Biology EOCT Practice-Assessment

SB1a. Explain the role of cell organelles for both prokaryotic and eukaryotic cells including the cell membrane, in maintaining homeostasis and cell reproduction.

1. Which organelle is directly involved in cellular transport?
   a. Endoplasmic reticulum
   b. Mitochondria
   c. Golgi apparatus
   d. Cell membrane
   e.

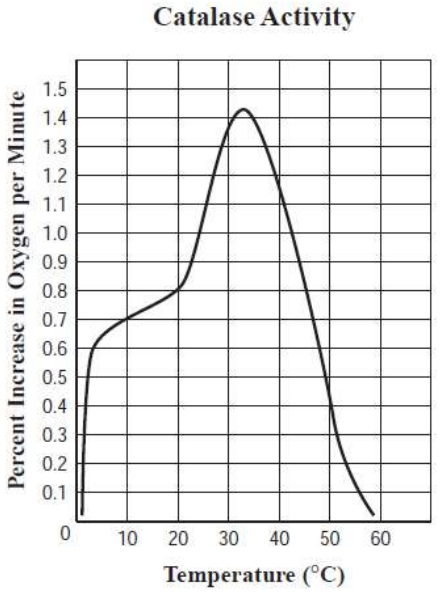
2. Which of the following matches an organelle with its function?
   a. Chloroplast – movement
   b. Nucleus – cell regulation
   c. Vacuole – energy production
   d. Mitochondrion – photosynthesis

3. If an animal cell is placed in distilled water, it will swell and burst. The bursting of the cell is a result of which biological process?
   a. Active transport
   b. Enzyme activity
   c. Osmosis
   d. Respiration

SB1b. Explain how enzymes function as catalysts.

4. The graph on the right shows the rate of activity for the enzyme catalase at different temperatures. Catalase helps convert hydrogen peroxide to oxygen and water. The rate of catalase activity is directly related to the percent increase in oxygen.

   Based pm the graph. Which of the following conclusions can be made about the functioning of catalase?
   a. Catalase works best at 34°C.
   b. Catalase is destroyed at 34°C.
   c. Catalase cannot function at 51°C
   d. Catalase functions most efficiently at 51°C.



5. Which of the following BEST explains why enzymes are necessary for many cellular reactions?
   a. Enzymes supply the oxygen necessary for the reactions.
   b. Enzymes change reactants from solid to liquid during the reactions.
   c. The reactions take up too much space in the cell if enzymes are missing.
   d. The reactions are too slow to meet the needs of the cell if enzymes are missing.

SB1c. Identify the function of the four major macromolecules (i.e. carbohydrates, proteins, lipids, and nucleic acids.

6. In the human body, fibrinogen is necessary for sealing cuts and stopping the loss of blood. Since fibrinogen is made of chains of amino acids, it is an example of which type of organic molecule?

a. Carbohydrate
b. Proteins
c. Fatty acid
d. Nucleic acid

7. When lactose is digested by the human body, each lactose molecule is broken down into smaller molecules. To which of the following categories of molecules do these smaller molecules belong and which macromolecule are those the building blocks of?

a. Amino acids, proteins
b. Monosaccharides, carbohydrates
c. Nucleotides, nucleic acids
d. Polypeptides

8. Many plants have waxy coatings on some surfaces. This coating reduces water loss because it is not water-permeable. This waxy coating is which of the following types of organic molecule?

a. Carbohydrate
b. Lipid
c. Nucleic acid
d. Protein

SB1d. Explain the impact of water on life processes (i.e. osmosis, diffusion).

9. The movement of water across a selectively permeable membrane is

a. Active transport
b. Osmosis
c. Mitosis
d. Meiosis

10. Diffusion takes place

a. Only in liquids
b. Only through a lipid bilayer
c. From an area of high concentration to an area of low concentration
d. From an area of low concentration to an area of high concentration

11. Which property of water allows many different substances to be dissolved?

a. Adhesive
b. Cohesive
c. Polarity
d. Translucent

SB2a. Distinguish between DNA and RNA.

12. In a molecule of double-stranded DNA, the amount of adenine present is always equal to the amount of
    a. Cytosine
    b. Guanine
    c. Thymine
    d. Uracil

13. A portion of one strand of a DNA molecule has the sequence shown below:

    ACCTGAAGG

    Assuming there are no mutations in this portion of the DNA, what is the corresponding sequence on the complimentary strand?
    a. *ACCTGAAGG*
    b. *GTTCAGGAA*
    c. *TGGACTTCC*
    d. *UGGACUUCC*

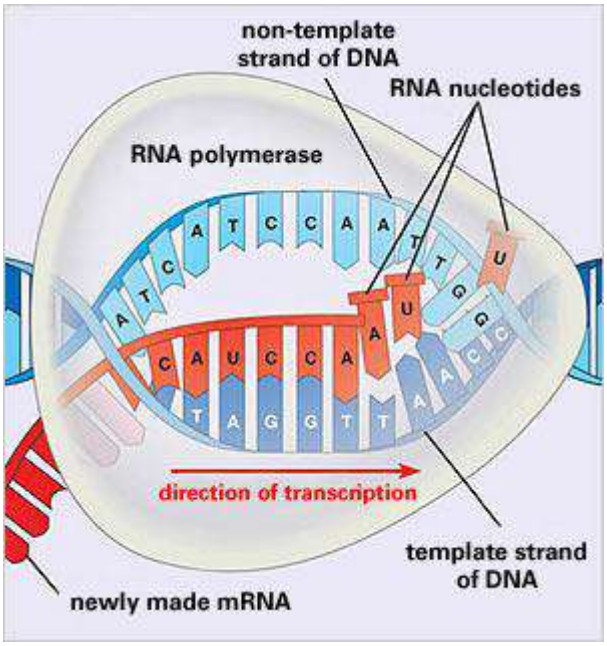
14. In a molecule of single-stranded RNA, the amount of adenine present is always equal to the amount of
    a. Guanine
    b. Cytosine
    c. Thymine
    d. Uracil

SB2b. Explain the role of DNA in storing and transmitting cellular information.

15. What is the correct order of stages of mitosis?
    a. Prophase, metaphase, anaphase, telophase
    b. Metaphase, anaphase, telophase, prophase
    c. Prophase, telophase, metaphase, anaphase
    d. Anaphase, metaphase, prophase, telophase

16. This molecule carries information from the DNA in the nucleus out into the cytoplasm of the cell
    a. tRNA
    b. rRNA
    c. ATP
    d. mRNA

17. What is the ultimate goal of the process shown in the diagram on the right?
    a. To store cellular energy
    b. To maintain homeostasis
    c. To replicate DNA
    d. To make protein



18. A unicellular organism reproduces asexually through binary fission. If the parent cell contains 28 chromosomes, how many chromosomes are contained within the daughter cell?

a. 7
b. 14
c. 28
d. 56

SB2c. Using Mendel's laws, explain the role of meiosis in reproductive variability.

19. During which phase of mitosis are duplicated chromosomes pulled to opposite ends of the cell?

a. Metaphase
b. Prophase
c. Anaphase
d. Telophase

20. During meiosis, only one chromosome from each homologous is passed on to the offspring. This helps increase

a. Genetic variation
b. Genetic mutations
c. Fertilization rates
d. The rate of evolution

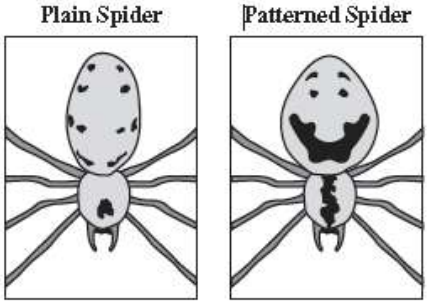
21. A mother who is homozygous recessive for short eyelashes and a father who is homozygous dominant for long eyelashes have a child. What are the chances the child will have short eyelashes?

a. 100%
b. 75%
c. 50%
d. 0%

22. What do prophase, metaphase, anaphase and telophase have in common?

a. They are phases of protein synthesis.
b. They are phases of cellular mitosis.
c. They are phases of cytokinesis.
d. They are phases of cellular respiration.

23. Hawaiian happy face spiders from the island of Maui can have different markings, as shown below. A single gene determine the markings on the spiders. A plain spider is crossed with a patterned spider. The patterned spider is homozygous. The pattern allele is dominant to the plain allele.



What percentage of the offspring from this cross are expected to be patterned instead of plain?

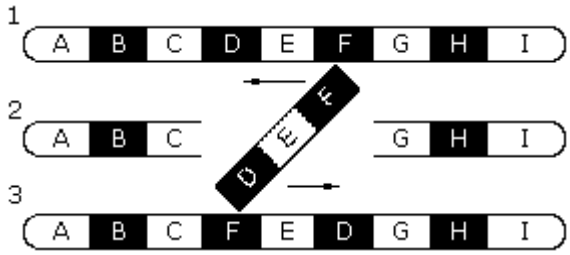
a. 0%
b. 25%
c. 50%
d. 100%

SB2d. Describe the relationships between changes in DNA and potential appearance of new traits including:

- **Alterations during replication**
  - **a. Insertions**
  - **b. Deletion**
  - **c. Substitutions**
- **Mutagenic factors that can alter DNA**
  - **a. High energy radiation**
  - **b. chemical**

24. The diagram to the right represents a mutation. What type of mutation is shown?

- **a. Deletion**
- **b. Insertion**
- **c. Inversion**
- **d. Substitution**



The DNA strand below is one half of a complimentary pair.

TACCCATTCGAT

25. Which of the following correctly shows the complimentary DNA strands with a duplication mutation?

- **a. TACCCATTCGATGAT**
- **b. TACCCATTCTAG**
- **c. UACCCAUUCGAUGAU**
- **d. ATGGGTAAGCTACTA**

SB2e. Compare the advantages of sexual reproduction and asexual reproduction situations.

26. When recovering from injury, blood platelets that cover the wound are slowly replaced by newly formed skin cells. Old skin cells, with 46 chromosomes, divide to form new skin cells with 46 chromosomes. This is classified as what sort of reproductive process?

- **a. Sexual**
- **b. Asexual**
- **c. Gestation**
- **d. Binary fission**

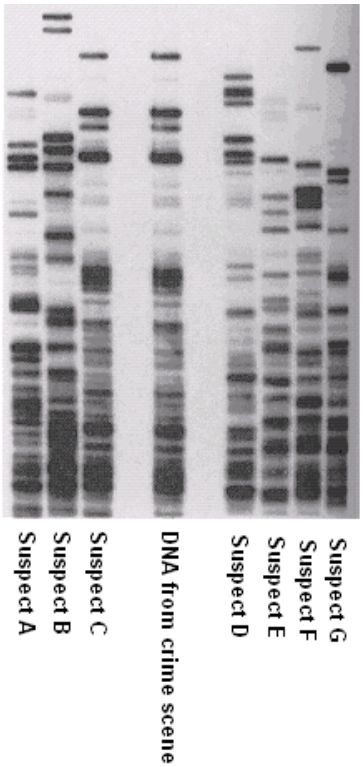
27. Female cattle that have white coats are crossed with male cattle that have read coats. Both male and female offspring have roan coats, which are coats with both red hairs and white hairs. Which of the following BEST describes the genetics of coat color in the cattle?

- **a. The red and white alleles are sex-linked**
- **b. The red and white alleles are codominant.**
- **c. The red allele is recessive to the white allele.**
- **d. The red allele is dominant to the white allele.**

SB2f. Examine the use of DNA technology in forensics, medicine, and agriculture.

28. Using the DNA profile to the right, which of the following is the suspect that should be charged with the crime?

- **a. Suspect A**
- **b. Suspect C**
- **c. Suspect E**
- **d. Suspect G**



29. Using the profile to the right, which of the following is the reason that the suspect should be charged with the crime?

- **a. The DNA bands from the suspect being charged is different from the crime scene evidence.**
- **b. The DNA bands from the suspect being charged have a few in common with the crime scene sample.**
- **c. The DNA bands from the suspect being charged has identical bands to those of the sample from the crime scene.**
- **d. None of the above are correct.**

SB3a. Explain the cycling of energy through the processes of photosynthesis and respiration.

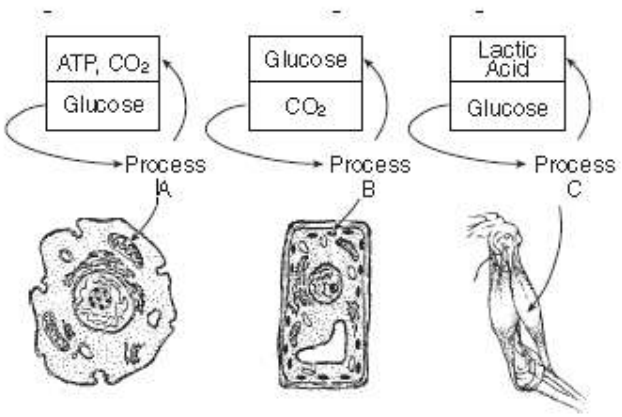
30. The equation below summarizes what biological process?

Light energy + $6H_2O$ + $6CO_2$ $C_6H_{12}O_6$ + $6O_2$ + ATP

- **a. Hemophotosynthesis**
- **b. Fermentation**
- **c. Photosynthesis**
- **d. Cellular Respiration**

31. All organisms have ways to produce ATP. Which of the following statements describes why ATP is a critical compound for all cells?

- **a. It causes mitosis to begin**
- **b. It is and energy-transfer molecule.**
- **c. It is a major component of cell membranes.**
- **d. It carries information from DNA to the ribosomes.**



32. In the diagram above, what is Process A known as

a. Photosynthesis
b. Fermentation
c. Dehydration synthesis
d. Aerobic respiration

33. Glucose is a product of

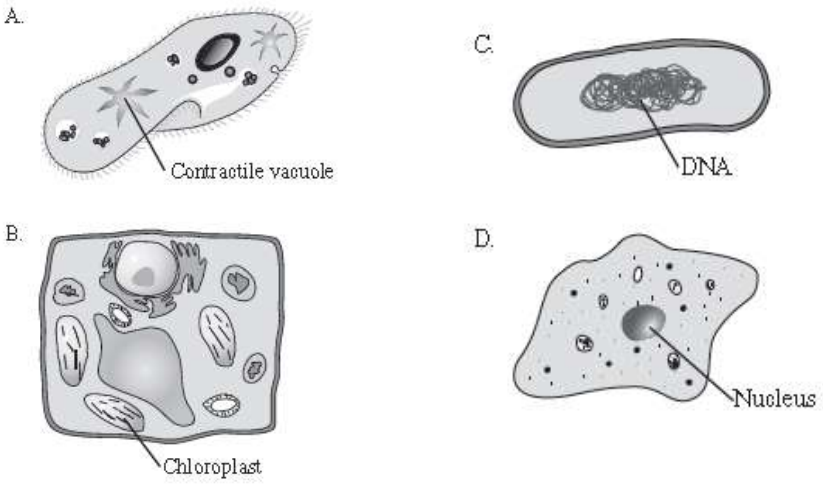
a. Process A, only
b. Process B, only
c. Process B and Process C
d. Process A and Process C

SB3b. Compare how structures and function vary between the six kingdoms (archaebacteria, eubacteria, protists, fungi, plants, and animals.

34. A microorganism is found in the lining of the human stomach. It has a flexible cell wall, no organelles and flagella. What is this organism?

a. Plant cell
b. Animal cell
c. Virus
d. Bacteria

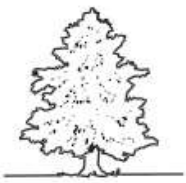
35. Scientist believe the first organisms to appear on Earth were prokaryotic. Which of the following BEST represents what the cell structure of these organisms may have looked like?



36. Which of the following organisms is eukaryotic, multicellular, and autotrophic?

A.

B.



C.

D.

SB3c. Examine the evolutionary basis of the modern classification system.

37. *Orcinus orca* is the scientific name for the killer whale. These names represent the _____ and _____ of this organism.

a. Kingdom and phylum
b. Class and order
c. Genus and species
d. Family and genus

38. *Ursus arctos* and *Ursus maritimus* are organisms that belong to the same

a. *Population*
b. Species
c. Genus
d. Chromosome

SB3d. Compare and contrast viruses with living organisms.

39. One important way to control the spread of viruses is through

a. The use of vaccines.
b. Proper hand washing
c. The use of other types of bacteria.
d. The use of antibiotics.

40. Which of the following characteristics is common to both bacteria and viruses?

a. Contain genetic material
b. Can be killed using antibiotics
c. Have a cell membrane
d. Have a protein coat

SB4a. Investigate the relationships among organisms, populations, communities, ecosystems, and biomes.

41. Similar organisms that can interbreed and produce fertile offspring in a natural environment make up a(n)

a. Species
b. Population
c. Community
d. Ecosystem

42. What does the carrying capacity represent?

- **a. The amount of mass in the entire population.**
- **b. The life expectancy of each organism.**
- **c. The largest number of individuals a given environment can support.**
- **d. The number of resources needed by each population in an ecosystem.**

SB4b. Explain the flow of matter and energy through ecosystem by:

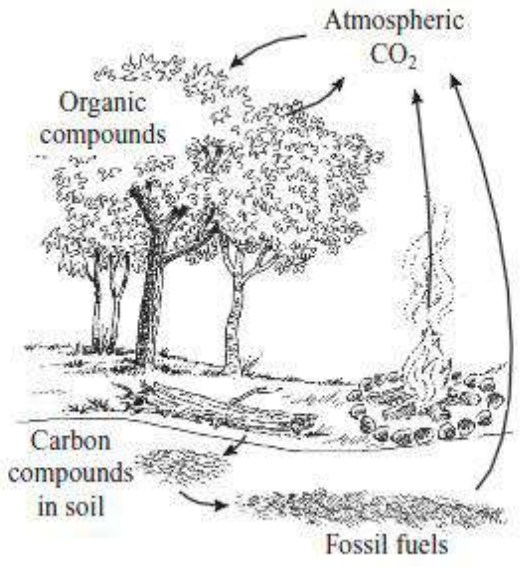
- **Arranging the components of a food chain according to energy flow.**
- **Comparing the quantity of energy in the steps of an energy pyramid.**
- **Explaining the need for cycling of major nutrients (C,H,O,N,P).**

43. The brown thrasher is the Georgia state bird. This bird eats mainly small vertebrates, like caterpillars, snails and grasshoppers. To what trophic level does this animal belong.

- **a. Primary producer**
- **b. Primary consumer**
- **c. Secondary consumer**
- **d. Tertiary consumer**

44. In the diagram to the right, part of the carbon cycle is illustrated. If many trees are removed from a forest by logging, what is the most immediate effect on the carbon cycle in that forest?

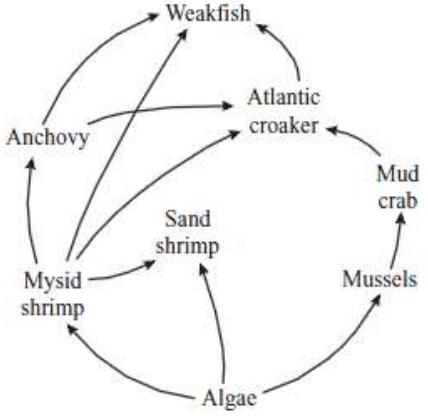
- **a. Increased rates of decomposition**
- **b. Decreased use of atmospheric CO_2**
- **c. Decreased combustion of fossil fuels**
- **d. Increased production of organic compounds**



45. A partial food web for a coastal ecosystem is shown to the right.

Which of the following organisms in this food web obtains energy from both producers and consumers?

- **a. Anchovy**
- **b. Mysid shrimp**
- **c. Weakfish**
- **d. Sand shrimp**



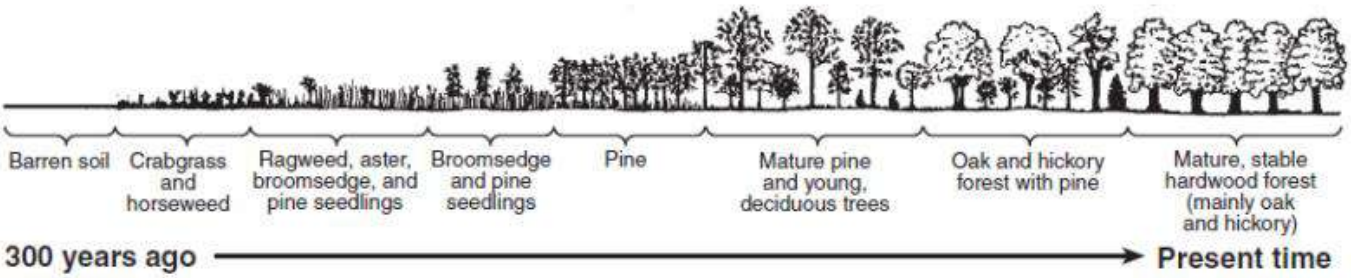
46. In the food web above which of the following would be considered a tertiary consumer?

a. Mussels
b. Mysid shrimp
c. Algae
d. Atlantic croaker

SB4c. Relate environmental successional changes in ecosystems.

47. A man in rural South Georgia dies and wills his farm to his son that lives in Atlanta. The son does not plant harvest on the land. Instead he allows the land to return to more natural state. After 25 years, what type of plant life do you MOST expect to find growing on the land?

a. Grasses and herbs only
b. Lichens and moss
c. Pine and hardwood trees
d. Shrubs and grasses only



49. Dominant plant species in the climax community include

a. Pine trees
b. Hickory trees
c. Mosses
d. Lichens

SB4d. Assess and explain human activities that influence and modify the environment such as global warming, population growth, pesticide use, and water and power consumption.

50. In the past 100 years, levels of atmospheric carbon dioxide have increased as the result of the burning of fossil fuels. Other processes in the carbon cycle have absorbed some of the carbon released by this combustion. Which of the following most likely have absorbed excess carbon released by combustion?

a. Animals
b. Glaciers
c. Plants
d. Rocks

51. What would the Earth be like without the greenhouse effect?

a. Too cold to be habitable
b. A little cooler than it is now
c. The same temperature as it is now
d. A little warmer than it is now

52. Which level of the food chain is most affected by biomagnifications?

a. Producers
b. Primary consumers
c. Secondary consumers
d. Tertiary consumers

SB4e. Relate plant adaptations, including tropisms, to the ability to survive stressful environmental conditions.

53. A root growing downward and shoot growing upward are both examples of

a. Phototropism
b. Thigmotropism
c. Photoperiodism
d. Gravitropism

54. What process is responsible for plants growing towards the light?

a. Phototropism
b. Thigmotropism
c. Photoperiodism
d. Gravitropism

SB4f. Relate animal adaptations, including behaviors, to the ability to survive stressful environmental conditions.

55. For a month, Pavlov would ring a bell before he fed his dogs. When the dogs saw the food, they would start to drool. Now the dogs start to drool when he rings a bell, even if they don't see food.

a. Insight Learning
b. Classical Conditioning
c. Imprinting
d. Instinct

56. A mouse is taught that going through a maze will give it a piece of cheese at the end. Researchers place it in a new maze it has never been in and it figures out how to get through to find the cheese. What type of learning is this?

a. Instinct
b. Classical Conditioning
c. Imprinting
d. Instinct

SB5a. Trace the history of the theory of evolution.

57. Which scientist believed that you could make changes to yourself and then pass those changes to your offspring?

a. Charles Darwin
b. Lamarck
c. Watson
d. Lynn Margulis

58. Which scientist was responsible for developing the theory of natural selection?

a. Charles Darwin
b. Lamarck
c. Watson
d. Lynn Margulis

SB5b. Explain the history of life in terms of biodiversity, ancestry, and the rates of evolution.

59. The spines of a cactus are modified leaves. The thorns of a rose are modified branches. What does the evolution of these two plants suggest?

a. The spine and thorn are homologous structures, and proof of common ancestry.
b. The spine and thorn are analogous structures, and are not proof of a common ancestry.
c. The spine and thorn have separate functions, so they are not homologous and provide no evidence to support common ancestry.
d. The spine and thorn are vestigial structures that have not evolved.

60. Change is to evolution as lack of change is to

a. Polygenic traits
b. Genetic variation
c. Genetic equilibrium
d. Gene pool

SB5c. Explain how fossil and biochemical evidence support the theory.

61. Observed evidence for evolution includes

a. Fossils, DNA sequences, and homologous structures.
b. Tropisms, genetic drift, and speciation
c. Gene flow, mutations, and tropisms
d. Phenotypes, food preferences, and fossils.

SB5d. Students will evaluate the role of natural selection in the development of the theory of evolution.

62. The ancestors of polar bears became separated from brown bears as they moved from the mainland to the Arctic Ice. The traits selected in the Arctic Ice population were different than the traits selected in the land population. Eventually, the two populations could no longer interbreed. Today, we call the descendants of Arctic Ice population "polar bears" and the descendants of the mainland population "brown bears." What pattern of evolution is described?

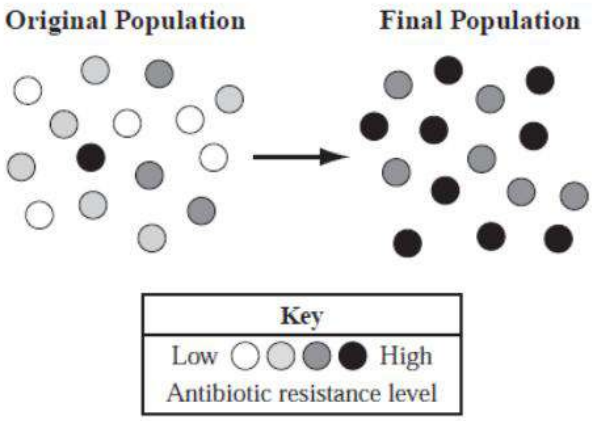
a. Divergent evolution
b. Extinction
c. Co-evolution
d. Convergent evolution

63. Differences that exist among members of the same species are known as

a. Natural variation
b. Artificial selection
c. Natural selection
d. Genetic drift

SB5e. Recognize the role of evolution to biological resistance (pesticide and antibiotic resistance).

64. Antibiotic resistance can vary within a population of bacteria. The diagram below represents the changes in a population as the results of exposure to an antibiotic over time.



The changes in the population are MOST LIKELY the result of which of the following?

a. Exponential growth
b. Genetic crosses
c. Immigration
d. Natural selection

65. A cabbage farmer has a five acre field of cabbage. Each year, his crop is attacked by cabbage eating beetles. To combat the problem, the farmer sprays his field with a mild pesticide. The pesticide kills 85% of the beetles on his field. In 1995, the farmer used 25 gallons to kill the beetles; however, by 2005, the farmer needed 40 gallons of pesticide to kill the same percentage of beetles. Why did the farmer need to use more pesticide to kill the same percentage of insects over a ten year period?

a. Because the beetles that had already been exposed to the pesticide were weaker.
b. Because the surviving 15% of beetles were the only reproducing each year, thus creating a population of beetles resistant to pesticides.
c. Because the farmer wants to buy lots of pesticide from his friend, the pesticide salesman.
d. Because in 2005, more beetles attacked the field than in 1995.