

# Biology Final Review Answers:

## Unit 1:

- 1) Observation, Hypothesis, Experiment, Conclusion, Report Results
- 2) More sunlight will increase plant growth.
- 3) Independent variable – you control    Dependent variable-the result
- 4) Control group – has normal conditions    Experimental group – has tested variable
- 5)

Micro-small	Homo-same	Cyto-cell
Hyper-above	Photo-light	Lysis-split
Hetero-different	Synthesis- build	Herba-plant
Hydro-water	Troph-nutrition	Hypo-below
Carne-meat	Auto-self	Co-with
- 6) Show Organization, Reproduce, Growth and Development, Adaptation, and Obtain & use energy
- 7) maintaining internal balance. Ex: temperature, blood pressure
- 8) Growth=adding mass, Development=changing features
- 9) Stimulus=loud noise    Response=someone jumps
- 10) Multicellular. We are made of multiple cells.

## Unit 2:

- 1) Biotic = living    ex: animals, plants, etc.    Abiotic= non-living    ex: rocks, water, etc.
- 2) Biosphere    Biome    Ecosystem    Community    Population    Organism
- 3) Niche= role    Habitat= where it lives
- 4) Deer competing for crops to eat.
- 5) Predator= owl    Prey=mouse
- 6) something that controls a population. Ex: amount of food available
- 7) relationship between different types of organisms

8) mutualism= both benefit, commensalism= one benefits one is unaffected,

parasitism= one benefits one is harmed

9) the Sun

10) Autotroph= makes its own food, photosynthesis=uses sunlight, chemosynthesis=uses chemical rxns

11) Heterotroph=can't make its food, Herbivores, Carnivores, Omnivores, Scavengers, Decomposers

Consumer

12) A Food Web overlaps several Food Chains

13) The pyramid shows energy flowing from bottom to the top. Producers are at the bottom and have the most energy.

14) Carbon, Nitrogen, and Water Cycles. Ultimately, the sun helps to replenish energy for each cycle.

# **UNIT 3: Chemistry of Life**

1. An **organic** compound means it contains what element? *Carbon*
2. Why do organisms need carbohydrates? *energy*
3. What is the difference between a monosaccharide, disaccharide and polysaccharide? *Each one is more complex*
4. Name polysaccharides found in an animal? Plant? Where are they stored? *Glycogen, starch, vacuoles*
5. What is the monomer of proteins? *amino acids*
6. What element is in a protein but NOT a carbohydrate? *N*
7. What role does an enzyme play in our bodies? *digestion, release of energy*
8. Describe the enzyme-substrate complex. *Lock & key*
9. What 2 factors affect how an enzyme works? *Catalyst, temperature, amount of substrate*
10. What is the difference between a saturated triglyceride and an unsaturated triglyceride? Which is "better" for us? *Unsaturated has fewer hydrogens & is easier to break down,*
11. What is the monomer of a nucleic acid? *Nucleotide*
12. Which macromolecule is ATP? *Nucleic Acid*
13. What is significant about water being a POLAR molecule? Polarity makes water a universal Solvent.
14. What elements make up a water molecule? What type of bond holds the atoms together? *H<sub>2</sub>O, covalent*
15. What type of bond connects water molecules with each other? *Polar bonds*
16. What is the difference between ADHESION and COHESION? *Adhesion = sticks to things*
17. What is capillary action? *H<sub>2</sub>O travels up root systems* *Cohesion = sticks to other H<sub>2</sub>O*
18. What is the difference between an acid and a base? What molecules will you find more in an acid vs a base? *Acid releases H<sup>+</sup>, Base releases OH<sup>-</sup>*
19. What is the difference between DIFFUSION and OSMOSIS? Provide an example of each. *Osmosis is diffusion of water.*
20. What is passive transport? *materials move in or out with the flow*
21. What is the difference between ENDOCYTOSIS and EXOCYTOSIS?
22. What are the 2 types of endocytosis?
 

↓

takes stuff  
into cell

↓

releases things  
from cell

1) Phagocytosis

2) Pinocytosis

## UNIT 4: Cell Theory & Structure

1. What are the 3 parts of Cell Theory?  
1) Cell is basic unit of life 2) All living things are made of cells, 3) All cells come from pre-existing cells.
2. Explain the contributions to cell science by the following scientists:
  - a. Hooke - coined the term "cell"
  - b. Leeuwenhoek - first microscope
  - c. Schleiden - Plants are made of cells
  - d. Schwann - Animals are made of cells
  - e. Virchow - Cells arise from other cells
3. What are the differences between a PROKARYOTE and EUKARYOTE? Eukaryotes are more complex. Have "real" organelles.
4. List the purpose/function of the following cell organelles:
  - a. Nucleus - control center
  - b. Nucleolus - makes ribosomes
  - c. Mitochondria - powerhouse of cell
  - d. Rough & Smooth Endoplasmic Reticulum - does chem reactions / makes & stores lipids
  - e. Golgi Apparatus - modify & package proteins
  - f. Chloroplast - does photosynthesis in plants
  - g. Centriole - makes spindle fibers
  - h. Cell wall - rigid barrier around plant cells
  - i. Cell membrane - controls what goes in/out of cell
  - j. Transport vesicle - carries materials in cell
  - k. Vacuole - stores food, waste, enzymes
  - l. Ribosomes - make proteins
  - m. Lysosome - contain digestive enzymes.

## UNIT 5: Cell Energy

1. Photosynthesis
  - a. What is Photosynthesis? process that plants use to make food.
  - b. In which organelle does PS occur? Chloroplast
  - c. Which type of organism goes through PS? Plants
  - d. What is the difference between LIGHT and DARK reactions in PS? Light + requires Sun energy
  - e. What are the reactants of PS (ingredients)? Products (results)?  $6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow{\text{Sun}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
  - f. Which step in PS makes the glucose (sugar)? How many "turns" must this cycle go through to make 1 molecule of glucose? Calvin Cycle, 3 turns
  - g. What energy molecules are used in PS, and why are they needed? ATP
  - h. Where does the oxygen ( $\text{O}_2$ ) come from in PS? The water
2. Cellular Respiration
  - a. What is Cellular Respiration? Breakdown of glucose to release E
  - b. In which organelle does CR occur? - Mitochondria
  - c. Which type(s) of organism go through CR? All organisms
  - d. What are the reactions and products of CR?  $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + \text{ATP}$
  - e. What energy molecules are used in CR? ATP
  - f. What are the 3 steps of CR, in their correct order? Glycolysis, Krebs Cycle, Electron Transport
  - g. What is the importance of oxygen in CR? Enable breakdown of glucose
  - h. What is the total amount of ATP made by the end of CR? About 36 ATP

## UNIT 6: Cell Division

1. What are the 2 parts of the cell cycle? Interphase & Mitosis
2. What is the importance of interphase? Prepares for mitosis → copies DNA / increases size
3. What are the 4 phases of mitosis? What occurs during each phase? Prophase, Metaphase, Anaphase, Telophase
4. What is cytokinesis and when does it occur? Cell finally forms 2 new cells after telophase
5. What is the difference between cytokinesis in a plant and animal cell? Plant cells form cell plate between cells.
6. What is the difference between HAPLOID and DIPLOID?  $\frac{1}{2}$  the chromosomes
7. What type of cell goes through mitosis? skin cells, plant cells, etc.
8. How many daughter cells are formed in mitosis, and what do they "look like"? 2, they are identical.
9. Why do cells go through mitosis? To grow, repair & replenish cells.
10. What type of cell goes through meiosis? Sex cells (gametes)
11. What is crossing over, why is it important, and when does it occur? chromosomes exchange information, gives more variation.
12. What are homologous chromosomes? maternal / paternal chromosome pair up.
13. Explain the differences between Meiosis I and Meiosis II. M I = cell splits in two w/ double-stranded chromosomes
14. What do they daughter cells "look like" at the end of meiosis? each has half of the chromosomes
15. What is fertilization? Egg & Sperm come together

## UNIT 7: DNA

1. What scientists were credited with discovering the shape of DNA? Watson & Crick
2. What is the shape of a DNA molecule? Double Helix
3. What is monomer of DNA? What are its 3 parts? Nucleotide, Nitrogen base, carbon sugar, phosphate group
4. What type of bond holds the 2 strands of DNA together? Hydrogen bonds
5. What is DNA replication, where does it occur and when? DNA gets copied, nucleus, Interphase
6. What are the differences between DNA and RNA? 1) Double strand vs single strand 2) Ribose sugar vs deoxyribose 3) RNA has Uracil instead of Thymine
7. What are the 3 types of RNA? mRNA, tRNA, rRNA
8. What is transcription, and where does it occur? DNA to RNA in Nucleus
9. Which type of RNA carries DNA's instructions out of the nucleus? Where does it travel to? mRNA to ribosomes
10. What is the final step of the Central Dogma, and where does it occur? Translation in Ribosomes
11. What does DNA's instructions get used to make? proteins
12. What is a codon? Sequence of 3 mRNA nucleotides
13. What is the monomer of proteins? amino acid
14. Make the complementary DNA strand for TACCGCTTAAC ATGGCGAA TTGA
15. Transcribe into mRNA, and translate into amino acids: TACCGCTTAAC  
AUGGCGAAUUGA  
UA CCGCUU AACU



## UNIT 8: Genetics

1. Explain the significance of Gregor Mendel's work. → Discovered how traits were passed on.
2. What 3 laws did Mendel's work prove? Law of Segregation, Law of Independent Assortment, Law of Dominance
3. What is the difference between a genotype and phenotype? genotype = genes, phenotype = appearance
4. What are the 3 types of genotypes?  $TT$ ,  $Tt$ ,  $tt$
5. What is the difference between an autosome and sex chromosome? How many of each do we have in a human cell? Autosomes determine traits, sex chromosome determines male or female. Humans have 44 Autosomes + 2 Sex chromosomes.
6. What is an allele? alternate forms of a gene.
- ~~7. What are the 3 Mendelian patterns of inheritance? See #2~~
8. Explain and provide an example of the NON-Mendelian patterns of inheritance:
  - a. Incomplete dominance → white, pink, red flowers
  - b. Codominance → white, red, white w/ red spots
  - c. Multiple alleles → A, B, AB, O Blood types
9. If a woman with heterozygous blood type A and a man with blood type O have a child, what are the possible blood types of that child?  $i^A i \times ii$ 

$i^A$	$i$
$i^A$	$i^A i$
$i$	$ii$

 Child could be A or O.
10. Fur color in rabbits is incomplete dominant. If a homozygous black rabbit mates with a homozygous white rabbit, what will all of their offspring look like?  $C^B C^B \times C^W C^W$  All will be  $C^B C^W$  Gray.
11. Flower color is incomplete dominant. Cross a homozygous dominant red flower with a homozygous recessive white flower. What is the genotype and phenotype of their offspring?  $C^R C^R \times C^W C^W$  All pink  $C^R C^W$
- ~~12. What is a carrier, and which patterns of inheritance will you find an individual who is a carrier? Which pattern has only female carriers?~~

## UNIT 9: Evolution

1. What did Charles Darwin notice about the 13 different islands of the Galapagos? Found variation within species.
  2. Explain the difference between Natural Selection and Artificial Selection. Provide an example of each.
  3. What are the 4 Principles of Natural Selection? 1) Variation 2) Inherited genes 3) More offspring than resources 4) Variations passed on to surviving generations. Nat. Select → fur color camo. Art select → Dog breeding
  4. What does it mean if an organism is "fit"? can reproduce & survive.
  - \* 5. What are the 4 types of evidence that support the Theory of Evolution?
  6. Explain the difference between Mimicry and Camouflage. act like another organism / become less visible.
  - \* 7. Provide an example, each, of Homologous structures, Analogous structures and Vestigial structures.
  8. What are the 3 Patterns of Natural Selection? 1) Disruptive 2) Directional 3) Stabilizing
  9. What is speciation? What are the 2 types? Formation of new species, Allopatric | Sympatric
  10. Explain the 2 types of Genetic Drift. 1) Founder effect 2) Bottleneck effect
  - \* 11. Explain the differences between the 3 patterns of Evolution; coevolution, adaptive radiation and convergent evolution.
- 5) 1) Fossil Record 2) Geographic Distribution 3) Comp. Anatomy 4) Similarities in Early Development
- 7) Homologous → human arm / horse leg      Analogous → bat wing / bird wing      Vestigial → Appendix, tail
- 11) Coevolution - species evolve in close relationship w/ other species.      Adaptive radiation - species diverge from single ancestor      Convergent evolution - unrelated species evolve to form similar adaptations