



Stamford Public Schools

EXCELLENCE IS THE POINT.

# Stamford Public Schools

## Science Department

### District Midterm Examination

### *REVIEW*

2013-2014

CP Biology

Student Name: \_\_\_\_\_

School/Teacher: \_\_\_\_\_

Date: \_\_\_\_\_



Dear Biology Student,

The district-wide CP Midterm Exam for the 2013-2014 school year will focus on the concepts covered in each of the first two quarters of the Biology course. You will have 90 minutes for this exam.

Enclosed is a list of the skills and concepts from your Biology course. Next to each main topic is the number of problems which will appear on the Exam and also the way questions will be formatted (Constructed Response or Selected Response).

In addition to the concepts listed and the formatting of the questions, this packet also includes a sampling of the types of questions which will be on your CP Biology Midterm Exam.

Please see your science teacher if you feel additional practice is necessary.

Wishing you success on your Exam,

Carrie Chiappetta  
Director School Improvement and Professional Development-Secondary

## CP Biology Midterm Exam 2014

### *Blueprint and Study Guide*

62 Selected Responses 1 point each (62 total points)

8 Constructed Responses 1-5 points each (total 22 points)

84 Total Points

Topic	# of selected response questions	# of constructed response questions	points for constructed response questions
<b>Scientific Inquiry</b> General content regarding scientific inquiry, literacy and numeracy.	6 total	0 total	0 points total
<b>Population Ecology</b>	6 total	1 total	3 points total
Human population growth	2		
Carrying capacity	2		
Limits to population size	1		
Birth rate/death rate	1		
Human influence on global warming			
Human population pyramids <ul style="list-style-type: none"> <li>• Interpreting</li> <li>• Predicting</li> <li>• Developed vs. underdeveloped</li> </ul>		1	
<b>The Chemistry of Life</b>	7 total	2 total	10 points total
Enzyme function and structure	1		
Activation energy	2		
pH scale	1		
buffers			
Synthesis of macromolecules			
Structure and function of macromolecules	3		
Interpreting Enzyme Lab Data		2	
<b>The Structure and Function of Cells</b>	15 total	0 total	0 points total
Homeostasis	1		
Properties of life	3		
Eukaryotic vs Prokaryotic cells	2		
Plant vs Animal cells	2		
Parts of the Eukaryotic Cell and their functions	8		
Passive and Active Transport	1		
Diffusion	1		
Osmosis (hypotonic, hypertonic, isotonic) <ul style="list-style-type: none"> <li>• Identifying solutions</li> <li>• Predicting movement of water</li> </ul>			

<b>Respiration and Photosynthesis</b>	<b>6 total</b>	<b>0 total</b>	<b>0 points total</b>
Equations of Respiration & Photosynthesis	2		
Reactants and Products of: <ul style="list-style-type: none"> <li>• Glycolysis</li> <li>• ETC</li> <li>• Kreb's cycle</li> <li>• Light reactions</li> </ul>			
Dark reactions (Calvin Cycle)			
Aerobic vs. Anaerobic respiration	3		
Location of processes			
ATP	1		
<b>DNA</b>	<b>5 total</b>	<b>1 total</b>	<b>4 points total</b>
Structure and Function of DNA	3	1	
Parts of a DNA nucleotide	1		
Base pairing rules	1		
Replication			
<b>Protein Synthesis</b>	<b>5 total</b>	<b>0 total</b>	<b>0 points total</b>
Structure and Function of RNA	2		
Parts of an RNA nucleotide			
Base pairing rules			
Codons and amino acids			
Transcription	2		
Translation	1		
<b>Cell Division</b>	<b>4 total</b>	<b>0 total</b>	<b>0 points total</b>
Mitosis	3		
Stages of the cell cycle			
Stages of Interphase			
Processes occurring during the cell cycle			
Processes occurring during Interphase	1		
Parent vs Daughter cells <ul style="list-style-type: none"> <li>• Genetic information</li> <li>• Chromosome number</li> </ul>			
<b>Sexual Reproduction</b>	<b>3 total</b>	<b>0 total</b>	<b>0 points total</b>
Meiosis	3		
Crossing over			
Parent vs. Daughter cells <ul style="list-style-type: none"> <li>• Genetic information</li> <li>• Chromosome number</li> </ul> Sources of genetic variability			

<b>The Nature of Science</b> Scientific Method Experimental components <ul style="list-style-type: none"> <li>• Constant</li> <li>• Control</li> <li>• Independent</li> <li>• Dependent</li> <li>• Hypothesis</li> </ul> Interpreting and Graphing data	Found in conjunction with questions throughout the assessment	4 total	5 points
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## **Science Process**

You should be able to:

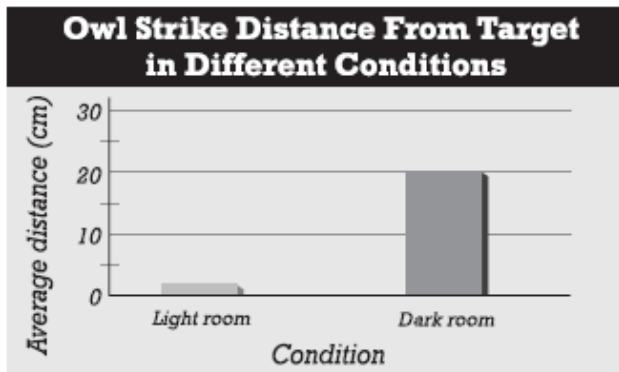
- Design experiments that test specific science questions
- Identify the independent/dependent variables and control if applicable
- Demonstrate a knowledge of common lab equipment and measurement units
- Write a reasonable hypothesis based on prior knowledge
- Read and interpret graphs, tables and diagrams
- Analyze data and observations to form reasonable conclusions
- Demonstrate an understanding of error related to the validity of data
- Apply mathematics to solving quantitative problems as applied to science
- Use common science language and vocabulary correctly
- Find logical connections between science concepts and applications in the real world.
- Evaluate information based on science practice
- Identify and emphasize interdisciplinary connections
- Explain how science understanding is challenged and developed through rigorous testing of concepts, theories and laws

## **CP Biology Midterm Exam 2014**

### *Blueprint and Study Guide*

1. Explain the relationship between an independent variable and a dependent variable.
2. Use the following terms in the same sentence: *observation, hypothesis, prediction and experiment.*
3. Summarize the parts of a controlled experiment.

**INTERPRETING GRAPHICS:** The graph below shows the distance it takes an owl to strike a mouse under different conditions. Use the graph to answer the question that follows.



4.

Which of the following is the dependent variable in the experiment?

- a. Twilight
- b. Complete darkness
- c. Daylight
- d. Distance from target

5. List the five main levels of organization in ecology.

6. How does a population differ from a community?

7. Why is the amount of light important to the animals in an ecosystem?

8. Which of the following is a population?

- a. All the fish in a pond
- b. All the birds of New York City
- c. all the members of a family of humans
- d. all of the fish of the same species in a lake

9. Explain how two populations can be the same size but have different densities.

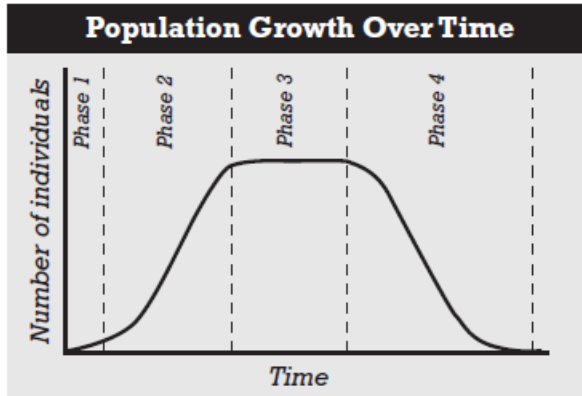
10. Explain the relationship between birth rate, death rate and growth rate.

11. List two density-independent factors that could limit population growth.

12. What effect did the agricultural revolution have on the growth of the human population?

13. Compare living standards in developing countries with those in developed countries.

**INTERPRETING GRAPHICS:** The graph below shows the size of a particular population over time. Use the graph to answer the question that follows.

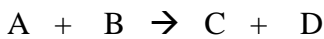


14.

In the graph, which time period shows negative growth of the population?

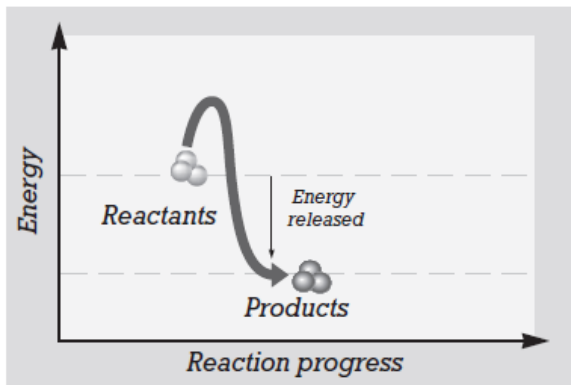
- a. Phase 1                      b. Phase 2                      c. Phase 3                      d. Phase 4

15. Identify the reactants and the products in the following chemical reaction.



16. Name two ions that are the products of the dissociation of water.

**INTERPRETING GRAPHICS:** The graph below shows the energy in a chemical reaction as the reaction progresses. Use the graph to answer the questions that follow.



17.

The amount of energy needed for this chemical reaction to begin is shown by the line rising from the reactants.

What is this energy called?

- a. Chemical energy                      c. activation energy  
b. Electrical energy                      d. mechanical energy

18. Suppose that the reaction above needs a catalyst to proceed. In the absence of a catalyst, the activation energy would be which of the following?
- Larger than what is shown
  - The same as what is shown
  - Smaller than what is shown
  - not much different from what is shown
19. Differentiate between organic and inorganic compounds.
20. Explain the role of ATP in cellular activities.
21. List the four major classes of organic compounds.
22. For each pair of terms. Explain how the meanings of the terms differ.
- Monomer* and *polymer*
  - Monosaccharide* and *disaccharide*
  - Polypeptide* and *protein*
  - Nucleic acid* and *nucleotide*
23. State the three fundamental parts of the cell theory.
24. Name eight characteristics that all living things share.
25. Identify the three main parts of an eukaryotic cell.
26. List four levels of organization that combine to form an organism.
27. For each pair of terms, explain how the meanings of the terms differ:
- nucleolus* and *nucleus*
  - cell wall* and *cell membrane*
  - ribosomes* and *endoplasmic reticulum*
  - chromatin* and *chromosomes*
  - mitochondria* and *chloroplast*

**INTERPRETING GRAPHICS:** The figure below shows a diagram of a cell. Use the figure to answer the question that follows.

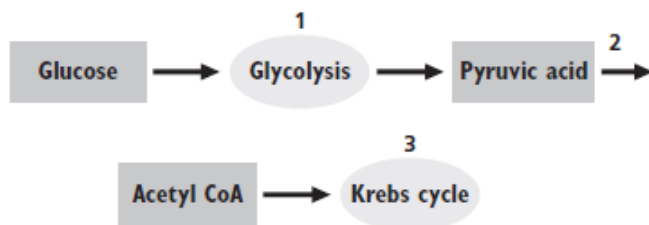


- 28.
- What is the function of the structure labeled 1?
- To make ATP
  - To make carbohydrates
  - To make proteins
  - To move proteins through the cell



29. During diffusion, molecules tend to move in what direction?
- The molecules involved in diffusion never move
  - In a direction that doesn't depend on the concentration gradient
  - From an area of lower concentration to an area of higher concentration
  - From an area of higher concentration to an area of lower concentration
30. Distinguish between passive and active transport.
31. Explain why both autotrophs and heterotrophs depend on photosynthesis to obtain the energy they need for life processes.
32. Explain why the splitting of water is important to the continuation of the light reactions.
33. What are the reactants and products for both the light reactions and the Calvin cycle?
34. List the two processes that together result in cellular respiration.
35. Describe what causes your muscles to become fatigued and sometimes develop cramps when you exercise too strenuously.

**INTERPRETING GRAPHICS:** The illustration below shows some stages and reactants of cellular respiration. Use the illustration to answer the question that follows.



36. At which of the points is ATP, the main energy currency of the cell, produced?
- 1 only
  - 2 only
  - 1 and 3
  - 1, 2 and 3
37. Describe the structure of the chromosome.
38. Summarize the events of interphase.
39. Use the following terms in the same sentence: *mitosis*, *meiosis* and *cytokinesis*.
40. How do the end products of meiosis differ from the end products of mitosis?
41. How do the base-pairing rules relate to structure of DNA?
42. List the four ways in which the structure of RNA differs from that of DNA.
43. For each pair of terms, explain how the meanings of the terms differ:
- purine* and *pyrimidine*
  - messenger RNA* and *transfer RNA*
  - transcription* and *translation*
44. Sequence the main steps of transcription and translation.

## CP Biology Midterm Vocabulary List

1. Acidic
2. Activation Energy
3. Active Transport
4. Adenine
5. Amino Acids
6. Anaphase
7. Animal Cell
8. ATP
9. Basic
10. Biology
11. Birth Rate
12. Cancer
13. Carbohydrate
14. Carrying Capacity
15. Catalysts
16. Cell
17. Cell Membrane
18. Cell Theory
19. Chloroplasts
20. Chromosome
21. CO<sub>2</sub>
22. Control group
23. Cytoplasm
24. Cytosine
25. Death Rate
26. Dependent Variable
27. Diffusion
28. DNA
29. DNA Replication
30. Emigration
31. Endoplasmic Reticulum
32. Environment
33. Enzymes
34. Eukaryotes
35. Fermentation
36. Gamete (egg/sperm)
37. Genotype
38. Glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>)
39. Glycolysis
40. Golgi Apparatus
41. Guanine
42. Heterozygous
43. Homeostasis
44. Homologous Pairs
45. Homozygous
46. Hybrid
47. Hypothesis
48. Immigration
49. Independent Variable
50. Interphase
51. Krebs Cycle
52. Lactic Acid
53. Limiting Factor
54. Living
55. Lysosomes
56. Meiosis
57. Metaphase
58. Mitochondria
59. Molecules
60. Monomers
61. Neutral
62. Niche
63. Nucleotide
64. Nucleus
65. Observation
66. Organ Systems
67. Organelles
68. Organic Compound
69. Organisms
70. Organs
71. Osmosis
72. O<sub>2</sub>
73. Passive Transport
74. pH
75. Photosynthesis
76. Plant Cell
77. Population
78. Prokaryotes
79. Prophase
80. Protein
81. Ribosomes
82. RNA
83. Scientific Experiment
84. Selectively Permeable
85. Species
86. Telophase
87. Theory
88. Thymine
89. Tissue
90. Transcription
91. Translation
92. Uracil
93. Vacuole