



Biology Pacing Guide 2017-2018

Day	Date	Essential Standard	Unit	Content
1	M 8/28		Introduction	1 – Syllabus 2 – Lab Safety 3 – Lab Safety Quiz
2	T 8/29			1 – Lab Safety Review 2 – Pre-test (Released State test)
3	W 8/30	1.1.1 4.2.2	Molecular Biology	1 – pH
4	TH 8/31	4.2.2		1 – Biomolecules
5	F 9/01	4.2.1		1- Biomolecule 2- Biomolecule Lab
6	T 09/05	4.2.1		1 – Biomolecule Lab 2 – Nutrition Lab
7	W 9/06	4.2.1		1 – Enzymes
8	TH 9/07	4.2.1		1 – Enzymes
9	F 9/08	4.2.1		1 – Review
10	M 9/11	4.1.1		1 – Review
11	T 9/12	4.1.1		1- Molecular Biology Test Day
12	W 9/13	4.1.1		1 – Osmosis Jones: Molecular Biology Wrap Up
13	TH 9/14	4.1.3		1 – Cell Theory 2 – Microscopes
14	F 9/15	1.1.2		1 – Prokaryotic Cells 2 – Eukaryotic Cells
15	M 9/18	1.1.2		1 – Eukaryotic Cells
16	T 9/19	Goal 4		1 – Eukaryotic Cells 2 – Cell Projects
17	W 9/20 ERS- SD	Goal 4		1 – Eukaryotic Cells 2 – Quiz on Organelles
18	TH	Goal 4		1 – Cell Membranes



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	9/21			2 – Cell Transport
19	F 9/22	Goal 4		1 – Cell Transport
19	M 9/25	1.1.2		1 – ATP/ADP 2 – Cell Processes Using ATP
20	T 9/26	1.1.2, 1.1.3		1 - Photosynthesis
21	W 9/27	1.1.3		1 – Cellular Respiration 2 – Fermentation
22	TH 9/28	1.1.3		1 – Photosynthesis & Respiration 2 – NADH and ATP Cellular Activity
23	F 9/29	1.2.2		1 – Cell Process Poster 2 – Quiz on Goal 4 to this Point
		Benchmark A Oct. 2- Oct 6 (Tentative) You may test on any day during this week.	Structure & Function of Cells	Benchmark Review All Materials Since Day 1 Teachers Decide Which Day(s) Benchmark will be based on standards taught this far. About 25-28 items will be on the Benchmark, and should take one class period to complete it.
24	TM 10/02	1.2.2		1 – Cell Cycle 2 - Mitosis
25	T 10/03	1.2.2		1 - Mitosis
26	W 10/04	1.2.2, 3.2.3		1 – Meiosis
27	TH 10/05	1.2.2, 3.2.3		1 – Meiosis



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28	F 10/06	3.2.1		1 – Comparing Mitosis and Meiosis
29	M 3/09	3.2.1		1 – Quiz Cell Cycle, Mitosis, Meiosis 2 – Sources of Variation
30	T 3/10	Goal 1		1 – Review Day
31	W 10/11	Goal 1		1 – Review Day
32	TH 10/12	Goal 1		1 – Structure and Function of Cells Test Day
33	F 10/13	1.1.3 3.2.1	Genetics	1 – DNA Structure 2 – DNA Replication
34	M 10/16	3.1.1 3.3.1		1 – RNA Structure
35	T 10/17	3.1.2		1 – Transcription
36	W 10/18 ERS Staff Dev.	3.2.1		1 - Translation
37	TH 10/19	3.2.1		1 – Transcription/Translation Activities
38	F 10/20	3.1.2		1 – Protein Synthesis
39	M 10/23	3.1.3		1 – Gene Linkage & Mutations
40	T 10/24	3.2.2		1 – Gregor Mendel 2 – Punnett Squares (Regular)
41	W 10/25	3.2.2		1 – Punnett Squares (Non-Mendelian)



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42	TH 10/26	3.2.2	Genetics	1 – Punnett Squares (Non-Mendelian) – Multiple Alleles
43	F 10/27	3.2.2		1 – Sex-Linked Traits
44	M 10/30	3.2.2		1 – Pedigrees
45	T 10/31	3.2.2		1 – Pedigrees
46	W 11/01	3.2.2, 3.2.3		1 - Genetics Quiz 2 - Karyotypes 3 – Genetic Diseases
47	TH 11/02	3.3.3		1 – Human Genome Project 2 – Recombinant DNA
48	F 11/03	3.3.3		1 - Recombinant DNA 2 - Cloning
49	M 11/06	3.3.1		1 – Gel Electrophoresis (<i>Lab to be completed if time allows</i>) 2 – DNA Fingerprinting
50	T 11/07	3.4.2	Evolution	1 – Natural Selection 2 – Charles Darwin & other contributing scientists
51	W 11/08	3.4.2		1 – Mechanisms of Evolution
52	TH 11/09	3.4.1		1 – Evidence for Evolution
		Benchmark B Nov 6-10 (Tentative) You may test on any		Benchmark Review All Materials Since Day 1 Teachers Decide Which Day(s) Benchmark will be based on standards taught since the beginning of the school year. About 35-38 items will be on the Benchmark, and should



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		day during this week.		take one class period to complete it.
53	M 11/13	3.4.3		1 – Antibiotic Resistance 2 – Pesticide Resistance 3- Bacteria Viruses
54	T 11/14	3.4.3		1 – Antibiotic Resistance 2 – Pesticide Resistance 3- Bacteria Viruses
55	W 11/15	2.1.2		1 – Evolution Quiz 2 – Elements of Behavior 3 – Innate & Learned Behaviors
56	T 11/16	3.5.1 3.5.2		1 - Classification Systems (2 days) Prokaryotic Euukaryotic 2 – Dichotomous Keys 3 – Cladograms
57	F 11/17	1.1.3		1 – Gymnosperm & Angiosperm Reproduction (Plants Vocab)
58	M 11/20	Goal 3		1 – Review
59	T 11/21	Goal 3	Evolution	Evolution and Genetics Test Day
60	M 11/27	2.1.1		1 – Abiotic vs. Biotic 2 – Ecological Organization
61	T 11/28	2.1.1		1 – Food Chains / Food Webs 2 – Ecological Pyramids
62	W 11/29	2.1.1		1 – Ecological Pyramids 2 - Cycling of Matter
63	TH 11/30	2.1.1		1 – Cycling of Matter Activities
64	F 12/01	2.1.3	Ecology	1 – Succession



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65	M 12/04	2.1.3		1 – Symbiosis 2 – Predator/Prey Relationships
66	T 12/05	2.1.4		1 – Ecology Quiz 1 2 – Population Growth
67	W 12/06	2.2.1		1 – Population Growth 2 – Limits to Growth
68	TH 12/07	2.2.1		1 – Human Population Growth 2 – Human Environmental Impacts
69	F 12/08	2.2.1		1 – Human Environmental Impacts 2 – Ecology Quiz
		Mock Exams Dec 11-15 You may test on any two days during this week.		Mock Exam Review All Materials Since Day 1 Teachers Decide Which Day(s) Mock Exam will be the Biology Released Test that was also our Pretest. You will need two class periods to complete the mock examination.
70	M 12/11	Goal 2		1 – Review Day
71	T 12/12	Goal 2		1 – Ecology Test Day
72	W 12/13	Goal 2		1 – Over the Hedge: Wrap up of Ecology
73	TH 12/14			1 – Molecular Biology
74	F 12/15			1 – Structure and Function of Cells
75	M 12/18			1 – Genetics



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76	T 12/19 ERS ALL			1 – Evolution
77	T 01/02			1 –Ecology
78	W 01/03		EOC Review	
79	TH 01/04			
80	F 01/05			
81	M 01/08			
82	T 01/09			
83	W 01/10			
84	TH 01/11 Th- F JAN 1/12			
85			EOC TESTING JAN 12 is the proposed start date...	

Important Vocabulary By Unit

Ecology	Structure and Function	Molecular Biology	Genetics/Evolution
Abiotic	Cell Membrane	Carbohydrate	Gel Electrophoresis
Biotic	Cell Wall	Protein	DNA Fingerprinting



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Ecosystem	Ribosomes	Enzyme	Karyotyping
Habitat	Mitochondria	Substrate	Cloning
Niche	Chloroplasts	Active Site	Human Genome Project
Community	Vacuole	Lipid	Pedigrees
Population	Golgi Apparatus	Nucleic Acid	Mendel
Producer/Consumer	Endoplasmic Reticulum	Biomolecules	DNA/RNA
Autotroph/Heterotroph	Nucleus	Activation Energy	Double Helix
Symbiosis	Lysosomes	Lipid Bilayer	Genotype
Carrying Capacity	Prokaryotic	Osmosis	Phenotype
Predator/Prey	Eukaryotic	Diffusion	Allele
Succession	Organelle	Facilitated Diffusion	Gene
Mutualism	Binary Fission	Active Transport	Trait
Commensalism	Interphase (G1, S, G2)	Passive Transport	Replication
Parasitism	Prophase	Endocytosis	Transcription
Competition	Metaphase	Exocytosis	Translation
Predation	Anaphase	ATP/ADP	Nucleotide
Exponential Growth	Telophase	Cellular Respiration	Genetic Variation
Logistic Growth	Cytokinesis	Photosynthesis	Nondisjunction
Ozone	Mitosis	Fermentation	Trisomy Twenty-one
Global Warming	Meiosis	Glycolysis	Evolution
Nitrogen-Fixing Bacteria	Centrioles	Krebs Cycle	Darwin
Global Warming	Spindle Fibers	Calvin Cycle	Fossil Record
Carbon Dioxide	Centromere	Acid/Base	Adaptation
Biosphere	Crossing-Over	Hydrogen Bonds	Natural Selection

Weight Distributions for Biology End of Course Examination

Unifying Concept	Biology
Structure and Function of Living Organisms (2)	18-22%
Ecosystems (2)	18-22%
Evolution and Genetics (1)	43-53%
Molecular Biology (4)	15-19%
Total	100%

This is the link for the unpacking document for Biology

<http://www.dpi.state.nc.us/docs/curriculum/science/scos/support-tools/unpacking/science/biology.pdf>



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How to Find Released test Items in Schoolnet for Biology

How to Find a Passage in Schoolnet based on the Biology Standards. Remember that you go to my.ncedcloud.org and type in your username and password. From the homepage you then click on the school building icon that takes you to schoolnet. Once in schoolnet follow the directions below..

1. Click the Assessment link once you are in schoolnet
2. Click find an item, passage, or rubric
3. Click Advance search
4. Click Standard Look up
5. Select Standard Document- Drop down arrow that allows you to select your subject
6. Select grade level
7. Select your subject by clicking on the + sign. You can also select specific standards
8. Once you click the plus (+) sign the subject that you have chosen will automatically drop down to specific standards for your subject
9. You can select specific standards by checking the box beside each standards
10. If you click the + sign beside specific standards you will be taken to the sub topic for each standard.
11. After you decide which standards you want click the box beside each standard.
12. Then click add
13. You are now to scroll down to the properties section and type `ncdpi_classroom` for the publisher in the passage properties section.
14. Then you would click search items at the bottom of the page. Always search items and not passages...

Molecular Biology: 15-19% of End of Course Exam Standards 4.1.1, 4.1.2, 4.2.1, and 4.2.2

Bio.4.1 Understand how biological molecules are essential to the survival of living organisms.

Bio.4.1.1 Compare the structures and functions of the major biological molecules (carbohydrates, proteins, lipids, and nucleic acids) as related to the survival of living organisms.

Bio.4.1.2 Summarize the relationship among DNA, proteins and amino acids in carrying out the work of cells and how this is similar in all organisms.

Note: Students are not expected to memorize the names and/or structures or characteristics of the 20 amino acids. The focus should be on the fact that side chains are what make each of the amino acids different and determine how they bond and fold in proteins.(Relate to Bio.3.1.2)

Bio.4.1.3 Explain how enzymes act as catalysts for biological reactions.

Note: Students should understand that enzymes are necessary for all biochemical reactions and have a general understanding of how enzymes work in terms of the connection between shape and function.

Sample Questions for Molecular Biology Unit



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1. Which process allows an amoeba to bring food inside to maintain cellular homeostasis?
 - A. locomotion
 - B. phagocytosis
 - C. organogenesis
 - D. photosynthesis

2. A disease resulted in mitochondria being unable to function properly. How could this most directly affect an organism's ability to maintain homeostasis?
 - A. Potassium inside nerve cells could not be kept at higher levels than the surrounding body fluids.
 - B. Osmosis could not occur resulting in the inability of water to move in and out of the cells.
 - C. Gases such as carbon dioxide and oxygen could not diffuse in and out of the cells.
 - D. Cells would be unable to use membrane proteins to carry out facilitated diffusion.

3. What determines the order of amino acids in a protein?
 - A. the tRNA anti-codons
 - B. the function of the protein
 - C. the sequence of nucleotides in the DNA
 - D. the percentage of each nucleotide in the gene

4. For all cells where protein synthesis occurs, which base pair is found only in mRNA?
 - A. uracil : adenine
 - B. adenine : thymine
 - C. cytosine : guanine
 - D. cytosine : uracil

5. What type of organic molecules are enzymes?
 - A. carbohydrates
 - B. lipids
 - C. nucleic acids
 - D. proteins

6. Why may snakes eat only once a week?
 - A. They have small digestive tracts.
 - B. They lack adequate available prey.
 - C. They require large amounts of food.
 - D. They require much less energy to maintain homeostasis.

7. This is an mRNA codon chart. An organism has the DNA sequence TAC TGC CCA ATA.



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Codons in mRNA									
First Base	Second Base							Third Base	
	U		C		A		G		
U	UUU	Phenylalanine	UCU	Serine	UAU	Tyrosine	UGU	Cysteine	U
	UUC	Phenylalanine	UCC	Serine	UAC	Tyrosine	UGC	Cysteine	C
	UUA	Leucine	UCA	Serine	UAA	Stop	UGA	Stop	A
	UUG	Leucine	UCG	Serine	UAG	Stop	UGG	Tryptophan	G
C	CUU	Leucine	CCU	Proline	CAU	Histidine	CGU	Arginine	U
	CUC	Leucine	CCC	Proline	CAC	Histidine	CGC	Arginine	C
	CUA	Leucine	CCA	Proline	CAA	Glutamine	CGA	Arginine	A
	CUG	Leucine	CCG	Proline	CAG	Glutamine	CGG	Arginine	G
A	AUU	Isoleucine	ACU	Threonine	AAU	Asparagine	AGU	Serine	U
	AUC	Isoleucine	ACC	Threonine	AAC	Asparagine	AGC	Serine	C
	AUA	Isoleucine	ACA	Threonine	AAA	Lysine	AGA	Arginine	A
	AUG	Methionine	ACG	Threonine	AAG	Lysine	AGG	Arginine	G
G	GUU	Valine	GCU	Alanine	GAU	Aspartic Acid	GGU	Glycine	U
	GUC	Valine	GCC	Alanine	GAC	Aspartic Acid	GGC	Glycine	C
	GUA	Valine	GCA	Alanine	GAA	Glutamic Acid	GGA	Glycine	A
	GUG	Valine	GCG	Alanine	GAG	Glutamic Acid	GGG	Glycine	G

Why is it possible for a different organism with the DNA sequence TAC TGT CCG ATG to produce the same protein?

- A. because the DNA sequence for both organisms is the same length
- B. because more than one codon codes for the same amino acid sequence
- C. because the first base in each codon determines the amino acid sequence
- D. because the mRNA sequence for both organisms contains the same bases

8. Cells in your intestinal lining have a higher concentration of sodium than your food. How do they acquire the additional sodium they need?

- A. osmosis
- B. diffusion
- C. active transport
- D. passive transport

9. Which process allows an amoeba to bring food inside to maintain cellular homeostasis?

- A. locomotion
- B. phagocytosis
- C. organogenesis
- D. photosynthesis

10. A disease resulted in mitochondria being unable to function properly. How could this most directly affect an organism's ability to maintain homeostasis?

- A. Potassium inside nerve cells could not be kept at higher levels than the surrounding body fluids.
- B. Osmosis could not occur resulting in the inability of water to move in and out of the cells.
- C. Gases such as carbon dioxide and oxygen could not diffuse in and out of the cells.
- D. Cells would be unable to use membrane proteins to carry out facilitated diffusion.

11. What determines the order of amino acids in a protein?

- A. the tRNA anti-codons



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- B. the function of the protein
 - C. the sequence of nucleotides in the DNA
 - D. the percentage of each nucleotide in the gene
12. For all cells where protein synthesis occurs, which base pair is found only in mRNA?
- A. uracil : adenine
 - B. adenine : thymine
 - C. cytosine : guanine
 - D. cytosine : uracil
13. Which most directly affects the sequence of amino acids in a protein?
- A. the DNA in the nucleus of the cell
 - B. the amino acids found in the cytoplasm
 - C. the type of cell in which the protein is made
 - D. the region of the cell in which the protein is made
14. Which is affected by the order of amino acids?
- A. The type of proteins produced.
 - B. The type of nucleotides produced.
 - C. The type of peptide bonds produced.
 - D. The type of phosphate group produced.
15. Which statement is untrue regarding aerobic cellular respiration and lactic acid fermentation?
- A. Only aerobic cellular respiration requires O₂.
 - B. Only lactic acid fermentation can cause muscle cramps.
 - C. Both aerobic cellular respiration and lactic acid fermentation break down glucose.
 - D. Both aerobic cellular respiration and lactic acid fermentation produce CO₂ waste.
16. Why are proteins important to the survival of animals?
- A. Proteins provide the body with energy.
 - B. Proteins provide energy storage for cells.
 - C. Proteins provide genetic information to cells.
 - D. Proteins provide structural functions for the body
17. Why are lipids important for the survival of animals?
- A. Lipids carry genetic information in the form of RNA.
 - B. Lipids store energy and vitamins that animals need.
 - C. Lipids provide animals with quick energy for routine tasks.
 - D. Lipids contain amino acids necessary for protein synthesis.
18. How do DNA and proteins work together to affect the metabolism of energy in cells?
- A. Energy is metabolized in cells after proteins transcribe DNA to undergo replication and to release energy into cells.



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- B. Proteins, like enzymes, metabolize energy during cellular respiration resulting in DNA synthesizing additional DNA in cells.
- C. DNA supplies the instructions for amino acids to form specific proteins like enzymes, which speed up the metabolism in cells.
- D. Proteins create energy to carry DNA out of the cell nucleus where it is transported to the ribosome for transcription into amino acids.
19. If an animal has a limited supply of O₂, which process would be most affected?
- A. alcoholic fermentation
- B. lactic acid fermentation
- C. aerobic cellular respiration
- D. anaerobic cellular respiration
20. A lack of availability of which substance would limit the rate of photosynthesis in aquatic plants in an aquatic environment?
- A. water
- B. oxygen
- C. simple sugars
- D. carbon dioxide

Structure and Function of Cells: 18-22% of the End of Course Examination

Standards 1.1.1, 1.1.2, 1.1.3, 1.2.1, 1.2.2, and 1.2.3

Bio.1.1 Understand the relationship between the structures and functions of cells and their organelles.

Bio.1.1.1 Summarize the structure and function of organelles in eukaryotic cells (including the nucleus, plasma membrane, cell wall, mitochondria, vacuoles, chloroplasts, and ribosomes) and ways that these organelles interact with each other to perform the function of the cell.

Bio.1.1.2 Compare prokaryotic and eukaryotic cells in terms of their general structures (plasma membrane and genetic material) and degree of complexity.

Bio.1.1.3 Explain how instructions in DNA lead to cell differentiation and result in cells specialized to perform specific functions in multicellular organisms.

Bio.1.2 Analyze the cell as a living system.

Bio.1.2.1 Explain how homeostasis is maintained in a cell and within an organism in various environments (including temperature and pH).

Bio.1.2.2 Analyze how cells grow and reproduce in terms of interphase, mitosis and cytokinesis.

Bio.1.2.3 Explain how specific cell adaptations help cells survive in particular environments (focus on unicellular organisms).

Structure and Function of Cells Sample Questions

1. How does DNA code for proteins in a cell?
- A. by creating a new double helix structure



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- B. by using its phosphate and sugar molecules
 - C. by adding more hydrogen bonds to its structure
 - D. by arranging certain nitrogen bases of the cell in a particular order
2. How are prokaryotic and eukaryotic cells similar?
- A. Both contain a nucleus.
 - B. Both contain ribosomes.
 - C. Both contain membrane-bound organelles.
 - D. Both contain cell walls.
3. Which best explains why muscle cells are different from blood cells?
- A. A mutation occurs during the development of muscle cells but not in blood cells.
 - B. Different genes are activated in muscle cells than in blood cells.
 - C. Muscles cells experience different environmental influences than blood cells.
 - D. Muscle cells are produced by the brain, but blood cells are produced by the heart.
4. What is the result when a single cell reproduces by mitosis?
- A. two cells with genetic material identical to the parent cell
 - B. two cells with half the genetic material of the parent cell
 - C. four cells with half the genetic material of the parent cell
 - D. four cells with genetic material identical to the parent cell
5. What process best explains how a nerve cell and a muscle cell can both develop from the same fertilized egg?
- A. differentiation
 - B. natural selection
 - C. selective breeding
 - D. genetic engineering
6. What will most likely be the result if all of the mitochondria are removed from a plant cell?
- A. It will be unable to carry out respiration.
 - B. It will lose water through osmosis.
 - C. It will break down the ribosomes in the cell.
 - D. It will be unable to photosynthesize.
7. Before mitosis begins, which happens before the nucleus starts dividing?
- A. The cytoplasm separates.
 - B. The DNA replicates.



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- C. The sister chromatids separate.
 - D. The homologous chromosomes cross over.
8. Which cell is undifferentiated?
- A. stem cell
 - B. sperm cell
 - C. kidney cell
 - D. red blood cell
9. In a laboratory setting, embryonic stem cells can differentiate into which types of cells?
- A. any type of eukaryotic cell
 - B. any type of prokaryotic cell
 - C. any cell from the same organism
 - D. any cell from a different organism
10. Which would most likely hinder the ability of a paramecium to survive in its environment?
- A. absorbing chemicals that impact contractile vacuoles
 - B. dividing into two identical daughter cells
 - C. using ATP to aid in movement of the cilia
 - D. replicating mitochondria within the cell
11. Which best determines whether a molecule crosses a cell membrane?
- A. shape
 - B. function
 - C. structure and cell type
 - D. polarity and concentration
12. Which form of transport permits water to cross a semi-permeable membrane from areas of high concentration to low concentration?
- A. osmosis
 - B. diffusion
 - C. ionization
 - D. active transport
13. Which example represents chemotaxis?
- A. An amoeba engulfs a food particle.
 - B. A paramecium removes excess water.
 - C. A euglena moves from a dark area towards a light source.
 - D. A bacterium swims towards higher concentrations of glucose.
14. Which action exemplifies phototaxis?



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- A. An amoeba engulfs a food particle.
 - B. A paramecium removes excess water.
 - C. A euglena swims towards a source of light.
 - D. A bacterium moves towards higher concentrations of glucose.
15. Which structure found in Euglena serves the same function as the cilia of a Paramecium?
- A. a flagella for movement
 - B. an eyespot for movement
 - C. a pseudopod for water removal
 - D. a contractile vacuole for water removal
16. Why is it important for dogs and cats to pant when they become hot?
- A. to prevent disease
 - B. to release excess water
 - C. to increase cellular metabolism
 - D. to maintain proper internal temperatures
17. Which explains how buffers help cells to maintain homeostasis?
- A. provide hydration for the cell
 - B. help keep the pH within a cell constant
 - C. contain enzymes to speed up chemical reactions
 - D. supply nutrients for growth and cellular processes
18. In which phase of the cell cycle is DNA replicated?
- A. gap 1
 - B. gap 2
 - C. mitosis
 - D. synthesis
19. Which type of cell will result from a DNA code for cells specialized in transmitting electrical signals?
- A. fat cell
 - B. nerve cell
 - C. sperm cell
 - D. red blood cell
20. Which is a practical purpose for classification?
- A. to facilitate the identification of unknown species
 - B. to explain the origin of unicellular organisms
 - C. to identify certain hereditary characteristics
 - D. to know the evolutionary history of species



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Genetics and Evolution 43-53% of the Biology End of Course Examination Standards

Bio.3.1 Explain how traits are determined by the structure and function of DNA.

Bio.3.1.1 Explain the double-stranded, complementary nature of DNA as related to its function in the cell.

Bio.3.1.2 Explain how DNA and RNA code for proteins and determine traits.

Bio.3.1.3 Explain how mutations in DNA that result from interactions with the environment (i.e. radiation and chemicals) or new combinations in existing genes lead to changes in function and phenotype

Bio.3.2 Understand how the environment, and/or the interaction of alleles, influences the expression of genetic traits.

Bio.3.2.1 Explain the role of meiosis in sexual reproduction and genetic variation.

Bio.3.2.2 Predict offspring ratios based on a variety of inheritance patterns (including dominance, co-dominance, incomplete dominance, multiple alleles, and sex-linked traits).

Bio.3.2.3 Explain how the environment can influence the expression of genetic traits.

Bio.3.3 Understand the application of DNA technology.

Bio.3.3.1 Interpret how DNA is used for comparison and identification of organisms. Bio.3.3.2 Summarize how transgenic organisms are engineered to benefit society.

Bio.3.3.3 Evaluate some of the ethical issues surrounding the use of DNA technology (including cloning, genetically modified organisms, stem cell research, and Human Genome Project).

Bio.3.4 Explain the theory of evolution by natural selection as a mechanism for how species change over time.

Bio.3.4.1 Explain how fossil, biochemical, and anatomical evidence support the theory of evolution.

Bio.3.4.2 Explain how natural selection influences the changes in species over time.

Bio.3.4.3 Explain how various disease agents (bacteria, viruses, chemicals) can influence natural selection.

Bio.3.5 Analyze how classification systems are developed upon speciation.

Bio.3.5.1 Explain the historical development and changing nature of classification systems.

Bio.3.5.2 Analyze the classification of organisms according to their evolutionary relationships (including dichotomous keys and phylogenetic trees).

Sample Questions