12.1

Transformation: The genetic alteration of a cell by introduction of extraneous DNA, especially by a plasmid/The heritable modification of a cell from its normal state to a malignant state.

Role of DNA: The DNA makes up genes must be capable of storing, copying, and transmitting the genetic info of a cell.

Storing Info: Genes control patterns of development, which means that the instructions that cause a single cell to develop into an oak tree a sea urchin, or a dog must somehow be written into the DNA of each of these organisms.

Copying info: Before a cells divides, it must make a complete copy of every one of its genes, similar to the way that a book is copied. Once the structure of the DNA molecule was discovered, a copying mechanism for the genetic material was soon put forward.

Transmit info: When a cell divides, each daughter cell must receive a complete copy of the genetic info. The loss of any DNA during meiosis might mean a loss of valuable genetic info from one generation to the next.

12.2

Nitrogenous bases and covalent bonds: The nucleotides in a strand of DNA are joined by covalent bonds formed between their sugar and phosphate groups. DNA has 4 kinds of nitrogenous bases: Adenine (A), Guanine (G), Cytosine (C), and thymine (T). A-U, T-A, G-C

Nucleic Acids and Nucleotides: DNA is a nucleic acid made up of nucleotides joined into long stands or chains by covalent bonds. Nucleic acids are made up of nucleotides, linked together to form long chains.

Chargaff's Rules: Discovered that the percentage of Adenine and thymine bases are almost equal in any sample of DNA. Same goes for Cytosine and Guanine.

The double Helix Model: Looks like a twisted ladder. Two strands twist around each other like a spiral staircase.

DNA backbone: Putting the DNA backbone together –refer to the 3' and 5; ends of the DNA.

Anti-parallel stands: Complementary strand runs in opposite direction. This arrangement enables the nitrogenous bases on both strands to come into contact at the center of the molecule.

Hydrogen Bonding: Watson and Crick's model showed that hydrogen bonds could form between certain nitrogenous bases, providing just enough force to hold the two DNA strands together.

Hydrogen bonds are weak chemical forces that allow two stands of the helix to separate.

Base Pairing: A=T , C=G

12.3

DNA Replication: Each strand of the DNA double helix has all of the info needed to reconstruct the other half by base-pairing.

Prokaryotic- Replication starts from a single poia single starting point on the chromosome.

Eukaryotic- Replication may begin at dozens or even hundreds of places on the DNA molecule, proceeding in both directions until each chromosomes in completely copied.

Telomeres: The tips of chromosomes.

The role of Enzymes: DNA replication is carried out by a series of enzymes. Recall that enzymes are highly specific. They are named for the reactions they catalyze. They first "unzip" a molecule of DNA by breaking up the hydrogen bond between base pairs and unwinding the two strands of the molecule.

13.1 & 13.2

The role of RNA: RNA, like DNA, is a nucleic acid that consists of a long chain of nucleotides. It then uses the base sequence copied from DNA to direct the production of proteins.

Functions of RNA: RNA is in a way like a disposable copy of a segment of DNA, a working copy of a single gene.

Transcription: During Transcription, segments of DNA serve as templates to produce complementary RNA molecules.

Promoters: Signals in DNA molecules that show RNA polymerase exactly where to begin making RNA.

Translation: The sequence of nucleotide bases in mRNA molecule is a set of instructions that gives the order in which amino acids should be joined to produce a polypeptide.

Steps in Translation: 1. Beings when ribosome attaches to an mRNA molecule to cytoplasm. 2. Ribosome reads each codon it directs tRNA to bring specified amino acid in the ribosome. 3. One at a time the ribosome attaches each amino acid the growing chain.

13.3

Insertions and Deletions: Are point mutations in which one base is inserted or removed from the DNA sequence.

Gene Mutation: Genes that involve changes in one or a few nucleotides are known as point mutations because they occur at a single point in the DNA sequence. They generally occur during replication.

Chromosomal Mutations: Inversion reverses the direction of parts of chromosome. Duplication produces an extra copy of all or part of a chromosome. Deletion involves the loss of all or part of a chromosome.

Mutagens: Some mutations arise from mutagens, chemical or physical agents in the environment. Chemical mutagens include certain pesticides, a few natural plant alkaloids, tobacco smoke, and environment pollutants.

Beneficial effects: Plant and animal breeders use good mutations. Important crop plants, Polyploidy also occurs naturally in citrus fruits.

Harmful Effects: Can change protein structure which disrupt normal biological activities. Sickle cell disease.