

Biology Study Guide (Semester 1)

You will be allowed to use one standard sheet of notebook or computer paper for your notes (handwritten). The following vocabulary and processes should be known.

- Scientific method
 - General steps
 - Why would you use a control
 - How to avoid bias, what does it mean for a study to be “double blind”?
- Simple chemistry/Carbon
 - What makes atoms of the same element identical?
 - Subatomic particles (protons, neutrons, electrons)
 - What makes carbon special (how many bonds can it make/what types of molecules)
 - Formula for water, is it polar or nonpolar? Why is this important (hint: what properties of ice are different from liquid water, how much energy does it take for water to become a gas)
- Biomolecules
 - Define the following/what are these used for within a living cell/what elements are in each
 - Carbohydrates
 - Lipids
 - Proteins
 - Nucleic Acids
 - Match the monomer that makes up the polymers
 - Saccharides → _____
 - Amino Acids → _____
 - Nucleotides → _____
 - DNA → RNA → Protein
 - Which molecules do the “work” in the cell?
 - What is DNA’s purpose?
- Cell structure
 - Define the following organelles: what are their jobs in the cell
 - Nucleus
 - Cell membrane
 - Cell wall
 - Ribosome
 - Mitochondria
 - Chloroplast
 - Cytoplasm
 - Golgi Apparatus
 - Rough Endoplasmic Reticulum
 - Smooth endoplasmic reticulum

- Vacuole
- Compare and contrast
 - Animal and plant cells
 - Prokaryotic and Eukaryotic cells...which ones are in your body?
 - Which of the organelles are present in all cells? Which are only in plant cells?
What makes eukaryotic cell different than a prokaryotic cell?
- Respiration
 - For each step answer the following
 - Glycolysis:
 - What simple sugar do you start with, and it turns into two molecules of what?
 - Where in the cell is it taking place?
 - Is oxygen needed?
 - Krebs Cycle:
 - What is made during this cycle?
 - Where in the cell is it taking place?
 - Is oxygen needed?
 - Electron Transport Chain:
 - This step makes the most _____ of any step
 - Where in the cell is it taking place?
 - Is oxygen needed?
- Photosynthesis
 - Simplified version: focus on big picture and not the many, many smaller reactions
 - What is the plant's energy source to start photosynthesis?
 - What does it make that the plant can use for energy?
 - What are the materials the plant needs to make this molecule?
 - What organelles in a plant are responsible for these processes? (not found in animal cells)
 - What is chlorophyll?
- Cell division
 - Steps of mitosis
 - Interphase
 - Prophase
 - Metaphase
 - Anaphase
 - Telophase
 - How does meiosis differ? How many chromosomes are there in the daughter cells after mitosis? How many are there afterward in meiosis?
 - Diploid vs haploid
 - Gametes

- Crossover
 - Compare and contrast sexual and asexual reproduction
 - Which allows for more variation in offspring?
 - Why is this variation a good thing in terms of genetic diversity and survivorship
- Genetics/inheritance
 - Gregor Mendel
 - Who he was
 - What he experimented on
 - What he found
 - Mendellian genetics
 - Dominant vs recessive
 - Phenotype vs genotype
 - Homozygous vs heterozygous
 - Punnett squares: determining the probability certain traits
 - Non-mendellian examples
 - Polygenetic traits (more than one gene controls a phenotype, could be on different chromosomes)
 - Co-dominant: two traits could both express themselves (example: blood type)
 - Sex-linked phenotypes: based on traits that are linked to the X or Y chromosome