation? Give an example.

When a single nucleotide is substituted for another. AAAAA 🡪 AACAA

1. What is a frame shift mutation?

When a nucleotide is added or deleted. AAAAA 🡪 AAGAAA

1. How does a mutation affect a protein?

A mutation changes the codons of mRNA created from DNA. This means new amino acids are created from the new codons. The end result of a mutation is a new protein is created from the DNA.

1. What is a virus?

A virus is a protein capsule with information inside of it in the form of DNA or RNA

1. Describe all of the components to a virus.

The protein capsule has many proteins on the surface of the capsule. They will allow it to trick a cell into thinking it is a protein. This will give it access to the cell.

The DNA or RNA then allows it to change the functions of the cell. The DNA or RNA redirects the cell to create more viruses instead of other cellular processes.

1. What are the two ways a virus could infect a cell?

The lytic cycle and the lysogenic cycle. In the lytic cycle a virus hijacks a cell to make more viruses. In the lysogenic cycle a virus incorporates its DNA into a cell’s DNA and waits for an opportune moment to create more viruses.

1. What are three ways that a bacteria increases its genetic variability?

Transformation, Transduction and Conjugation