Stamford Public Schools
EXCELLENCE IS THE POINT.

Stamford Public Schools
Science Department

District Midterm Examination
REVIEW

2014-2015

CP Biology

Student Name:_____

School/Teacher:_____

Date: _____

Stamford Public Schools
EXCELLENCE IS THE POINT.

Dear Biology Student,

The district-wide CP Midterm Exam for the 2014-2015 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 2015

Blueprint and Study Guide

Selected Responses 1 point each (50 total points)

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

72 Total Points

Topic	**# of selected response questions**	**# of constructed response questions**	**points for constructed response questions**
Scientific Inquiry General content regarding scientific inquiry, literacy and numeracy.	6 total	0 total	0 points total
Population Ecology	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 • Interpreting • Predicting • Developed vs. underdeveloped		1	
The Chemistry of Life	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	
The Structure and Function of Cells	15 total	0 total	0 points total
Homeostasis			
Properties of life	2		
Eukaryotic vs Prokaryotic cells	2		
Plant vs Animal cells	2		
Parts of the Eukaryotic Cell and their functions	7		
Passive and Active Transport	1		
Diffusion	1		
Osmosis (hypotonic, hypertonic, isotonic) • Identifying solutions • Predicting movement of water			

Respiration and Photosynthesis	6 total	0 total	0 points total
Equations of Respiration & Photosynthesis	2		
Reactants and Products of: • Glycolysis • ETC • Kreb's cycle • Light reactions			
Dark reactions (Calvin Cycle)			
Aerobic vs. Anaerobic respiration	3		
Location of processes			
ATP	1		
DNA	5 total	1 total	4 points total
Structure and Function of DNA	3	1	
Parts of a DNA nucleotide	1		
Base pairing rules	1		
Replication			
Protein Synthesis	5 total	0 total	0 points total
Structure and Function of RNA	2		
Parts of an RNA nucleotide			
Base pairing rules			
Codons and amino acids			
Transcription	2		
Translation	1		
The Nature of Science Scientific Method Experimental components • Constant • Control • Independent • Dependent • Hypothesis Interpreting and Graphing data	Found in conjunction with questions throughout the assessment	4 total	7 points

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 2015

Blueprint and Study Guide

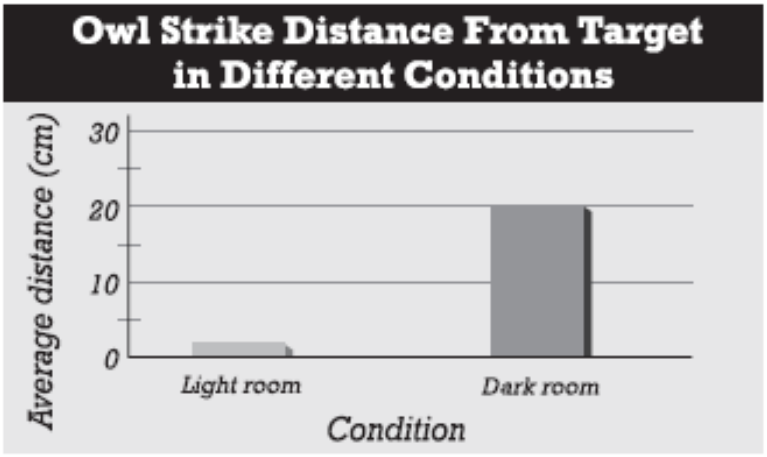
The Scientific Method:

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

Population Ecology:

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

2. How does a population differ from a community?

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

4. 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

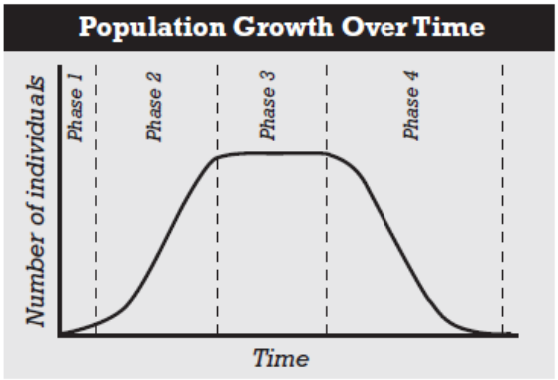
5. Explain the relationship between birth rate, death rate and growth rate.

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

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

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

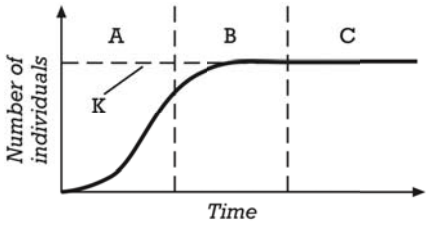
INTERPRETING GRAPHICS: The graph below shows the size of a particular population over time. Use the graph to answer the question that follows.



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

9. Compare the birth rate and death rate in each phase of the graph above.

10. The graph below shows the growth of a population over time.



a. Describe the birth rate and death rate in region A _____
b. Describe the birth rate and death rate in region C _____
c. Identify the line labeled K _____

11. The current population growth rates of developed countries
a. are lower than those of developing countries.
b. are high because the death rate is low.
c. are increasing because the fertility rate is increasing.
d. are low because the death rate is high.

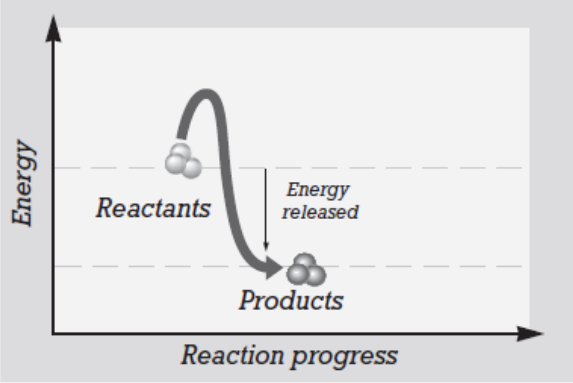
Chemistry of Life:

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

A + B → C + D

2. 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?

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.



a. Chemical energy
b. Electrical energy
c. Activation energy
d. Mechanical energy

3. Suppose that the reaction above needs a catalyst. If a catalyst is not available, the activation energy would be which of the following?

a. Larger than what is shown
b. The same as what is shown
c. Smaller than what is shown
d. Not much different from what is shown

4. Which type of atom is common to all organic molecules?

5. List the four major classes of organic compounds.

6. Fill in the blanks:

_____ bond together to form polymers.

_____ bond together to form proteins.

_____ bond together to form polysaccharides.

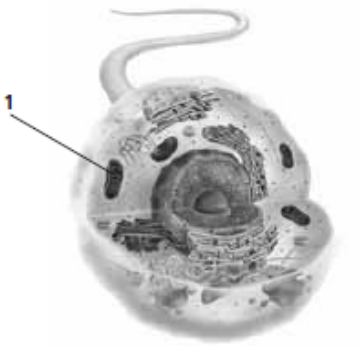
7. When working in the laboratory, you discover that the solutions you are working with are tomato juice with a pH of 4 and soap with a pH of 10. Which of the two solutions is an acid and which one is a base? How do you know?

Structure and Function of Cells

1. State the three fundamental parts of the cell theory.

2. 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.



3. In the diagram above, what is the function of the structure labeled 1?
   a. To make ATP
   b. To make carbohydrates
   c. To make proteins
   d. To move proteins through the cell

4. How do molecules move during the process of diffusion?
   a. The molecules involved in diffusion never move
   b. In a direction that doesn't depend on the concentration gradient
   c. From an area of lower concentration to an area of higher concentration
   d. From an area of higher concentration to an area of lower concentration

5. Distinguish between passive and active transport.

6. One difference between eukaryotic and prokaryotic cells is that
   a. only prokaryotic cells are surrounded by a cell membrane.
   b. only prokaryotic cells have a nucleus.
   c. only eukaryotic cells have DNA.
   d. only eukaryotic cells have membrane-bound organelles.

7. The cell membrane
   a. lets all substances to move into and out of the cell.
   b. stops all substances from passing into and out of the cell.
   c. is made mainly of a protein bilayer.
   d. is made mainly of a lipid bilayer.

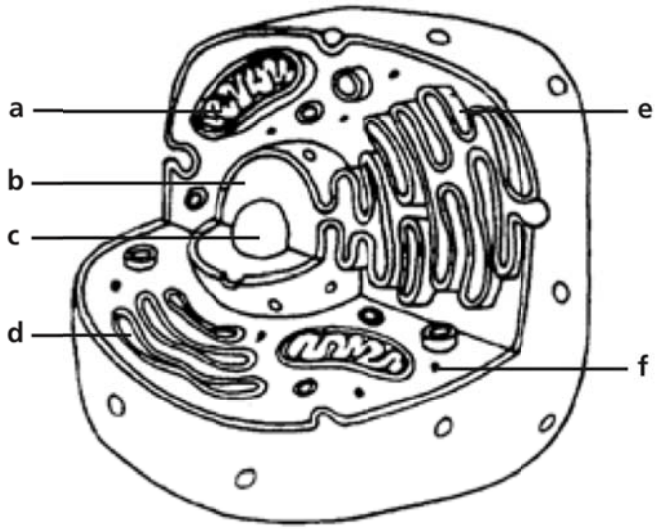
8. Which of the following organelles is found in plant cells but not in animal cells?
   a. nucleus
   b. chloroplast
   c. mitochondrion
   d. Golgi bodies

9. When a human red blood cell is placed in a hypotonic environment, it will
   a. undergo cytolysis.
   b. undergo plasmolysis.
   c. experience a decrease in turgor pressure.
   d. be at equilibrium.

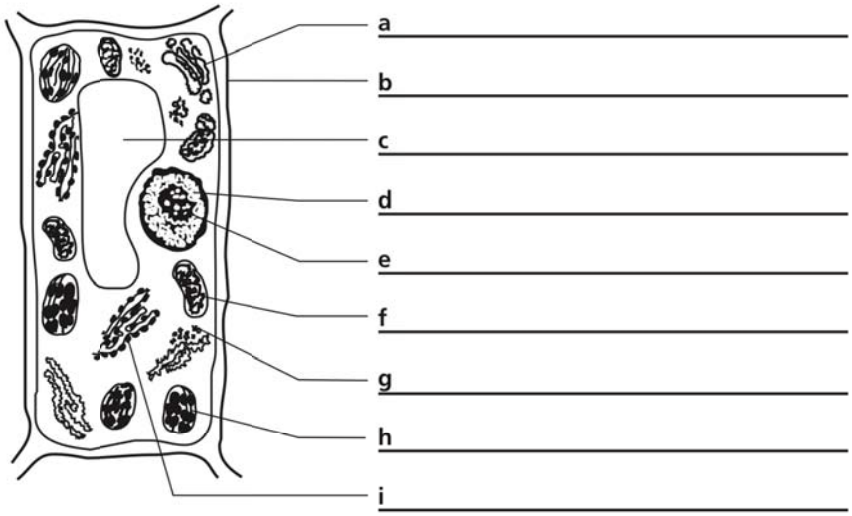
10. What is the job of the cell membrane?
    a. provides alternative to phospholipid bilayer
    b. prevents transport proteins from harming the cell
    c. controls what enters and leaves the cell
    d. block all water from entering the cell.

11. Which of the following is not a function of the Golgi apparatus?
    a. controls the cell
    b. produces proteins
    c. makes energy for the cell
    d. packages and distributes protein

10. This diagram represents a typical animal cell. Label each part of the figure. Be sure you are able to indicate the function of each structure if asked.



11. The diagram below represents a typical plant cell. Label each part of the figure. Be sure you are able to explain the function of each structure if asked.



Photosynthesis and Respiration:

1. Explain why both autotrophs and heterotrophs depend on photosynthesis to obtain the energy they need for life processes.

2. Explain why the splitting if water is important to the continuation of the light reactions.

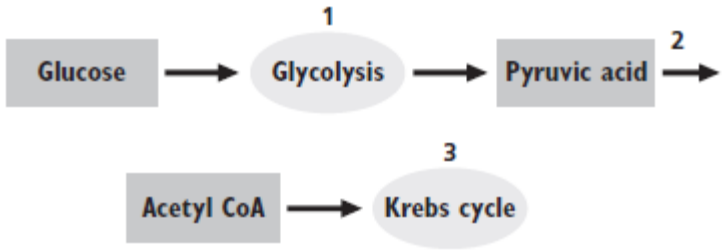
3. What are the reactants and products for both the light reactions and the Calvin cycle?

4. List the two processes that together result in cellular respiration.

5. Describe what causes your muscles to become fatigued and sometimes develop cramps when you exercise too strenuously.

6. At which of the points is ATP, the main energy currency of the cell, produced in the diagram below?

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



a. 1 only b. 2 only c. 1 and 3 d. 1, 2 and 3

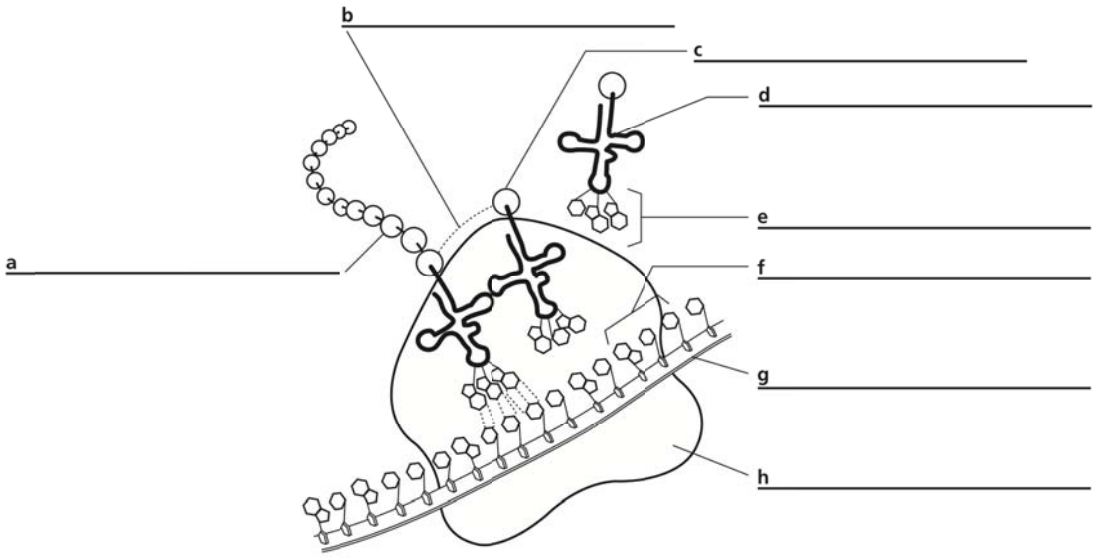
DNA and Protein Synthesis

1. What is the function of DNA?
2. Describe the structure of DNA
3. How does the structure of DNA compare to that of RNA?
4. Draw the structure of a nucleotide.
5. Describe the structure of the chromosome.
6. Distinguish between transcription and translation
7. Describe the shape and the function of each type of RNA.
8. The primary function of DNA in cells is to
    a. serve as a storage form for unused nucleotides.
    b. occupy space in the nucleus to keep the nucleus from collapsing.
    c. store information that tells the cells which proteins to make.
    d. serve as a template for making long, spiral carbohydrates.
9. According to the base-pairing rules, guanine binds with _____.

10. Which of the following distinguishes RNA from DNA?
    a. It stores genetic information.
    b. There are multiple type of RNA
    c. It is a nucleic acid.
    d. It is a biomolecule.

11. DNA technology is being used to develop crop plants that are
    e. a. less toxic to the pests that normally feed on them.
    f. b. more susceptible to herbicides.
    g. c. unable to fix nitrogen in the atmosphere.
    h. d. resistant to some diseases.

11. The diagram below summarizes the events that occur during translation. Label each part of the figure in the space provided and summarize the process. Use the terms anticodon, codon, mRNA, tRNA, amino acid, peptide bond, protein.



CP Biology Midterm Vocabulary List

1. Acidic
2. Activation Energy
3. Active Transport
4. Adenine
5. Amino Acids
6. Animal Cell
7. ATP
8. Basic
9. Biology
10. Birth Rate
11. Cancer
12. Carbohydrate
13. Carrying Capacity
14. Catalysts
15. Cell
16. Cell Membrane
17. Cell Theory
18. Chloroplasts
19. Chromosome
20. CO_2
21. Control group
22. Cytoplasm
23. Cytosine
24. Death Rate
25. Dependent Variable
26. Diffusion
27. DNA
28. DNA Replication
29. Emigration
30. Endoplasmic Reticulum
31. Environment
32. Enzymes
33. Eukaryotes
34. Fermentation
35. Glucose ($C_6H_{12}O_6$)
36. Glycolysis
37. Golgi Apparatus
38. Homeostasis
39. Hypothesis
40. Immigration
41. Independent Variable
42. Interphase
43. Krebs Cycle
44. Lactic Acid
45. Limiting Factor
46. Living
47. Lysosomes
48. Mitochondria
49. Molecules
50. Monomers
51. Neutral
52. Niche
53. Nucleotide
54. Nucleus
55. Observation
56. Organ Systems
57. Organelles
58. Organic Compound
59. Organisms
60. Organs
61. Osmosis
62. O_2
63. Passive Transport
64. pH
65. Photosynthesis
66. Plant Cell
67. Population
68. Prokaryotes
69. Protein
70. Ribosomes
71. RNA
72. Scientific Experiment
73. Selectively Permeable
74. Species
75. Theory
76. Thymine
77. Tissue
78. Transcription
79. Translation
80. Uracil
81. Vacuole