

1st Quarter EQT - Honors Biology

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. Aisha wants to conduct an experiment to determine whether sun and shade varieties of the same plant species prefer the same wavelength of light. She plans to measure the rates of photosynthesis. Which design would be best for her experiment?
- a. 1 plant of the sun variety tested under blue light only, and 1 plant of the shade variety tested under blue light only
 - b. 4 plants of the sun variety: 1 tested under blue light, 1 under green, 1 under red, 1 under yellow, and 4 plants of the shade variety: 1 tested under blue light, 1 under green, 1 under red, 1 under yellow
 - c. 10 plants of the sun variety tested under blue light only; and 10 plants of the shade variety tested under blue light only.
 - d. 40 plants of the sun variety: 10 tested under blue light, 10 under green, 10 under red, 10 under yellow, and 40 plants of the shade variety: 10 tested under blue light, 10 under green, 10 under red, 10 under yellow

- _____ 2. Lydia works in a flower shop after school. She notices that the hydrangeas in Container 1 have pink blossoms, while the hydrangeas in Container 2 have blue blossoms. She makes sure they all receive the same amount of light and water. Her boss tells her that the flowers were all grown from the same seed variety. Lydia discovers, after testing the soil, that although the same type of soil was used, the soil in Container 1 has a pH of 6.0, and the soil in Container 2 has a pH of 5.0.

Lydia most likely conducted her investigation to answer what question about hydrangeas?

- a. How does the chemistry of soil affect the color of the hydrangea blossoms?
 - b. What role do genetic factors play in hydrangea color?
 - c. Do varying degrees of light affect hydrangea color?
 - d. What type of soil will produce hydrangea with both pink & blue blossoms?
- _____ 3. Scientific experimentation can most likely answer which question regarding a bird population.
- a. How does a baby bird learn to recognize the type of food that it can eat?
 - b. How does the type of food a bird eats affect the number of offspring it produces?
 - c. What is the relationship between beak size and the number of offspring a bird produces?
 - d. Why does a bird with a very short beak produce more offspring than a bird with a very long beak?

- _____ 4. Mrs. Lewis set up a lab for her biology students using a culture of the small crustacean *Daphnia*, obtained from a pond that was 20°C. The students are to investigate the effect temperature has on *Daphnia*. The students will observe the crustacean's heartbeat under the microscope, at different temperatures, and count the number of heartbeats per sec.

If the experiment is designed correctly, what will the students choose for the experimental treatment?

- a. Placing 5 identical cultures of *Daphnia* at 20°C
- b. Placing each 5 identical cultures of *Daphnia* at a different temperature
- c. Placing 5 cultures, each with a different type of crustacean, at 20°C
- d. Placing 5 cultures, each with a different type of crustacean, at a different temperature

- _____ 5. Mrs. Lewis set up a lab for her biology students using a culture of the small crustacean *Daphnia*, obtained from a pond that was 20°C. The students are to investigate the effect temperature has on *Daphnia*. The students will observe the crustacean's heartbeat under the microscope, at different temperatures, and count the number of heartbeats per sec.

What is the independent variable in this experiment?

- a. Temperature of the samples
- b. Number of heartbeats/sec
- c. Number of *Daphnia* in the cultures
- d. Type of microscope used

- _____ 6. Which experimental design would provide scientists with the best data for investigating which type of feed yields the greatest gain in lean muscle mass in cattle?

- a. Test 5 different types of cows with the same feed mixture and measure their weight gain at the end of a 6-week trial.
- b. Test 5 similar groups of cows with 5 different feed mixtures and measure their weight gain at the end of a 6-week trial.
- c. Test 5 similar groups of cows with the same feed mixture, give each group varying amounts of feed, and measure their weight gain at the end of a 6-week trial.
- d. Test 5 different types of cows with 5 different feed mixtures, give each group varying amounts of feed, and measure their weight gain at the end of a 6-week trial.

- _____ 7. Two students conducted studies to determine the amount of bacteria in hamburgers cooked to different internal temperatures. The students cooked 3 hamburgers: 1 rare, 1 medium, and 1 well-done. The students then took a core from the center of each hamburger and placed each core in a separate petri dish with nutrient agar. Each dish was incubated until colonies formed. The students hypothesized that the rare hamburger core would generate the most bacteria colonies.

Eight hundred colonies grew in the dish containing the rare hamburger core, 400 colonies grew in the dish containing the medium core, and 0 colonies grew in the dish containing the well-done hamburger core.

What is the most appropriate next step for the students to take in this study?

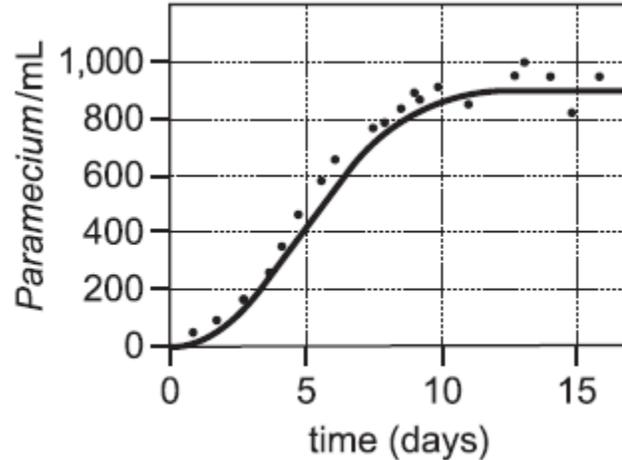
- a. Accept the results; one trial is all that is necessary to test a hypothesis.
- b. Accept the results; the results of this experiment support their hypothesis.
- c. Perform more trials using a different type of meat, under the same conditions as the first experiment.
- d. Perform more trials using the same type of meat, under the same conditions as the first experiment.

- _____ 8. Bryce is planning to plant tomatoes in his garden. He wants to determine if tomato seeds will germinate (sprout) faster in soil with sugar added than in soil with no sugar added. He plants one seed in 100 grams of soil in each of 20 pots.

Which experiment will give him the most useful results?

- a. Placing 5 grams of sugar in all 20 pots; then giving 10 pots 40 mL of water daily and the other 10 pots 80 mL water daily
- b. Placing 5 grams of sugar in 10 pots, and 10 grams of sugar in the other 10 pots; then giving all 20 pots 40 mL daily
- c. Placing 5 grams of sugar in 10 pots, and no sugar in the other 10 pots; then giving all pots 40 mL of water daily
- d. Placing 5 grams of sugar in 10 pots, and no sugar in the other 10 pots; then giving the 10 pots with sugar 40 mL of water daily and the 10 pots without sugar 80 mL of water daily

9. Shown below is a growth curve for *Paramecium* grown in a 1.0 L flask containing pond water at 20°C. The pond water is continually filtered to remove waste products, and nutrients are added at a constant rate.



How could the experiment be modified to determine whether temperature influences the population size of *Paramecium* ?

- | | |
|--|--|
| a. Repeat the procedures described using 1 flask and increase the temperature to 25°C for Days 10-15. | c. Repeat the procedures described using 2 flasks; incubate 1 flask at 15°C and the other at 25°C. |
| b. Repeat the procedures described using 1 flask, and vary the temperature randomly during the entire incubation time. | d. Repeat the procedures described using 2 flasks; incubate both flasks at 20°C. |

10. Dr. Hansen performs an experiment testing the effectiveness of different cough syrups. Identify the independent variable in the experiment.

- | | |
|--------------------------|--|
| a. Type of cough syrup | c. Number of people taking each cough syrup |
| b. Flavor of cough syrup | d. Number of days people take each cough syrup |

11. Ebola virus is a potentially deadly virus in the blood which causes Ebola fever. Ebola virus is often spread by monkeys. Scientists used 2 groups of monkey kidney cells in an experiment to confirm the first human case of Ebola fever. The scientists inoculated cells in Group 1 with samples of the Ebola virus taken from a human with Ebola fever. They did not inoculate the cells in Group 2.

What was the control group in the experiment?

- | | |
|-----------------------------------|-----------------------------------|
| a. The Ebola virus | c. Monkey kidney cells in Group 1 |
| b. All of the monkey kidney cells | d. Monkey kidney cells in Group 2 |

12. A microbiologist wants to determine whether a certain chemical affects the growth rate of bacteria. Which method would be most efficient and reliable for tracking the bacteria population's growth rate each hr. for 24 hrs?

- | | |
|---|--|
| a. counting individual bacterial cells | c. measuring the light absorbance of the populations in the tubes using a spectrophotometer |
| b. determining the mass of the tube containing bacteria | d. calculating the size of the population using the average doubling time of the bacteria in the absence of the chemical |

13. The number and type of micro invertebrates are good indicators of the amount of pollution in a stream because they tolerate varying levels of pollution. A biology textbook provides this tables of tolerance levels.

Macro invertebrate	Pollution level tolerated
Stonefly	Low
Crayfish	Medium
Blackfly	High
Leech	Very high

Biology students gather samples from a local stream and conclude that it is extremely polluted. Which table most likely reflects the data gathered by the students?

a.

Macroinvertebrate	Number collected
Stonefly	2
Crayfish	10
Blackfly	5
Leech	3

c.

Macroinvertebrate	Number collected
Stonefly	0
Crayfish	2
Blackfly	5
Leech	5

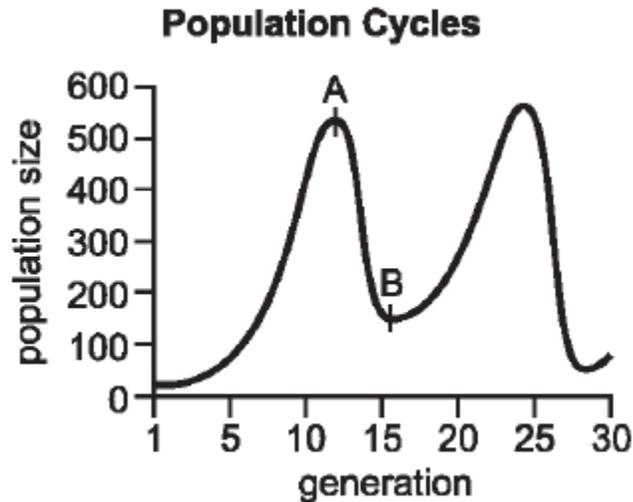
b.

Macroinvertebrate	Number collected
Stonefly	2
Crayfish	1
Blackfly	3
Leech	2

d.

Macroinvertebrate	Number collected
Stonefly	0
Crayfish	12
Blackfly	8
Leech	3

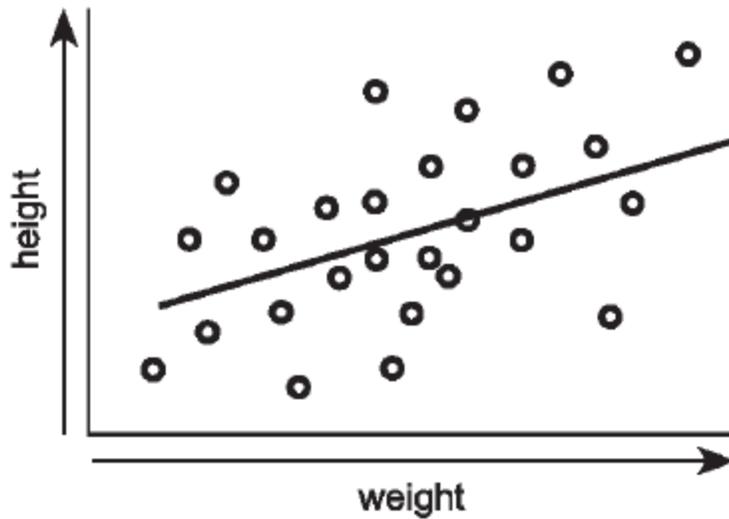
14. The graph provides information about the size of 1 rabbit population over 30 generations.



What most likely happened shortly after the 10th generation to cause the change in population between Points A and B?

- a. A fatal disease infected the rabbits. c. the average temperature decreased by 0.5°
 b. area farmers set traps for coyotes d. the average monthly rainfall increased by 0.25 in.
15. Scientists collected data on the height and weight of individuals in a population. They recorded their results in this scatterplot.

Height and weight of individuals

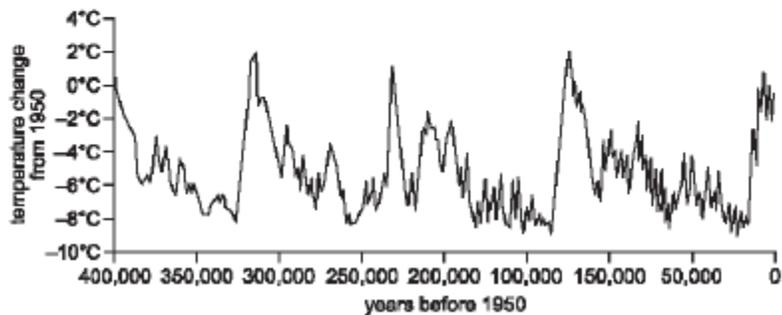
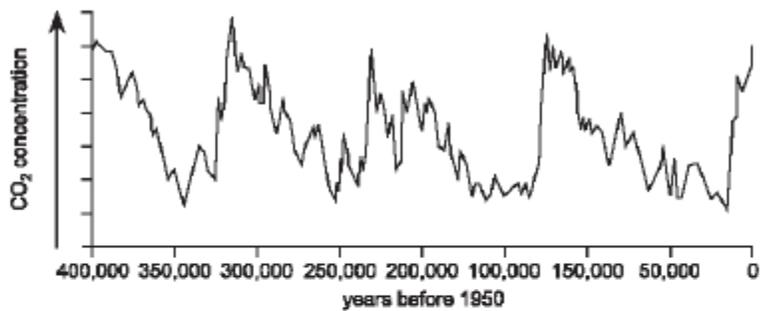


What is the most accurate conclusion regarding the relationship between height and weight?

- a. Tall individuals are always heavier than short individuals
- b. there is no relationship between height and weight
- c. there is a negative relationship between height and weight
- d. there is a positive relationship between height and weight

16. These graphs represent Earth's estimated carbon dioxide (CO₂) levels and temperature over the past 400,000 years.

Temperature and CO₂ Concentration in the Atmosphere



Using the data in the graphs, determine the relationship between Earth's CO₂ levels and temperature.

- a. The temperature falls as the CO₂ level rises.
- b. The temperature rises as the CO₂ level falls.
- c. there is a positive correlation between CO₂ levels and temperature

- b. the CO₂ level and the temperature are equal d. there is a negative correlation between CO₂ levels and temperature

17. Biology students carried out an experiment to determine if a certain fertilizer increased growth (height) in plants. The students selected 4 different types of plants and planted 10 seeds of each type: 5 treated with fertilizer and 5 not treated with fertilizer. All other conditions were identical. The students recorded the collected data in the table.

Plant Height (cm) after 120 Days							
Castor bean		Okra		Radish		Tomato	
Fertilizer	No fertilizer	Fertilizer	No fertilizer	Fertilizer	No fertilizer	Fertilizer	No fertilizer
90	85	75	70	15	10	150	140
95	90	80	80	20	15	145	130
85	80	75	70	25	20	155	135
80	75	75	65	20	15	160	120
75	75	75	70	20	20	165	125

Which type of plant exhibited the greatest increase in height when treated with fertilizer?

- a. castor bean c. radish
b. okra d. tomato

18. A researcher counted the number of eggs a single fruit fly laid in 24 hrs. for 5 days and recorded the findings in this table.

Day	Number of eggs
1	10
2	14
3	7
4	8
5	11

What is the average number of eggs laid per day over the 5 days?

- a. 5 c. 25
b. 10 d. 50

19. Hurricanes are rated on a scale of 1-5 by wind speed as summarized in the table below.

Category	Wind speed (mph)
1	74-95
2	96-110
3	111-130
4	131-155
5	156+

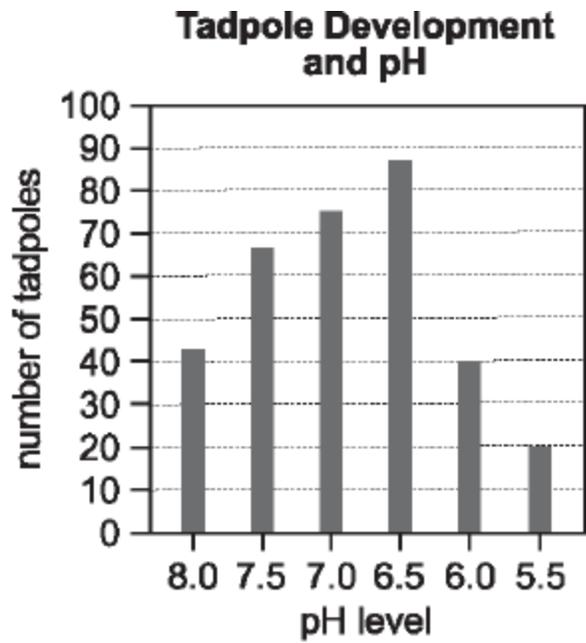
One source on hurricanes provides the following information about the intensity and occurrence of hurricanes in Texas and Mexico from 1900-2004.

Category	Number of hurricanes
1	65
2	41
3	50
4	16
5	2

Based only on the information in the tables, for the majority of the hurricanes that will strike the coast near Texas and Mexico, what is the most likely wind speed range, in mph?

- a. 74-95
- b. 96-110
- c. 111-130
- d. 131-155

____ 20. Biologists studying the effect of pH level on the tadpole development gathered data and recorded it in this graph.

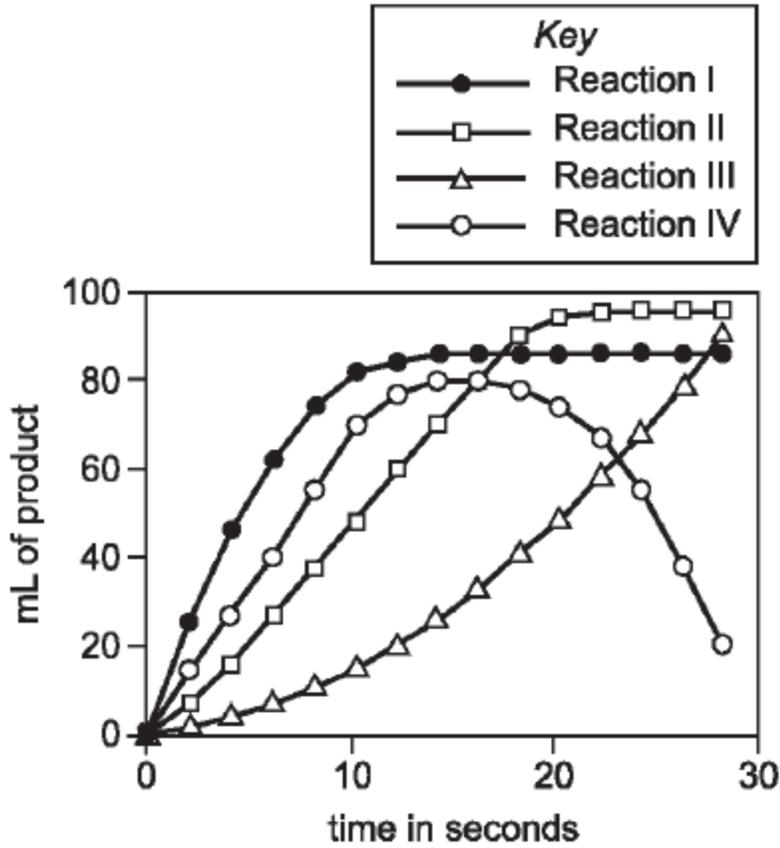


In the graph, between which 2 consecutive pH levels is there the greatest difference in the number of tadpoles?

- a. 5.5 and 6.0
- b. 6.0 and 6.5
- c. 6.5 and 7.0
- d. 7.5 and 8.0

____ 21. This graph illustrates 4 different chemical reactions.

Amount of Product in Enzyme-Catalyzed Reactions

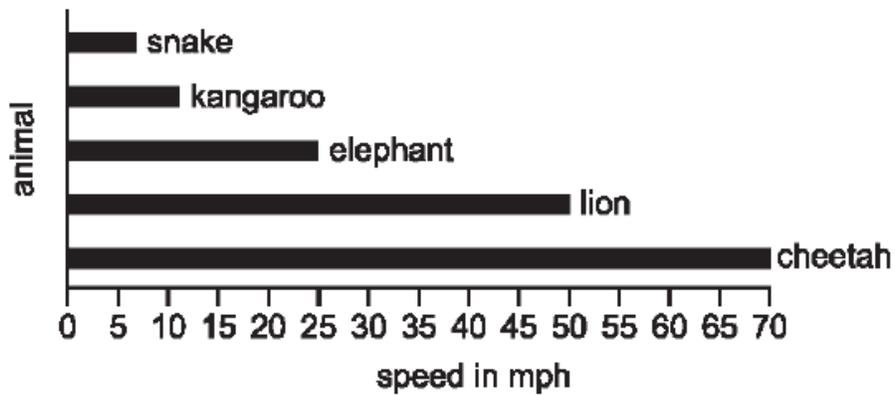


Which reaction has the fastest initial reaction rate?

- a. Reaction I
- b. Reaction II
- c. Reaction III
- d. Reaction IV

___ 22. The graph represents the average fastest speed of 5 animals recorded in one study.

Average Fastest Speed Recorded



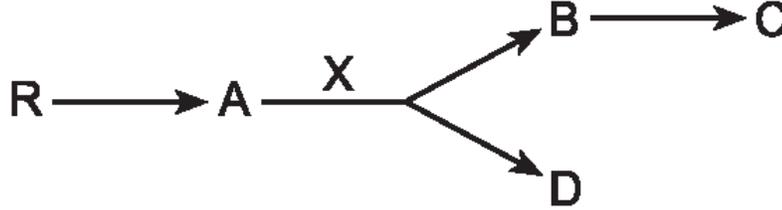
Based on the graph, which species is approximately $\frac{1}{3}$ as fast as the cheetah?

- a. Elephant
- b. Kangaroo
- c. Lion
- d. Snake

- _____ 23. What is the best definition of a scientific theory?
- a. An explanation of how and why a natural phenomenon behaves the way it does
 - b. A description of an invariable relationship that exists in nature
 - c. A speculation or guess about how nature works
 - d. An unproven fact
- _____ 24. Lydia works in a flower shop after school. She notices that the hydrangeas in Container 1 have pink blossoms, while the hydrangeas in Container 2 have blue blossoms. She makes sure they all receive the same amount of light and water. Her boss tells her that the flowers were all grown from the same seed variety. Lydia discovers, after testing the soil, that although the same type of soil was used, the soil in Container 1 has a pH of 6.0, and the soil in Container 2 has a pH of 5.0. As described in the scenario above which fundamental assumption of science did Lydia put into practice while working at the flower shop?
- a. We arrive at knowledge mainly by using our sense of intuition.
 - b. We learn how the natural world works by observing it and by conducting experiments.
 - c. We can develop a theory based on a few consistent experimental results.
 - d. We can manipulate several variables at a time in a controlled experiment.
- _____ 25. A scientific theory is based on experimental results that satisfy which criterion?
- a. They can be replicated by others.
 - b. Their significance is supported by experts.
 - c. They are absolute and cannot be challenged.
 - d. They are inconsistent with personal experience.
- _____ 26. In an experiment, 6,000 people with a common cold who drank orange juice daily had symptoms that lasted an average of 4 days. Another 6,000 people with a common cold who did not drink orange juice daily had symptoms that lasted an average of 7 days. Scientists repeated the experiment 3 times with the same results. They concluded that orange juice reduces the length of the common cold. Was this conclusion valid, and why?
- a. Yes, because vitamin C is a known common cold cure.
 - b. Yes, because scientists repeated the experiment.
 - c. No, because the sample size was too small.
 - d. No, because some of the people who drank orange juice did not feel better.
- _____ 27. After learning about viruses in Biology class, Sam decides to have his cat vaccinated against feline leukemia virus. According to cell theory, are viruses, such as feline leukemia, considered living things?
- a. Yes, because they can reproduce.
 - b. Yes, because they are composed of cells.
 - c. No, because they cannot adapt to their environment.
 - d. No, because they are not composed of cells.
- _____ 28. Which level of biological organization includes nonliving factors?
- a. Organism
 - b. Population
 - c. Community
 - d. Ecosystem
- _____ 29. A scientist studies the effects that barnyard grass, a weed, has on the h=growth of rice, other weeds, and insects. The barnyard grass and other weeds, rice, and insects make up which level of biological organization?

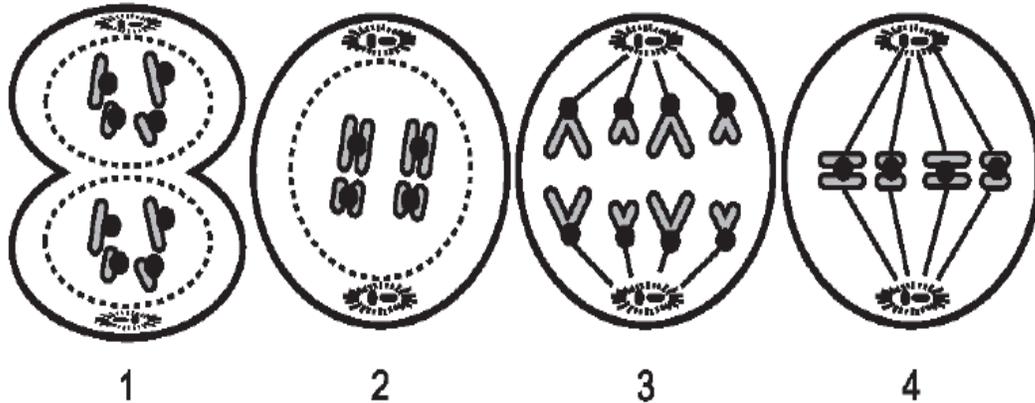
- a. population
b. community
- c. ecosystem
d. biome
- ___ 30. Which is the best example of population?
a. All insects in North America
b. All the white-tail deer on an island
c. All the bacteria in a person's digestible tract
d. All the single-celled creatures in a sample of pond water
- ___ 31. What is the correct order of organization of all living things from simplest to most complex?
a. Atom, cell, organ, organelle, organ system, organism, molecule, tissue
b. Atom, molecule, organelle, cell, tissue, organ, organ system, organism
c. Atom, molecule, cell, tissue, organelle, organ, organism, organ system
d. Organelle, atom, molecule, cell, tissue, organ, organ system, organism
- ___ 32. Which sequence is in order from the simplest level of organization to the most complex?
a. Muscle, erythrocyte, lipid, mitochondrion, carbon
b. Carbon, lipid, erythrocyte, mitochondrion, muscle
c. Muscle, mitochondrion, lipid, erythrocyte, carbon
d. Carbon, lipid, mitochondrion, erythrocyte, muscle
- ___ 33. A teacher challenged her students to design an experiment to study the importance of eyesight in the ability of crayfish to avoid land predators such as raccoons. The experiment was to be set up in a laboratory, using live crayfish, but simulated predators. Students set up control groups in which crayfish could see normally and experimental groups that restricted their ability to see. However, the students used different methods of restricting the crayfish's eyesight. Given the rules of experimental design and the requirements of the challenge, which method would be the most appropriate treatment for the experimental group?
a. Keeping the crayfish in the dark
b. Cutting off the crayfish's eyestalks
c. Separating the crayfish from the simulated predator using different colored filters
d. Covering the crayfish's eyestalks with a black plastic hood to restrict sight
- ___ 34. A student wants to determine whether temperature affects the rate at which mold grows on bread. The student puts one piece of bread inside a Petri dish, closes the lid, and places the Petri dish in the refrigerator. Which treatment would be the best comparison for this experiment?
a. Placing another piece of bread in an open Petri dish in the same refrigerator.
b. Placing another piece of bread in a closed Petri dish in the same refrigerator
c. Placing another piece of bread in an open Petri dish on the countertop
d. Placing another piece of bread in a closed Petri dish on the countertop
- ___ 35. Jenna's favorite breakfast food, papaya, contains significant amounts of the enzyme papain (a protease). What substances does papain help digest?
a. Carbohydrates
b. Fatty Acids
c. Nucleic acids
d. Proteins
- ___ 36. Which formula represents an organic molecule?
a. $\text{CuSO}_4 \cdot \text{H}_2\text{O}$
b. $\text{C}_{12}\text{H}_{22}\text{O}_{11}$
c. AgNO_3
d. H_2O
- ___ 37. Which solution has the greatest concentration of hydroxide ions (OH^-)?
a. Urine (pH 6.0)
b. Rainwater (pH 5.5)
c. Tomato juice (pH 4.0)
d. Gastric juice (pH 2.0)

38. In this series of metabolic reactions, Reactant R is converted into Product A, and Enzyme X then catalyzes the conversion of Product A into Products B and D. Product B is converted to Product C.



Assume that Product C inhibits Enzyme X and that Product C is not consumed in a subsequent reaction. The rate of production of which product is LEAST likely to decrease?

- a. A
b. B
c. C
d. D
39. In aerobic respiration, glucose ($C_6H_{12}O_6$) combines with oxygen (O_2) to yield carbon dioxide (CO_2) and water (H_2O). What is the balanced chemical equation for this reaction?
- a. $C_6H_{12}O_6 \rightarrow CO_2 + H_2O$
b. $C_6H_{12}O_6 + 6O_2 \rightarrow 6H_2O$
c. $C_6H_{12}O_6 + O_2 \rightarrow 6CO_2 + 6H_2O$
d. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$
40. How do enzymes speed up chemical reactions?
- a. By reducing activation energy
b. By reducing energy produced by the reaction
c. By increasing activation energy
d. By increasing energy produced by the reaction
41. What trait of an ATP molecule enables it to store energy for use by cell?
- a. Its small size
b. Its solubility in water
c. Its ability to form hydrogen bonds
d. Its phosphate-phosphate bond
42. Two students conduct an experiment in which they measure the concentration of an enzyme in a test tube at 1 minute intervals over the course of an enzymatic reaction. Each of the students makes a prediction about what will happen to the enzyme concentration as the reaction progresses.
Student 1 predicts that the concentration of the enzyme in the test tube will decrease as the reaction progresses.
Student 2 predicts that the concentration of the enzyme in the test tube will stay the same as the reaction progresses.
Which student's prediction is correct, and why?
- a. Student 1; enzymes are depleted as a reaction progresses
b. Student 1; enzymes are not depleted as a reaction progresses
c. Student 2; enzymes are depleted as a reaction progresses
d. Student 2; enzymes are not depleted as a reaction progresses
43. In aerobic respiration, glucose ($C_6H_{12}O_6$) combines with oxygen (O_2) to yield carbon dioxide (CO_2) and water (H_2O). What is the balanced chemical equation for this reaction?
- a. $C_6H_{12}O_6 \rightarrow CO_2 + H_2O$
b. $C_6H_{12}O_6 + 6O_2 \rightarrow 6H_2O$
c. $C_6H_{12}O_6 + O_2 \rightarrow 6CO_2 + 6H_2O$
d. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$
44. Naomi adds Cycloheximide to cells grown in a test tube. Within minutes, she identifies short incomplete segments of proteins in the cells. On which organelle does the cycloheximide act?
- a. Endoplasmic Reticulum
b. Golgi Apparatus
c. Nucleus
d. Ribosome



From start to finish, what is the correct order of the stages?

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

52. What is the purpose of mitosis?
- a. To produce 2 cells, each with 1 complete set of chromosomes
 - b. To produce 2 cells, each with half the normal number of chromosomes
 - c. To produce 4 cells, each with 1 complete set of chromosomes
 - d. To produce 4 cells, each with half the normal number of chromosomes
53. During which phase of mitosis do spindle fibers separate sister chromatids?
- a. Anaphase
 - b. Metaphase
 - c. Prophase
 - d. Telophase
54. The presence of which structure indicates that cells are NOT photosynthetic bacteria?
- a. Cell wall
 - b. Chloroplast
 - c. DNA
 - d. Ribosome
55. What combines with sugar and a phosphate group to form a nucleotide?
- a. Amino acid
 - b. Deoxyribose
 - c. Glycerol
 - d. Nitrogenous base
56. DNA and RNA have many structural similarities. Which structure in DNA and RNA is similar?
- a. Purine bases
 - b. Pyrimidine bases
 - c. Type of sugar
 - d. Attached proteins
57. Despite the diversity of nature, most organisms contain the same 4 DNA bases. This table shows that DNA composition of 3 organisms as reported in a classical 1950s experiment.

Base Composition (percent)				
Organism	Adenine (A)	Guanine (G)	Thymine (T)	Cytosine (C)
Human	29	21	29	21
Wheat Germ	27	23	27	23
E. Coli	25	25	25	25

Based on this study, what did scientists conclude about the DNA composition of all living organisms?

- a. A, G, T, and C occur in equal percentages
- c. A and T occur in equal percentages, and G and C occur in equal percentages

1st position	2nd position				3rd position
	U	C	A	G	
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	Stop	Stop	A
	Leu	Ser	Stop	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

The mRNA sequence ACU Codes for the amino acid Thr. A mutation occurs, and the resulting mRNA sequence is AUU. What amino acid will replace Thr?

- a. Val
- b. Met
- c. Ile
- d. Ala

60. Persons A and B have similar mRNA Sequences with the exception of 1 nucleotide.

Person A: AUGGUUACUAAGGGCUGA

Person B: AUGGUUACUGAGGGCUGA

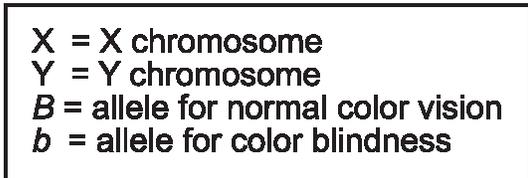
Use the genetic code chart to determine how this difference affects the sequence of amino acids in the resulting protein.

1st position	2nd position				3rd position
	U	C	A	G	
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	Stop	Stop	A
	Leu	Ser	Stop	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

- a. Lys in Person A is replaced with Glu in Person B.
- b. Phe in Person A is replaced with Leu in Person B
- c. Persons A and B have identical amino acid sequences
- d. A stop codon is generated in Person B and not in Person A.

61. What occurs during metaphase 1 of meiosis?
- a. Centromeres of replicated chromosomes line up along the cell's equator.
- b. Centromeres divide as sister chromatids move toward opposite poles of the cell.
- c. Homologous chromosome pairs line up along the cell's equator.
- d. Homologous chromosomes move toward opposite poles of the cell.
62. During what phase of meiosis does nondisjunction occur?
- a. Metaphase I
- b. Anaphase I
- c. Prophase II
- d. Metaphase II
63. Which event of meiosis reveals the mechanism for understanding Mendel's law of segregation and independent assortment?
- a. Chromosome number is reduced during telophase 1 so gametes have half the standard number of chromosomes.
- b. The arrangement of homologous chromosomes during metaphase 1 varies from cell to cell.
- c. Centromeres break apart during anaphase II so that sister chromatids can move to opposite poles of the cell.
- d. DNA is replicated during interphase before chromosomes condense and become attached to kinetochores.
64. In humans, pigmented skin is dominant to nonpigmented skin (albinism). What is the genotype of an individual with albinism?
- a. Carrier
- b. Heterozygous
- c. Homozygous dominant
- d. Homozygous recessive

65. Jeanine inherited 2 alleles for round eye shape and has round eye shape. Her brother inherited 1 allele for round eye shape and 1 allele for almond eye shape and has almond eye shape. What type of trait is round eye shape?
- Co-dominant
 - Dominant
 - Recessive
 - Sex-linked
66. Horses born to 2 palomino (golden-coated) horses have a 25% chance of having a white coat, a 25% chance of having a chestnut (brown) coat, and a 50% chance of having a palomino coat. Which description of inheritance best explains the coat-color trait in these horses?
- Palomino coat color is a recessive trait.
 - Palomino coat color is a dominant trait.
 - Coat color is an incompletely dominant trait.
 - Coat color is a sex-linked trait.
67. In Humans, red-green color blindness is a chromosomes and alleles associated with color blindness are represented in this chart.



- Which child could NOT be born to these parents: a female ($X^B X^b$) and a male ($X^B Y$)?
- Color-blind daughter
 - Color-blind son
 - Daughter with normal vision
 - Son with normal color vision
68. Adrenolukodystrophy (ALD) is a sex-linked recessive trait that affects the nervous system. In one family, the father, mother, daughter, and elder son do not have ALD, while the younger son has ALD. Who must be a carrier of the ALD allele?
- Father
 - Mother
 - Daughter
 - Elder son
69. Two black guinea pigs bred and produced 3 black offspring and 2 albino offspring. Assuming no mutations, which guinea pigs must be heterozygous?
- All 3 black offspring
 - Exactly 2 of the black offspring
 - Both albino offspring
 - Both parents
70. Alkaptonuria is a genetic disorder of protein metabolism. The disorder is determined by 2 alleles at 1 locus.



- What is the genotype for Individual 1 in the diagram?
- AA or Aa
 - AA
 - Aa
 - aa

- _____ 71. Keisha passes a local dairy farm that has many brown cows, but only a few white cows. A dominant allele produces brown hair in cows and a recessive allele produces white hair. Which characteristic of any brown cow can Keisha identify?
- a. The genotype of both of the cows' parents
 - b. The genotype of the cows' hair
 - c. The phenotype of the cow's parents
 - d. The phenotype of the cow's hair
- _____ 72. Cell organelles, like mitochondria, experience changes in structure and function over time. Modern forms of mitochondria seem to have arisen from interactions between 2 organisms. Which organisms gave rise to the modern mitochondria?
- a. A virus entering a eukaryotic cell
 - b. A virus entering a prokaryotic cell
 - c. A prokaryotic entering a eukaryotic cell
 - d. A prokaryotic entering a viral cell
- _____ 73. Alec studied an unknown microscopic organism and recorded this information:
- It contains DNA
 - It has a cell wall, but no nucleus
- What is Alec most likely studying?
- a. Bacterium
 - b. Fungus
 - c. Protist
 - d. Virus
- _____ 74. The presence of what cellular structure distinguishes as a plant cell from an animal cell?
- a. Cell membrane
 - b. Chloroplast
 - c. Mitochondrion
 - d. Nucleus
- _____ 75. What level of organization best describes a group of living organisms and their abiotic environment?
- a. Community
 - b. Ecosystem
 - c. Niche
 - d. Population