

EOC Study Guide

CELLS

SB1. Students will analyze the nature of the relationships between structures and functions in living cells.

Units	Questions	Points Possible	Points Earned
Unit 1	1. What are the characteristics that all living things share? 2. What is homeostasis?	1 1	
Unit 2	3. Describe the 4 properties of water. 4. What are the functions of the four macromolecules: carbohydrates, lipids, proteins, and nucleic acids? 5. List the elements in EACH macromolecule (C, H, O, N, or P) and the monomer name for each macromolecule. 6. What are the 3 parts of the Cell Theory? 7. List the differences between a prokaryotic cell and a eukaryotic cell using the following questions: does it have a nucleus? Does it have membrane bound organelles? How many cells: unicellular, multicellular, or both? What parts do the 2 cells have in common? 8. List ALL the cell's organelles and their functions. 9. Which 3 organelles do plant cells have that are different from animal cells? 10. Define selective permeability. 11. How many layers does the cell membrane contain and what are the 2 main parts of the membrane? 12. What is the difference between hydrophobic and hydrophilic sides of a phospholipid? 13. What are the functions of the following parts of the cell membrane: receptor protein, transport protein, cholesterol, carbohydrate? 14. Define passive and active transport: energy used and concentration gradient movement (high to low or low to high) 15. Define diffusion, facilitated diffusion, and osmosis: including what type of molecule each transports 16. Explain the difference between the three types of environments that cause osmosis: hypertonic, hypotonic, and isotonic. Include amount of solute on the outside, whether there is high, low or equal amounts of water compared to the inside of the cell, and what happens to the shape of the cell 17. Explain each of the following active transports: Sodium/Potassium pump, Endocytosis, and Exocytosis.	1 1 1 1 1 4 1 1 1 1 1 1 1 1 1 1	
Unit 3	18. What is an enzyme? What macromolecule is an enzyme? 19. What are activation energy, substrate, and active site? 20. How does the enzyme change the activation energy of a reaction? 21. List the main characteristics of enzymes. 22. Explain how the following factors affect enzyme function: temperature, pH, and inhibitors 23. If the enzyme concentration increases and there is plenty of substrate available, what will happen to the amount of product formed?	1 1 1 1 1 1	
Unit 5	24. List what occurs in the 3 phases of Interphase of the cell cycle 25. Define mitosis and cytokinesis. 26. What is the main goal of Mitosis? List the end results of Mitosis. 27. Explain what happens to the DNA from the start of the cell cycle to the end – including each phase of mitosis 28. What is the term for the cell division in prokaryotic cells?	1 1 1 1 1	
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GENETICS

SB2. Students will analyze how biological traits are passed on to successive generations.

Units	Questions	Points Possible	Points Earned
Unit 4	<ol style="list-style-type: none"> Describe the differences between DNA and RNA in terms of types of sugar, base pair rules, # of sides, location in the cell, and function. What are the 3 parts of a typical nucleotide? Describe the steps of DNA replication and when it occurs in the life of a cell. What are the functions of the three types of RNA? Which types have codons and which types have anticodons? Describe the steps and location of transcription. Describe the steps and location of translation. What is genetic engineering? Explain gel electrophoresis, PCR, and organism cloning Define stem cells. What are some factors that can cause DNA mutations? If a mutation occurs in your somatic (body) cells, can you pass on the mutation to your offspring? Why or why not? 	<p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	
Unit 5: Cell Division	<ol style="list-style-type: none"> Define the following: chromosome/chromatin, chromatid/centromere, diploid/haploid, sex chromosome/autosome Define homologous chromosome Explain the types of DNA mutations that can occur: deletion, inversion, translocation, nondisjunction, point - substitution, point - frameshift What are the advantages and disadvantages of sexual and asexual reproduction? How is genetic diversity caused in meiosis (what happens in Prophase I)? What phases of meiosis have homologous chromosomes lining up in the middle of the cell? What phases of meiosis have sister chromatids lining up in the middle of the cell? What are the main differences between Mitosis and Meiosis (main goal, # of divisions, # of cells at the end, # of chromosomes at the end: haploid or diploid, identical or not identical to parent cell, crossing over)? When a sperm and egg (gametes) unite in fertilization, what is the resulting first cell called? 	<p>2</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>3</p> <p>1</p>	
Unit 5: Genetics	<ol style="list-style-type: none"> What is genetics? What is the difference between traits, alleles, and genes? Describe Mendel's experiment with pea plants including the generation names and results. Draw the 2 Punnett Squares to show Mendel's crosses: homozygous dominant crossed with homozygous recessive and then heterozygous crossed with heterozygous. Include the phenotypic and genotypic ratios or percentages. (Use B=purple flowers and b=white flowers) Define the following: dominant/recessive, homozygous/heterozygous, genotype/phenotype, monohybrid/dihybrid What is the difference between complete dominance, incomplete dominance, and co-dominance? Dihybrid cross: RrBb X RrBb: R = tall, r = short, B = brown eyes, b = blue eyes. What are the phenotypic ratios? Explain Mendel's Law of Independent Assortment and Law of Segregation. What is the difference between multiple alleles, polygenic inheritance, and sex-linked traits? What is a pedigree analysis and how is it used? 	<p>1</p> <p>1</p> <p>1</p> <p>4</p> <p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	
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ORGANISMS

SB3. Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems.

Units	Questions	Points Possible	Points Earned
Unit 1	<ol style="list-style-type: none"> 1. What is taxonomy and classification? 2. Who developed the current naming system? 3. What is the term given to the two-word naming system for organisms? 4. In an organism's scientific name, what does the first word represent and what does the second word represent? 5. Define phylogenetic tree and cladogram. What information can you learn from these diagrams? 6. What is a dichotomous key? 7. What pieces of evidence do scientists use to construct phylogenetic trees and cladograms? 8. Using the plant phyla cladogram on p.429 (also in the Classification Notes), what type of plant is most closely related to the flowering plants and what type of plant is least closely related to the flowering plants? 9. Starting with domain, write down the levels of organization for classification. 10. What is a virus and what characteristics do they have in common with living things and what characteristics do they lack? 11. Explain the lytic and lysogenic cycles of viral replication. 12. For each of the 6 kingdoms, list the main characteristics: cell type, # of cells, nutrition, and cell wall 	<p>1 1 1 1 1 1 1 1 1 1 1 4</p>	
Unit 3	<ol style="list-style-type: none"> 13. What is the full name of the energy molecule for living things? Write the equation for how ATP is built and broken down. 14. Write the equations for photosynthesis and cell respiration and the main purpose of each process. 15. What organelles are responsible for photosynthesis and cell respiration? 16. Where do the 2 parts of photosynthesis take place? light reaction and Calvin cycle 17. List the main purpose of each of the following: light reaction and Calvin cycle in photosynthesis 18. Where do the 3 parts of cell respiration take place? glycolysis, Krebs cycle, electron transport chain 19. List the main purpose of each of the following: glycolysis, Krebs cycle, and electron transport chain in cellular respiration 20. What is fermentation, what are the types and how does it compare to cell respiration: use of O₂ and amount of energy made? 	<p>1 2 1 1 1 1 1 1</p>	
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