**Biology Spring Final Exam Study Guide Answers**

1. The central dogma is DNA🡪RNA🡪PROTEINS
2. Mutations occur on the DNA and are seen on the protein level
3. Transcription is DNA being copied into mRNA and leaving the nucleus.

Translation is the process of converting mRNA to proteins. It occurs in the cytoplasm

1. tRNA-Transfer RNA: brings amino acids into the ribosome to match with the codon on the mRNA, 3 base pairs are called anti-codon

mRNA-Messenger RNA: takes the code from DNA out of the nucleus, 3 base pairs are called codons

1. DNA is double stranded, contains thymine, sugar is deoxyribose

RNA is single stranded, contains uracil, sugar is ribose

1. DNA: A-T and C-G RNA: A-U and C-G
2. R-group is how amino acids differ
3. A protein is a chain of amino acids bonded together by peptide bonds
4. Keratin, hormones, hemoglobin, collagen
5. An enzyme is a biological catalyst
6. Enzymes are specific, reusable, usually end in –ase
7. Enzymes lower a reaction’s activation energy
8. The monomers of proteins are amino acids
9. 
10. Catabolic reaction: Breaks down one reactant into multiple products

Anabolic reaction: Builds up multiple reactants into one product

1. Saturated fatty acids have no double bonds and are “saturated” with hydrogen

Unsaturated fatty acids contain a double bond and have less hydrogen

1. Diffusion is the movement of small, non-polar particles down a concentration gradient from high to low

Facilitated diffusion is the movement of bigger particles from high to low with the help of protein channels

1. Osmosis is the diffusion of water across a semipermeable membrane from high to low concentration
2. Active transport is the movement of particles against a concentration gradient from low to high concentration and requires energy!
3. Hypertonic solution: More solute outside of cell, water moves out of cell into solution and cell shrinks

Hypotonic: More solute inside cell, water moves into cell and cell swells

Isotonic: equal concentrations of solute and solvent on either side of cell

1. The cell membrane is composed of a double-layer of phospholipids with embedded proteins
2. The phosphate head is polar or hydrophilic and the lipid/fatty acid tails are non-polar or hydrophobic
3. The cell membrane functions as a protective barrier, cell to cell recognition, control what enters and exits the cell
4. Cell cycle: Interphase, Mitosis (PMAT), cytokinesis
5. Prophase-cell prepares for division, nucleus disappears, spindle fibers appear

Metaphase-Chromosomes line up in the middle of the cell

Anaphase-sister chromatids are pulled apart and go to opposite ends of cell

Telophase-Two daughter cells are formed

1. G1-growth S-DNA replication G2-growth and prepare for Mitosis
2. 46 chromosomes (23 pairs)
3. Diploid means “double” (46) Haploid means “half” (23)
4. Meiosis is the division of sex cells or gametes and reduces the chromosome number by half
5. Reduced by half
6. Crossing over is unique to Meiosis
7. Karyotype is a chart of chromosomes used to check for genetic markers
8. Cancer is the uncontrolled division of cells
9. Meiosis produces gametes or sex cells (egg and sperm)
10. Alleles are different forms of a gene (B or b)
11. Genotype describes the genetic makeup (Bb)

Phenotype describes the physical appearance (black)

1. Law of Dominance-One allele is dominant over the other and all heterozygous individuals will express the dominant allele.

Law of Segregation-Two alleles for the same trait separate from one another (Punnett square)

Law of Independent Assortment- Alleles for 2 or more different traits separate independently from one another

1. Co-Dominance is when both alleles are dominant and both alleles are expressed in heterozygous individuals. (red and yellow flower make a flower that is both red and yellow)
2. Incomplete dominance is when neither allele is dominant and an in-between phenotype is expressed in heterozygous individuals (red and yellow flower make an orange flower)
3. Sex-linked traits are carried on the X or Y chromosome, usually carried on the X chromosome
4. Pedigree-if both parents are affected, then trait is dominant, if neither parent is affect then trait is recessive

If equal number of males and females are affected, trait is autosomal, if more males are affected than females, trait is sex-linked

1. ○-female ●-affected female ■- affected male □-male
2. Homologous structures are similar in structure but different in function, show convergent evolution and show common ancestry

Analogous structure are different in structure but similar in function

1. Lamarck believed that acquired traits were passed onto offspring (not correct)
2. Stabilizing selection- selection favors the average individual

Direction selection- selection favors one of the extreme individuals

Disruptive selection- selection favors both of the extreme individuals

1. A species is a group of closely related organisms that can interbreed
2. Cladograms show the closes common ancestry, show latest🡪 most recent
3. Yes evolution is still occurring, discovering new species
4. Binomial nomenclature is a two part naming system, first name is Genus and second name is species
5. Eukarya kingdoms- Protista-uni-cellular, amoeba, Fungi-mushrooms, mold, yeast, Animalia-heterotrophs, most diverse, us and Plantae-autotrophs, trees, flowers, photosynthesis
6. Kingdom, Phylum, Class, Order, Family, Genus, Species
7. Dichotomous key—follow steps and look for traits to name organism
8. Characteristics are used to classify organisms
9. Homeostasis is the ability to maintain a stable internal environment—example is dog panting or humans sweating when we get hot