Student Name _____

Teacher Name _____

School _____

System _____

BIOLOGY I

Practice Test

Tennessee End of Course Assessment

Biology I
Form 2

PEARSON

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Introduction to Biology I

Content of tests

The testing program titled the *Tennessee End of Course Assessment* was established to meet the Tennessee mandate for end of course assessments in Tennessee secondary schools. These tests measure the Tennessee State Performance Indicators. Subject areas covered by the end of course assessments include Mathematics, Language Arts, History, and Science.

Test development

For the *Tennessee End of Course Assessment,* professional item writers experienced in each of the content areas researched and wrote the items. Professional editors and test developers carefully reviewed all items and test directions for content and accuracy. To provide a large pool of items for final test selection, the test developers created approximately 50% more items as were needed in the final editions of the tests.

After items were field tested, student responses were analyzed. Professional content editors and researchers carefully reviewed items, their data, and test directions for content, suitability, and accuracy before including certain items and test directions in operational tests.

Test administration

Tennessee End of Course Assessments are given to students as they are completing courses that are included in the program. Tests may be given midyear for block schedules or at the end of the school year.

Each test contains 65 multiple-choice questions.

You will have ample time to read and answer each of the questions. The Biology I test has been designed to be administered in one session and is not timed. The first 15 minutes are set aside to complete identifying data on the answer sheet.

Tips for Taking the Test

Preparing for the test

- Take this Practice Test several times
- Review the Tennessee End of Course Item Sampler for Biology I located at http://tennessee.gov/education/assessment/sec_samplers.shtml on the Tennessee Department of Education Web site.
- Become familiar with the correct way to mark answers on the answer sheet. There is a sample answer sheet in this Practice Test.

Before the test

- Get a good night's sleep. To do your best, you need to be rested.

During the test

- Relax. It is normal to be somewhat nervous before the test. Try to relax and not worry.
- Listen. Listen to and read the test directions carefully. Ask for an explanation of the directions if you do not understand them.
- Plan your time. Do not spend too much time on any one question. If a question seems to take too long, skip it and return to it later. First answer all questions that you are sure about.
- Think. If you are not sure how to answer a question, read it again and try your best to answer the question. Rule out answer choices that you know are incorrect and choose from those that remain.

Answer Sheet for the Practice Test

1 Ⓐ Ⓑ Ⓒ Ⓓ	14 Ⓐ Ⓑ Ⓒ Ⓓ	27 Ⓐ Ⓑ Ⓒ Ⓓ	40 Ⓐ Ⓑ Ⓒ Ⓓ	53 Ⓐ Ⓑ Ⓒ Ⓓ
2 Ⓐ Ⓑ Ⓒ Ⓓ	15 Ⓐ Ⓑ Ⓒ Ⓓ	28 Ⓐ Ⓑ Ⓒ Ⓓ	41 Ⓐ Ⓑ Ⓒ Ⓓ	54 Ⓐ Ⓑ Ⓒ Ⓓ
3 Ⓐ Ⓑ Ⓒ Ⓓ	16 Ⓐ Ⓑ Ⓒ Ⓓ	29 Ⓐ Ⓑ Ⓒ Ⓓ	42 Ⓐ Ⓑ Ⓒ Ⓓ	55 Ⓐ Ⓑ Ⓒ Ⓓ
4 Ⓐ Ⓑ Ⓒ Ⓓ	17 Ⓐ Ⓑ Ⓒ Ⓓ	30 Ⓐ Ⓑ Ⓒ Ⓓ	43 Ⓐ Ⓑ Ⓒ Ⓓ	56 Ⓐ Ⓑ Ⓒ Ⓓ
5 Ⓐ Ⓑ Ⓒ Ⓓ	18 Ⓐ Ⓑ Ⓒ Ⓓ	31 Ⓐ Ⓑ Ⓒ Ⓓ	44 Ⓐ Ⓑ Ⓒ Ⓓ	57 Ⓐ Ⓑ Ⓒ Ⓓ
6 Ⓐ Ⓑ Ⓒ Ⓓ	19 Ⓐ Ⓑ Ⓒ Ⓓ	32 Ⓐ Ⓑ Ⓒ Ⓓ	45 Ⓐ Ⓑ Ⓒ Ⓓ	58 Ⓐ Ⓑ Ⓒ Ⓓ
7 Ⓐ Ⓑ Ⓒ Ⓓ	20 Ⓐ Ⓑ Ⓒ Ⓓ	33 Ⓐ Ⓑ Ⓒ Ⓓ	46 Ⓐ Ⓑ Ⓒ Ⓓ	59 Ⓐ Ⓑ Ⓒ Ⓓ
8 Ⓐ Ⓑ Ⓒ Ⓓ	21 Ⓐ Ⓑ Ⓒ Ⓓ	34 Ⓐ Ⓑ Ⓒ Ⓓ	47 Ⓐ Ⓑ Ⓒ Ⓓ	60 Ⓐ Ⓑ Ⓒ Ⓓ
9 Ⓐ Ⓑ Ⓒ Ⓓ	22 Ⓐ Ⓑ Ⓒ Ⓓ	35 Ⓐ Ⓑ Ⓒ Ⓓ	48 Ⓐ Ⓑ Ⓒ Ⓓ	61 Ⓐ Ⓑ Ⓒ Ⓓ
10 Ⓐ Ⓑ Ⓒ Ⓓ	23 Ⓐ Ⓑ Ⓒ Ⓓ	36 Ⓐ Ⓑ Ⓒ Ⓓ	49 Ⓐ Ⓑ Ⓒ Ⓓ	62 Ⓐ Ⓑ Ⓒ Ⓓ
11 Ⓐ Ⓑ Ⓒ Ⓓ	24 Ⓐ Ⓑ Ⓒ Ⓓ	37 Ⓐ Ⓑ Ⓒ Ⓓ	50 Ⓐ Ⓑ Ⓒ Ⓓ	63 Ⓐ Ⓑ Ⓒ Ⓓ
12 Ⓐ Ⓑ Ⓒ Ⓓ	25 Ⓐ Ⓑ Ⓒ Ⓓ	38 Ⓐ Ⓑ Ⓒ Ⓓ	51 Ⓐ Ⓑ Ⓒ Ⓓ	64 Ⓐ Ⓑ Ⓒ Ⓓ
13 Ⓐ Ⓑ Ⓒ Ⓓ	26 Ⓐ Ⓑ Ⓒ Ⓓ	39 Ⓐ Ⓑ Ⓒ Ⓓ	52 Ⓐ Ⓑ Ⓒ Ⓓ	65 Ⓐ Ⓑ Ⓒ Ⓓ

Directions for Taking the Practice Test

In this Practice Test, you will answer various science questions. You may write in the open spaces in this book to work the questions, but remember to fill in the circle on your answer sheet that goes with the answer you choose for each question. Fill in the circle completely and make your mark heavy and dark. If you want to change an answer, erase the mark you made and make a new mark.

You will do the items in this Practice Test by yourself. Remember to read all the directions carefully. When you have finished, you may check for answers.

On your answer sheet, find Number 1. Mark your answers beginning with Number 1.

You may begin. Stop when you have finished the test.

At the end of the Practice Test, make sure that all your marks are heavy and dark and that you have completely erased any marks that you do not want.

Turn to Page 73 and locate the Answer Key. Check your answers and review those items that you marked incorrectly.

1. DNA and RNA interact in the process of protein formation. Which is a correct description of a step in protein synthesis that involves the actions of nucleic acids?

A DNA molecules move into the cytoplasm to produce transfer RNA.

B Messenger RNA is made on a DNA template by the process of transcription.

C Transfer RNA functions to proofread DNA to eliminate errors during replication.

D The original code for proteins is contained in RNA which is transcribed and translated by DNA.

2. How can the relationship between photosynthesis and cellular respiration <u>best</u> be described?

A Cellular respiration produces oxygen that is used by photosynthesis.

B Carbon dioxide is produced by photosynthesis and used in cellular respiration.

C Photosynthesis produces glucose which is used in cellular respiration to produce energy.

D Cellular respiration stores energy for future use by cells and photosynthesis releases energy for use in cellular reactions.

3. **A scientist observes a cell that has no cell wall, no nucleus, and no visible organelles. What kind of cell is the scientist observing?**

A protist

B gamete

C plant cell

D prokaryote

4. **In humans, free earlobes are dominant and attached earlobes are recessive. A man with attached earlobes has a child with a woman who is heterozygous for the earlobe trait. What is the probability that their child has attached earlobes?**

A 25%

B 50%

C 75%

D 100%

5. Muscle cells require large amounts of energy to function. Which organelle is found in greater numbers in muscle cells than in other types of cells because of this large energy requirement?

A lysosomes

B mitochondria

C Golgi complex

D endoplasmic reticulum

6. The rate at which phosphorus from rock is being released in an ecosystem is greatly reduced. From a biogeochemical perspective, why would this reduction make soil erosion a greater threat to the health of the ecosystem?

A Soil prevents organic debris from returning phosphorus to local sedimentary rock.

B Rocks and soil would fail to balance one another's contributions to phosphorus cycling.

C Material recycled to plants from organic debris is the ecosystem's only source of phosphorus.

D Soil stores alternative nutrients which reduce the dependence of the ecosystem on phosphorus.

7. A student is going to investigate if a flower-color trait in a plant is dominant or recessive. Which part of the student's investigation will guide the overall design of the procedure?

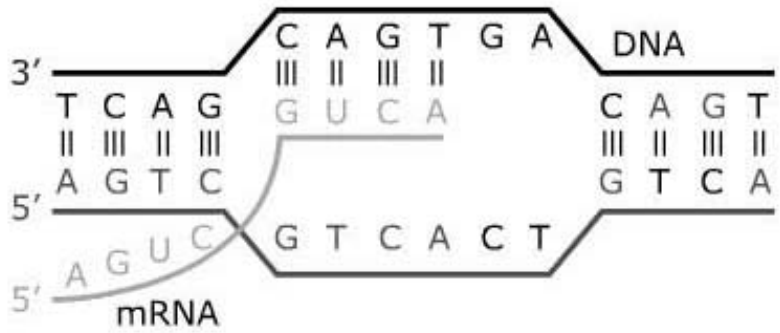
A apparatus

B conclusion

C hypothesis

D observations

8. **The diagram shows a function of DNA in cells.**



What function does DNA serve in the diagram?

A DNA provides genetic material for offspring.

B DNA provides a template for protein synthesis.

C DNA provides structure to support the cell nucleus.

D DNA directly regulates what enters and leaves the cell.

9. The black-footed cat, found in the deserts of southern Africa, and the Arctic fox have thick fur on the bottoms of their feet. Which statement <u>best</u> describes how the thick fur on the bottoms of their feet <u>most</u> likely benefits these animals in their environments?

A The fur helps them climb trees.

B The fur reduces the chance of infection.

C The fur protects them from the surfaces on which they walk.

D The fur helps conserve energy and maintain body temperature.

10. **A researcher crossed true-breeding, axial-flowering pea plants with true-breeding, terminal-flowering pea plants. The plants in the F_1 generation all had axial flowers. The plants in the F_1 offspring were then crossed with other F_1 generation plants. In the F_2 generation, the proportion of axial flowering plants to terminal flowering plants was 3 to 1. The researcher concluded that when present, the allele for axial flowers masked the expression of the allele for terminal flowers. Which statement <u>best</u> defends the researcher's conclusion?**

A The axial flower and terminal flower alleles are codominant.

B The axial flower allele is dominant to the terminal flower allele.

C The axial flower allele is recessive to the terminal flower allele.

D The axial flower and terminal flower alleles are incompletely dominant.

11. **A group of students is learning about the different shapes of bacteria. Which tool would be <u>best</u> to use to examine the shapes of bacteria found in different brands of yogurt?**

A centimeter ruler

B magnifying glass

C triple beam balance

D compound light microscope

12. **When Biuret reagent is added to an unknown colorless solution, the solution turns purple. This indicates the presence of which molecules?**

A lipids

B proteins

C carbohydrates

D nucleic acids

13. **Enzymes are only able to perform their functions within specific temperature ranges. Temperatures above an enzyme's range begin to break weak bonds between atoms in an enzyme. How do such changes likely prevent an enzyme from performing its function?**

A Increased temperatures bind chemical energy more strongly to the enzyme, preventing the enzyme from spreading the chemical energy to the enzyme's substrate.

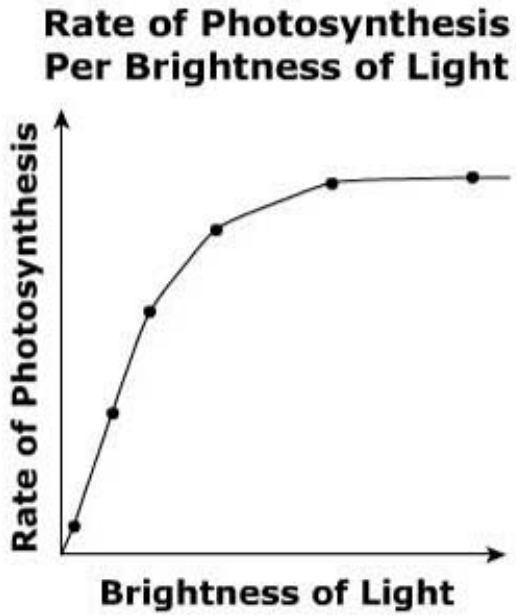
B Increased temperatures transform the enzyme's chemical energy to thermal energy, preventing the enzyme from donating the energy to the enzyme's substrate.

C Increased temperatures alter the enzyme's three-dimensional structure, preventing the enzyme from interacting catalytically with the enzyme's substrate.

D Increased temperatures alter the enzyme's electrical distribution and resistivity, preventing the flow of current between the enzyme and the enzyme's substrate.

14.

A scientist makes a graph of the rate of photosynthesis relative to light brightness for a plant species.



What implication does this graph carry for a farmer growing this plant species indoors under artificial light?

A The farmer should only light the growing space when plants are photosynthesizing.

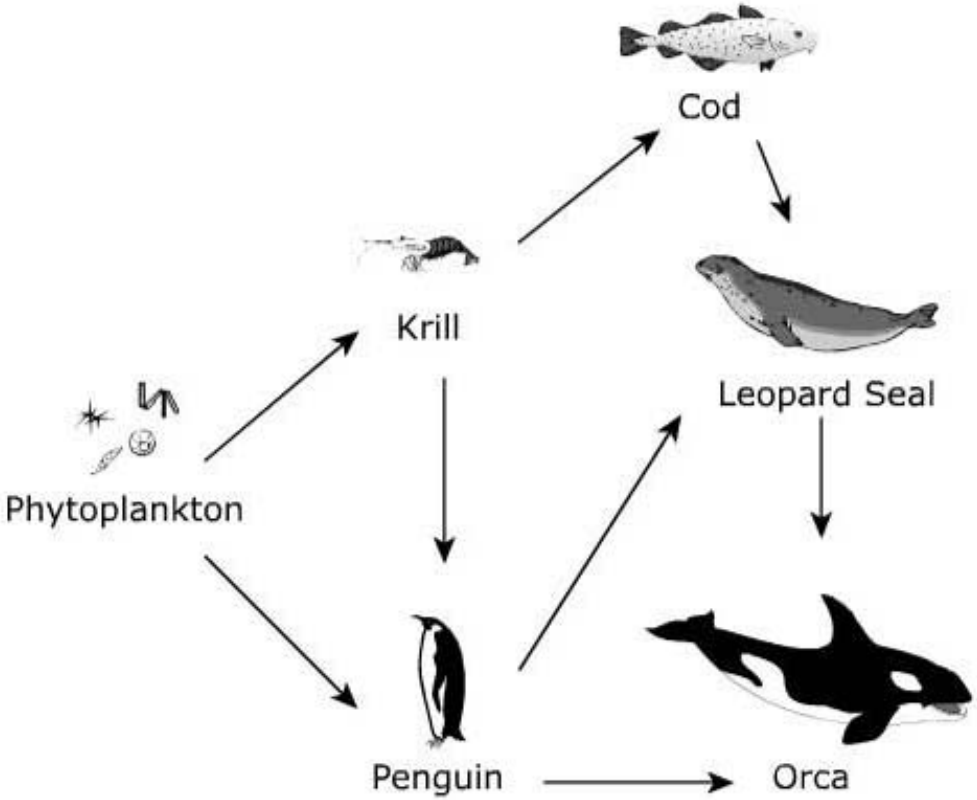
B The farmer should light the growing space dimly but constantly throughout the day and night.

C The farmer should only light the growing space to yield the maximum photosynthesizing response.

D The farmer should light the growing space as brightly as the growing space's electrical system safely allows.

15.

The illustration below shows an ocean food web.



Which organism would be at the top of the energy pyramid in this ecosystem?

A Cod

B Penguin

C Orca

D Leopard Seal

16. **All organisms contain four organic molecules. Which group of molecules contains fatty acids and glycerol, is insoluble in water, and functions in long-term energy storage?**

A carbohydrates

B nucleic acids

C proteins

D lipids

17. **A cell is placed in a beaker containing pure water. Which statement <u>best</u> explains the changes that will be seen in the cell?**

A The cell will increase in volume as water enters the cell.

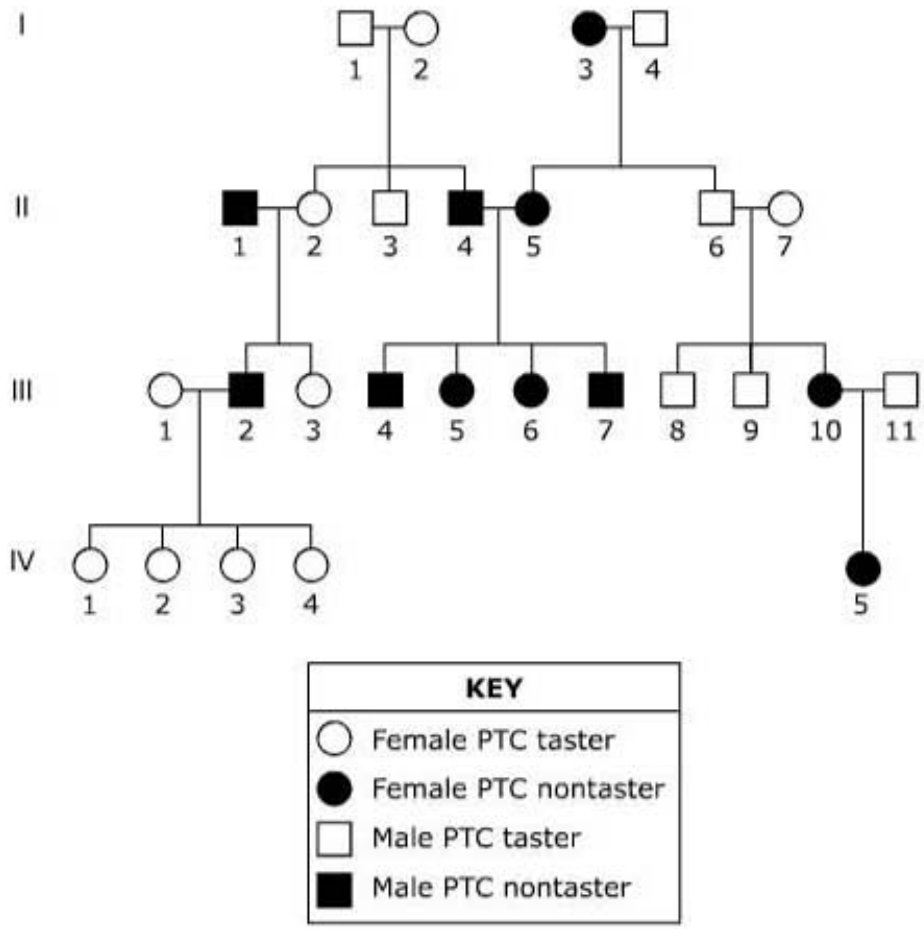
B The cell will decrease in volume as water leaves the cell.

C The cell will decrease in volume as water and salt leave the cell.

D The cell will increase in volume as water and salt enter the cell.

18.

The gene for the ability to taste the bitter compound phenylthiocarbamide (PTC) is the dominant allele (T) over the nontasting gene. The pedigree shows four generations of a family and their tasting abilities.



Which individual <u>most</u> likely has a TT genotype?

A Generation I, individual 3

B Generation II, individual 7

C Generation III, individual 1

D Generation III, individual 11

19. **Certain hare species that live in cold climates have brown fur in the summer. In the winter, the brown fur is replaced by white fur. How does fur that changes color with the seasons <u>most</u> likely benefit the hare?**

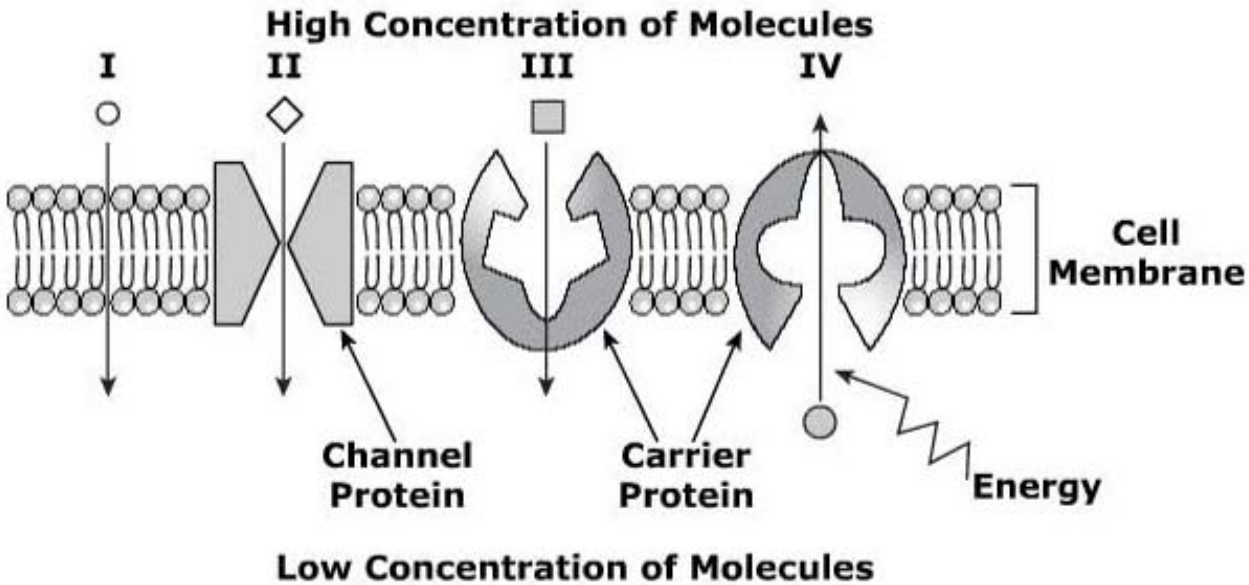
A helps the hare attract mates

B helps the hare maintain homeostasis

C helps the hare blend into its environment

D helps the hare with the rate of respiration

20. **The illustration is a representation of the different ways molecules are transported across a cell membrane.**



Which part of the illustration represents active transport?

A I

B II

C III

D IV

21. The monarch butterfly migrates between Canada and Mexico along regular geographical routes over several generations. Monarch butterflies revisit the same areas during their migration to and from Canada and Mexico. Which of these would <u>most</u> likely contribute to the possible extinction of the monarch butterfly?

A predation by bird species along their route

B ecological destruction of any sites to which they regularly return

C adaptation to make their migrations over a different number of generations

D over-breeding during any given migration at a single location along their route

22. Students want to find the minimum concentration of bleach and water solutions that will control algal growth in a pond. Which procedure <u>best</u> enables the students to effectively test all the bleach concentrations against a control?

A Add different bleach concentrations during a period of time to a large container holding algae.

B Set up four small jars with equal portions of algae, and add each different bleach concentration to three of the jars.

C Add different bleach concentrations to a pond with algal growth in order from weakest concentration to strongest concentration.

D Set up three small jars with equal portions of algae, add each different bleach concentration, and compare the results to a pond with algal growth.

23. **In humans, freckles are dominant and a lack of freckles is recessive. What is the probability that a child would have freckles if one parent is homozygous for freckles and one parent does <u>not</u> have freckles?**

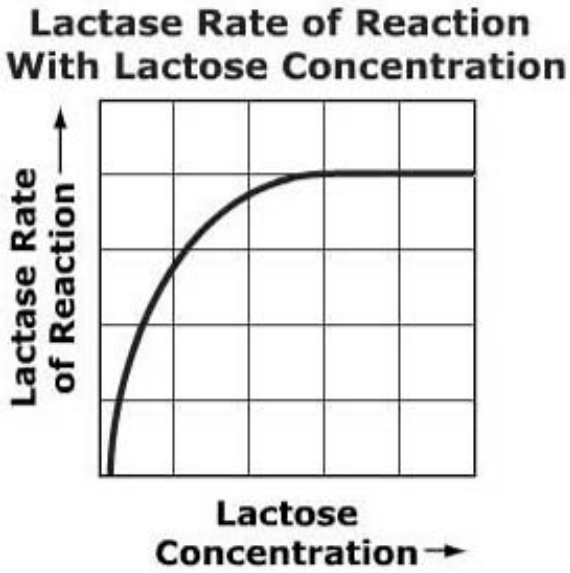
A 0%

B 25%

C 75%

D 100%

24. **Lactase is an enzyme that converts lactose to glucose and fructose. The figure below shows the activity of lactase as the concentration of lactose is increased.**



Why does the rate of reaction slow and eventually become constant?

A The enzyme has been saturated.

B The enzyme has been denatured.

C The enzyme is interfered with by glucose.

D The enzyme does not have enough lactose.

25. Which statement <u>best</u> describes why sexual reproduction increases diversity in the population of a species?

A Offspring receive genetic material that has changed due to environmental pressures.

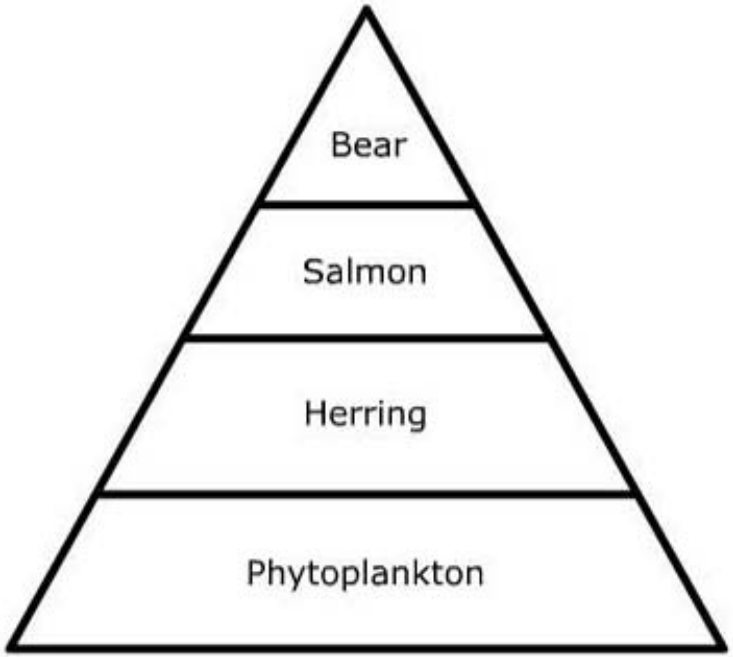
B Offspring receive a combination of parental genetic traits with varying expression of genes.

C Offspring receive genetic material that has different gene sequences from the parental generation.

D Offspring receive a combination of parental genetic traits that contain mutations from DNA replication.

26.

The following diagram represents a food pyramid.



An ecosystem has a stable population of herring. Sardines migrate into the ecosystem and compete with the herring for resources. What is the <u>most</u> likely outcome?

A The salmon population will increase.

B The phytoplankton population will decrease.

C The sardine population will become extinct.

D The herring population will be unaffected.

27. In many parts of the United States, coal is used to produce electricity, and the smoke from the coal fires is released into the atmosphere. This smoke contains sulfur dioxide and nitric oxides in addition to carbon dioxide that can interact with living and nonliving portions of the environment. How would these coal-burning facilities impact the environments around them?

A A decrease in acid rain would be seen upwind of the coal-burning facilities.

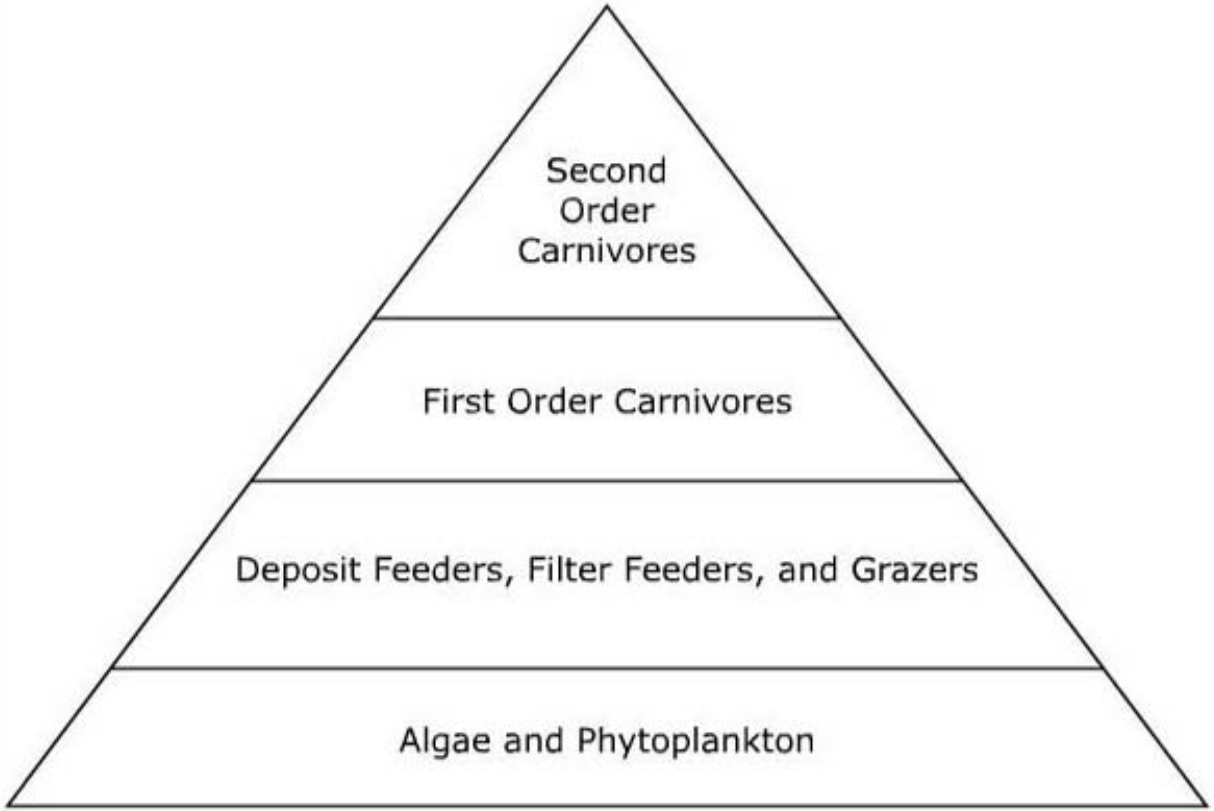
B An increase in acid rain would be seen downwind of the coal-burning facilities.

C Acid rain would decrease immediately around the area of the coal-burning facilities.

D There would be no effect on the amount of acid rain in any of the areas surrounding the coal-burning facilities.

28.

The diagram shows the ecological relationships between some species in an ocean ecosystem.



What <u>best</u> describes how energy moves through the ecosystem?

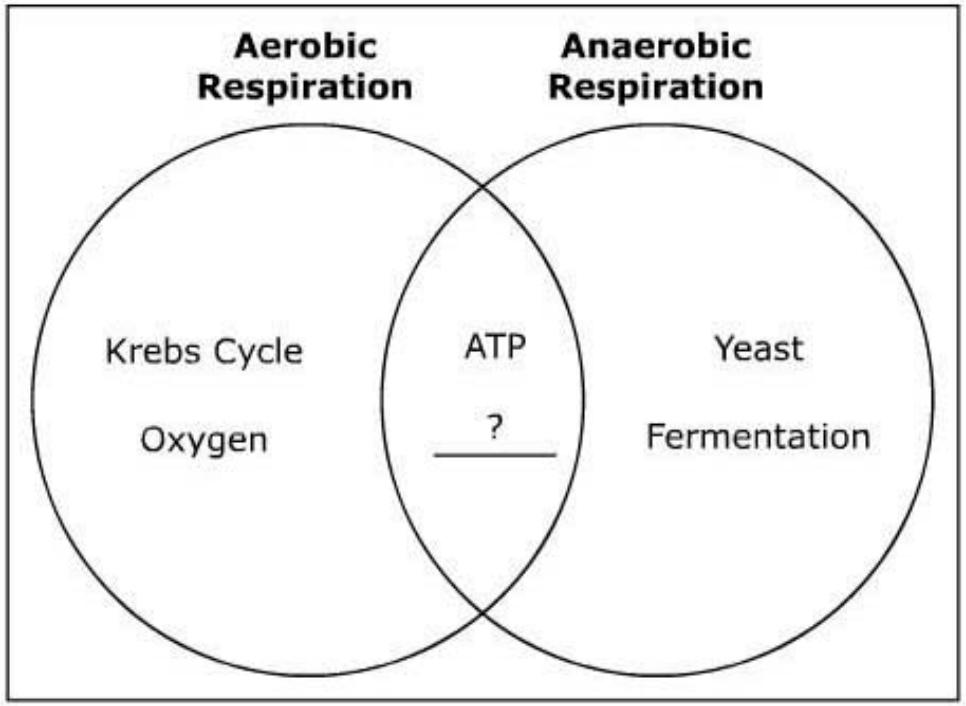
A The sun provides energy directly to the producers and consumers.

B The primary consumers directly need the secondary consumers for energy.

C The sun provides energy directly to the producers and indirectly to the consumers.

D The secondary consumers directly need the producers for energy which indirectly use light energy.

29. **Both aerobic and anaerobic respiration convert food into energy. The Venn diagram illustrates some of the ways the processes differ and characteristics that they have in common.**



Which term belongs in the blank with a question mark?

A electron transport system

B ethyl alcohol

C lactic acid

D glycolysis

30. Which comparison <u>best</u> describes the difference between photosynthesis and cellular respiration?

A Cellular respiration is ATP dependent; photosynthesis is ATP independent.

B Photosynthesis is oxygen dependent; cellular respiration is carbon dioxide independent.

C Photosynthesis is light-energy dependent; cellular respiration is light-energy independent.

D Cellular respiration is electron-transport dependent; photosynthesis is electron-transport independent.

31. **Which type of molecule performs its functions in the body mostly due to a complex structure held together by weak bonds?**

A lipid

B protein

C nucleic acid

D carbohydrate

32. **Scientists are experimenting with a new way to stimulate heart muscles using light instead of electricity. This may solve some existing problems with pacemakers that require wires and batteries. However, the technique may take longer and require more patient and laboratory procedures. How will the new technology affect the cost-to-benefit ratio of heart pacemakers?**

A There will be an increase in both the costs and the benefits.

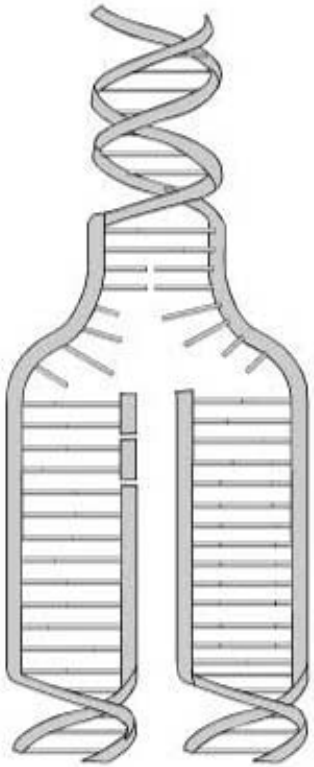
B There will be a decrease in both the costs and the benefits.

C There will be an increase in the costs but a decrease in the benefits.

D There will be a decrease in the costs but an increase in the benefits.

33.

The diagram depicts the process of DNA replication.



What is the significance of this process?

A provides the cell's genetic code to daughter cells

B ensures that proteins are synthesized for cell division

C provides the cell a chance to adapt to environmental changes

D ensures that environmental conditions are conducive to cell division

34.

During the process of protein synthesis, amino acids are added to the protein chain according to the DNA code. The amino acids coded for each RNA codon are shown in the chart below.

Second Letter of Codon

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

According to the chart, which amino acids are coded for by the mRNA strand AUGUGUCCAGUA?

A Methionine, Leucine, Arginine, Valine

B Methionine, Cysteine, Proline, Valine

C Valine, Proline, Cysteine, Methionine

D Valine, Methionine, Phenylalanine, Tryptophan

35. A cell transports materials through the cell membrane either passively or with the use of energy. Which cellular process demonstrates the movement of materials that requires a source of energy?

A Transport proteins move molecules through the cell membrane to an area of higher concentration inside the cell.

B Water moves through channels in the cell membrane to an area of lower concentration outside the cell.

C Particles move through the cell membrane to an area of lower concentration inside the cell.

D Carrier proteins provide a channel for the movement of glucose inside the cell.

36. **A hay field is fertilized with nitrate fertilizer. The fertilizer dissolves in rainwater and some enters a nearby stream from runoff. What is the most immediate affect this event could have on the biological energy in the stream ecosystem?**

A Producers could have more available energy.

B Decomposers could have less available energy.

C Tertiary consumers could have less available energy.

D Primary consumers could have more available energy.

37. **Coat color in cats is a sex-linked trait controlled by two genes, black and orange-brown, located on the X chromosome. Heterozygous cats will have a calico color, and homozygous cats will be black if they received the black gene or orange-brown if they received the orange-brown gene. If a black male and an orange-brown female have kittens, what percentage of male kittens would be expected to have the calico color?**

A 0%

B 25%

C 50%

D 75%

38. **The following changes occurred in an ecosystem.**

1. **Lichens and moss colonize newly exposed rock and then secrete acids.**
2. **The acids cause cracks in the rock that widen due to freezing and thawing.**
3. **As the cracks widen, moisture is trapped and mosses begin to grow.**
4. **Larger cracks form that can hold soil.**
5. **The soil supports the growth of grasses and small shrubs.**
6. **The largest cracks come together to form basins where trees can take root.**

The changes that occurred in this ecosystem are <u>best</u> described by which term?

A natural selection

B niche competition

C sexual reproduction

D biological succession

39. **A pedigree for a family reveals the following data:**

Generation	Number of Individuals	Number of Individuals with Trait *N*
1	2	1 (male)
2	4	0
3	8	1 (female)

Which statement <u>best</u> explains the data?

A The trait is autosomal dominant.

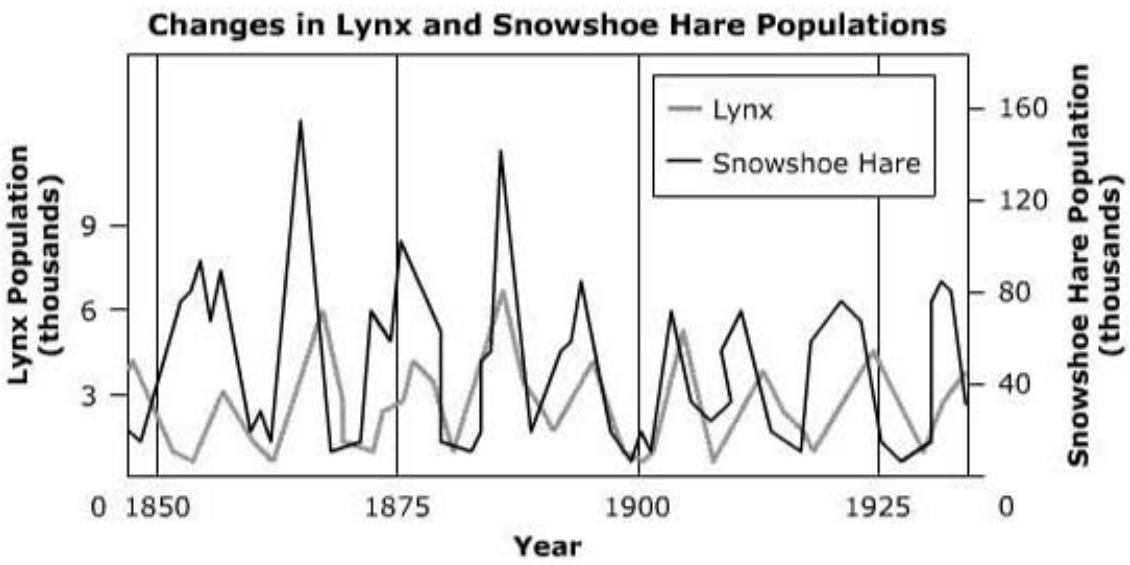
B The trait is autosomal recessive.

C The trait is X-linked dominant.

D The trait is X-linked recessive.

40.

Lynxes are known to prey on a number of mammals, including snowshoe hares. The graph shows changes in the populations of both lynxes and snowshoe hares over time in an ecosystem.



Which statement about carrying capacity is correct based on the changes in populations shown?

A The lynx population has no impact on the ecosystem's carrying capacity for the snowshoe hare population.

B The snowshoe hare population has no impact on the ecosystem's carrying capacity for the lynx population.

C As the lynx population passes the ecosystem's carrying capacity, the lynx population decreases and the snowshoe hare population increases.

D As the snowshoe hare population passes the ecosystem's carrying capacity, the lynx population decreases and the snowshoe hare population increases.

41. Down syndrome occurs when an individual has three copies of chromosome 21 instead of the normal complement of two copies of this chromosome. Which statement <u>best</u> explains how this condition can result?

A improper crossing over during meiosis I

B mutation of chromosome 21 after meiosis is completed

C lack of spindle fiber attachment to centromeres during meiosis I

D lack of separation of homologous chromosomes during meiosis II

42. **Various environmental factors may cause changes in population sizes. In North America, most songbirds alternate between northern and southern latitudes. This migration causes the populations to change on a regular basis. Which environmental factors are <u>most</u> influential in this behavior?**

A breeding patterns of predators of the songbirds

B overreproduction of the songbirds in each area

C seasonal patterns of temperature, moisture, and sunlight

D outbreak of disease that spreads rapidly through a population

43. Which event during meiosis introduces genetic variation between parents and offspring?

A condensation of the chromatin to form distinct chromosomes

B replication of DNA to make multiple copies of parent genetic material

C crossing over of homologous sequences between matching chromosomes

D migration of chromosomes to opposite sides of the cell along microtubules

44. **There is an extensive history of using technologies in forensic analysis and diagnosis of diseases. With each technological advance, ethical issues have been discussed, and when necessary, safeguards have been put in place to ensure that these technologies are used in an ethical manner. DNA fingerprinting is a recently developed technique that can have many different uses. Which is the primary concern about using DNA fingerprinting in diagnosis of diseases?**

A maintaining patient privacy

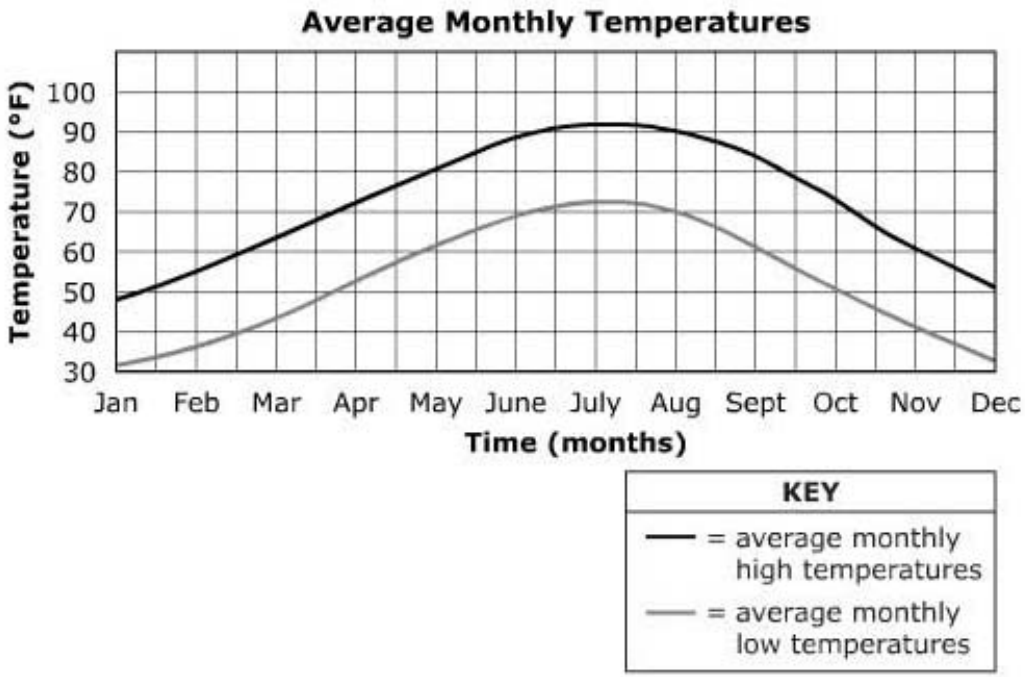
B inappropriate diagnosis

C reliability of the test

D gene patenting

45.

The monthly average high and low temperatures for a state park are recorded in the graph below. A park ranger concludes that the high temperature increase in the spring is not at the same rate as the high temperature decrease in the fall.



Based on the data in the graph, what information supports this conclusion?

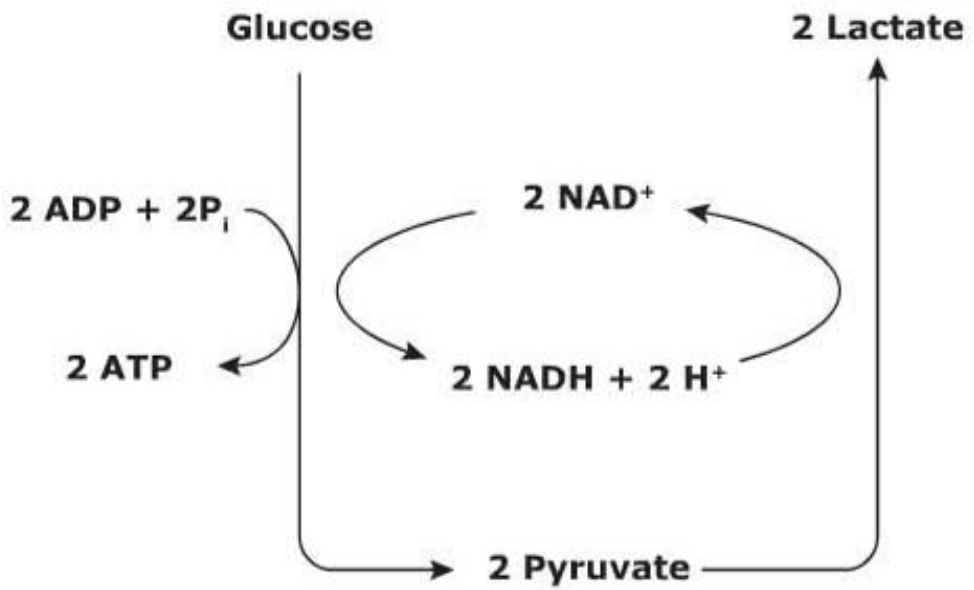
A The average high temperature increase was less from April to June than the high temperature decrease from September to November.

B The average high temperature increase was greater from April to June than the high temperature decrease from September to November.

C The average high temperature increase was greater from April to June than the low temperature decrease from September to November.

D The average low temperature increase was greater from April to June than the high temperature decrease from September to December.

46. **The diagram shows a biochemical process.**



What condition in human body cells enables this process?

A excess food

B excess water

C deficient oxygen

D deficient lactose

47. Several factors may contribute to the formation of a new species. For natural selection to be the main contributing factor in forming a new species, which characteristic must be present in the original population?

A some organisms that grow much larger than others in size

B a trait that provides advantages in competition for resources

C emergence of a geographic boundary, such as a river, that separates the population

D reproductive isolation to keep a newly formed species from interbreeding with the original species

48.

The table shows nine substances tested for biomolecules.

Substance	Iodine Solution	Biuret Reagent	Sudan IV Reagent
Banana	+	–	–
Applesauce	–	–	–
Meat	–	+	Slight
Egg Yolk	–	+	–
Cream	–	+	Slight
Flour	+	–	–
Cornstarch	+	–	–
Soaked Beans	+	+	–
Table Sugar	–	–	–

Which substance contains protein and starch?

A Banana

B Egg Yolk

C Soaked Beans

D Table Sugar

49. **Giant pandas are endangered and live in cold, rainy forests in a few small areas in southwestern China. These mammals have a low reproductive rate, eat mainly bamboo, and live to about twenty years of age in the wild. How could a parasitic infection of plants in their habitat <u>most</u> likely lead to extinction of giant pandas?**

A The pandas' only source of food could be lost.

B The parasites could shorten the life span of the pandas.

C The parasites could transfer from the plants to the pandas.

D The loss of plants could decrease the pandas' available oxygen.

50. Which function in prokaryotic and eukaryotic cells is accomplished differently in the two cell types?

A storage of hereditary information

B separation of the cell from its environment

C breakdown of energy-storage molecules for energy use

D use of hereditary information to guide construction of proteins

51. **In the spring of 2011, scientists reported that they may have discovered a new species of rhinoceros. In order to make this determination, the scientists <u>most</u> likely compared data obtained about the new species to which type of data about the known species?**

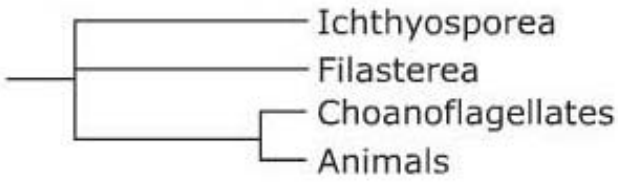
A fossil and dental records

B skin texture and foot size

C physical traits and genetic analysis

D diet requirement and disease history

52. **This diagram illustrates the modern classification of several groups of organisms.**



Based on the information in this diagram, which is an accurate statement about the history of the groups of organisms shown?

A Animals and Choanoflagellates diverged from one another at about the same time Filasterea diverged from Ichthyosporea.

B Filasterea, Ichthyosporea, and a common ancestor of Animals and Choanoflagellates descend from an overall common ancestor.

C Animals and Choanoflagellates show divergent evolution, whereas Filasterea and Ichthyosporea show convergent evolution.

D Animals and Choanoflagellates do not share a common ancestor with Filasterea and Ichthyosporea.

53. As growing cells reach a certain size, they undergo mitosis. How does mitosis help cells maintain efficient function?

A Mitosis reduces the amount of energy needed by cells.

B Mitosis provides more storage space for waste materials.

C Mitosis produces new genetic material for control of cell processes.

D Mitosis keeps the cell volume and surface area in proper proportion.

54. **Students are given four unknown molecules. The table below lists the elements that are in each unknown molecule.**

Molecule	Carbon	Hydrogen	Nitrogen	Oxygen	Phosphorus
1	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	No
3	Yes	Yes	No	Yes	Yes
4	Yes	Yes	No	Yes	No

Which of the unknown molecules is a protein?

A Molecule 1

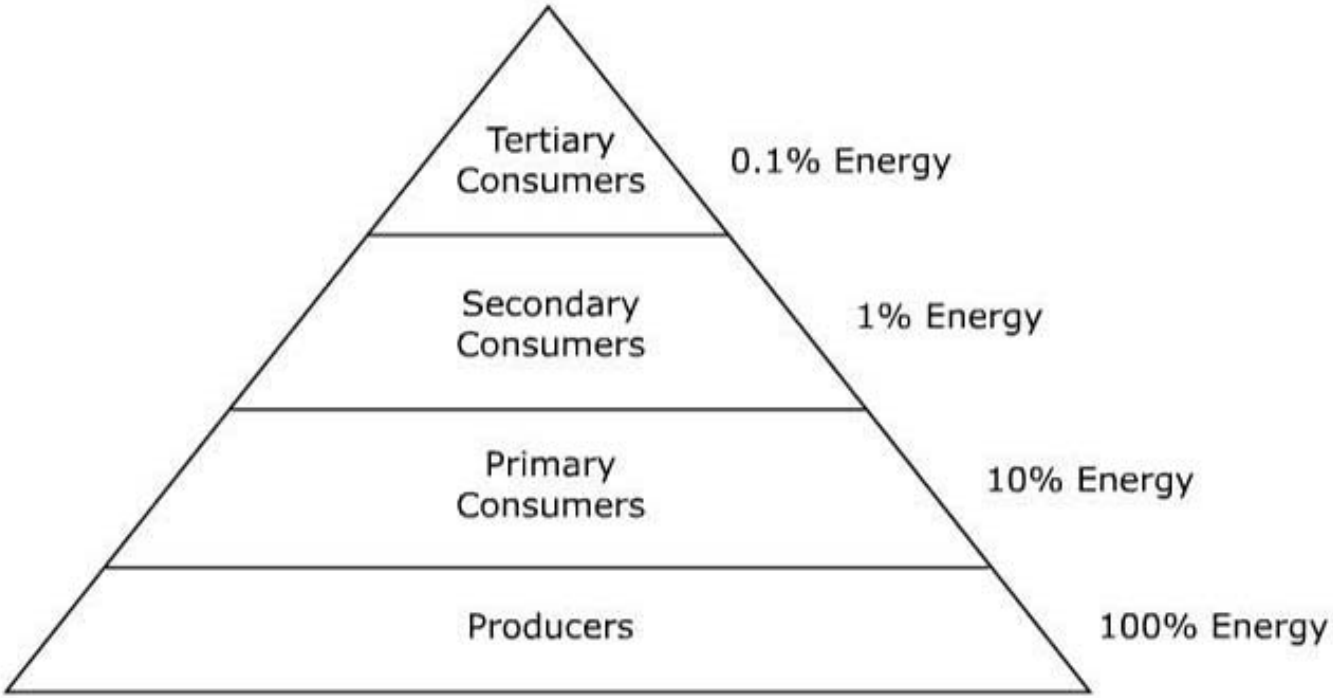
B Molecule 2

C Molecule 3

D Molecule 4

55.

This pyramid indicates relative amounts of energy at different trophic levels of an ecosystem.



Which statement <u>best</u> explains the decline in pyramid wedge size with increase in trophic level?

A The rate of photosynthesis in organisms decreases with each increase in trophic level.

B Body size increases with trophic level, causing higher energy demand and less efficient use of energy.

C Organisms in each trophic level convert some of the energy they capture into heat, making it unavailable for consumption.

D Competition between consumers increases with trophic level, resulting in distribution of the same amount of energy to larger and more diverse populations.

56. **An agricultural scientist used selective breeding to produce orange trees which grow oranges much smaller than those currently grown. Which flaw occurred earliest in the engineering design process this scientist used?**

A Alternate solutions were not considered.

B The design proposal does not address a problem known to exist.

C The system being designed does not allow production of a prototype.

D Refining the product after testing will be difficult and expensive.

57. **A tundra has a permanently frozen layer of soil known as permafrost. The soil is nutrient poor, frozen, and has low water content except on the surface. A desert has soil that is very dry, sandy, and does not retain water. Which physical structure in plants aids survival in both environments?**

A a shallow root system

B a deep root system

C small leaves

D long stems

58. **In a cell's environment, materials move in and out of the cell. Which process is an example of active transport?**

A Glucose molecules in the bloodstream move through proteins in the cell membrane.

B Potassium ions move across a cell membrane to the side of higher concentration.

C Dissolved carbon dioxide gas from mitochondria diffuses evenly throughout a cell.

D Water moves from high concentration inside the cell into the fluid outside the cell.

59. **The food chain shown occurs in an ecosystem.**

Grass → Grasshopper → Spider → Toad → Hognose Snake → Hawk

A change in the population of one organism results in an increase in grasshopper population and a fall in grass population. Which change could have caused these changes?

A decrease in the toad population

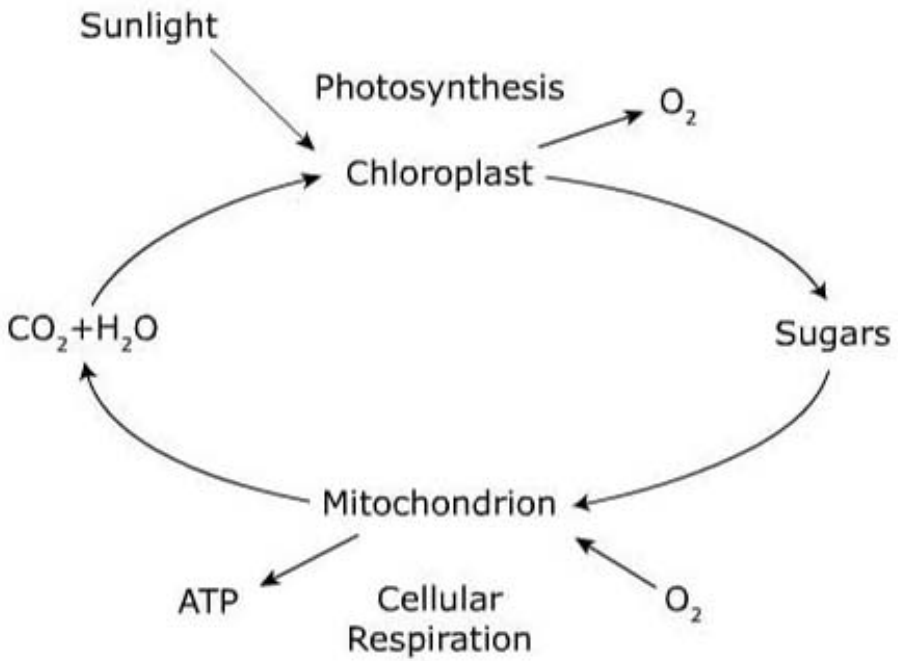
B decrease in the spider population

C increase in the spider population

D increase in the hognose snake population

60.

Photosynthesis and cellular respiration are both metabolic processes that share some common features. The relationship between photosynthesis and cellular respiration that can occur in some plant cells is shown.



How would these reactions be altered if the amount of light were decreased?

A Photosynthesis would decrease and cellular respiration would decrease.

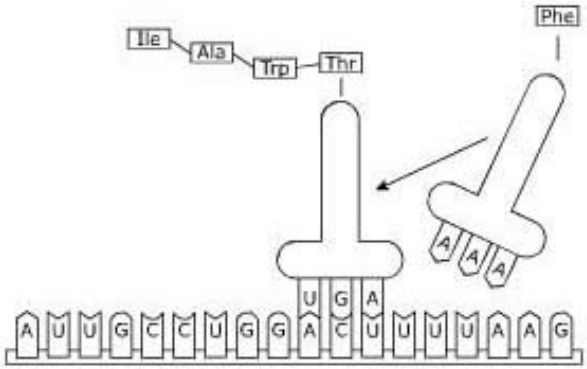
B Photosynthesis would increase and cellular respiration would not change.

C Cellular respiration would increase and photosynthesis would increase.

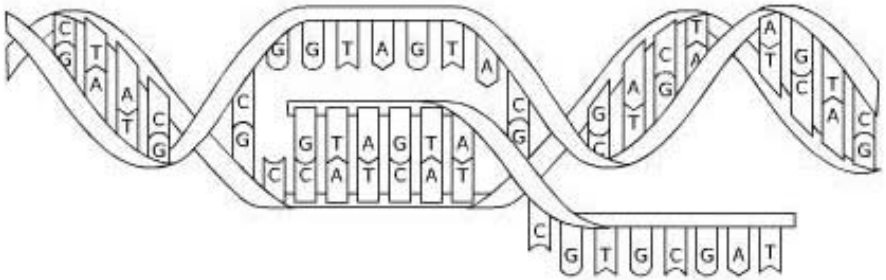
D Cellular respiration would decrease and photosynthesis would not change.

61. **DNA and RNA are involved in the production of proteins within a cell. Which diagram accurately illustrates the stage in protein formation in which DNA and RNA most directly interact?**

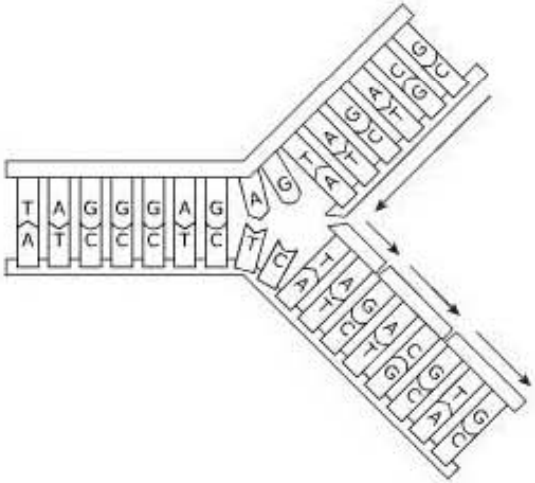
A



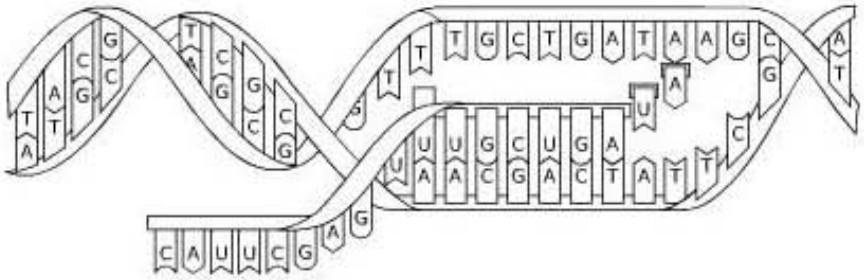
C



B



D



62. Yeast have a protein, wee1, which helps regulate when cell reproduction begins. Wee1 prevents cell reproduction before which process is complete?

A migration to an environment high in available energy

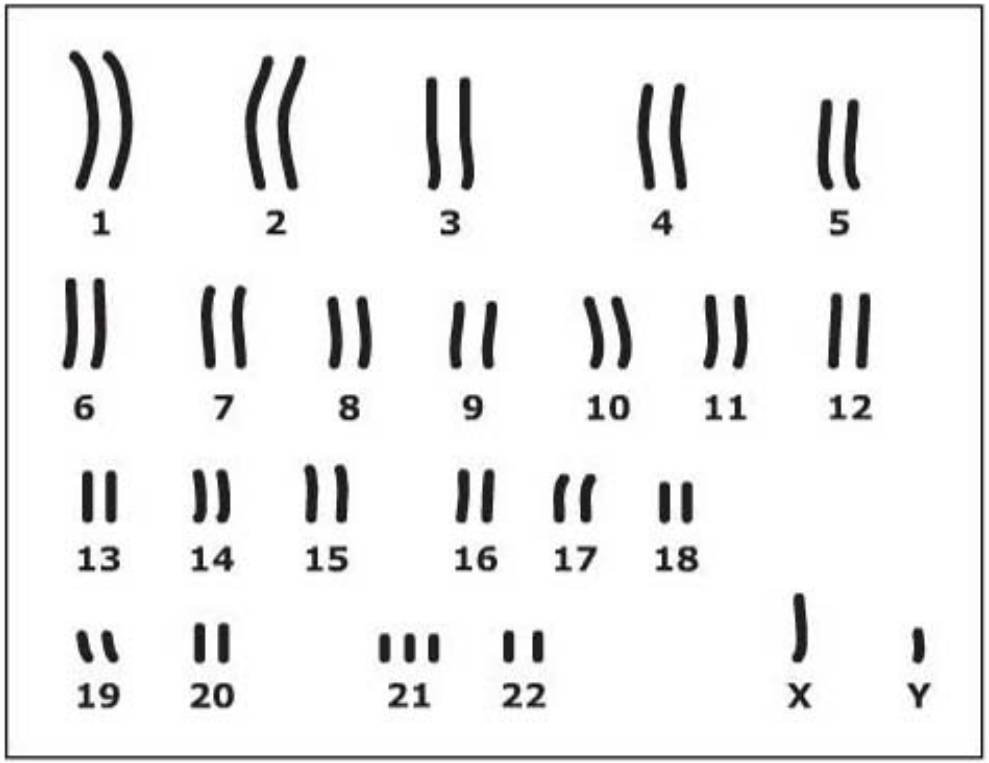
B migration to an environment lacking in predators

C growth of the cell to a certain minimum size

D growth of DNA to a certain minimum length

63.

The karyotype shows a genetic disorder.



The genetic disorder represented is caused by which type of mutation?

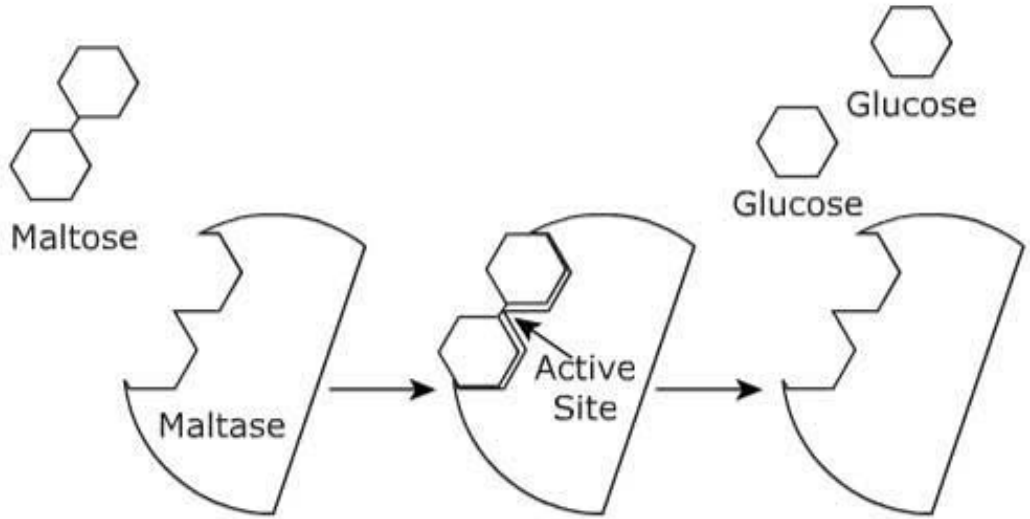
A an extra copy of a chromosome that is the result of nondisjunction

B genetic material left off of both chromosomes that is the result of a deletion

C extra genetic material added to one chromosome that is the result of an insertion

D a portion of one chromosome added to the other chromosome that is the result of a translocation

64. **Maltase is an enzyme found in cells. The diagram shows the activity of maltase.**



What is the function of maltase in the cell?

A produces maltose from glucose

B inhibits the production of glucose

C eliminates glucose waste products

D breaks the bond between glucose molecules

65. **Snowy owls nest on the Arctic tundra. They feed on small mammals, birds, and fish. They require vast, treeless areas to locate their prey. Which factor in snowy owl survival <u>best</u> illustrates the importance of biodiversity in the Arctic region?**

A vast, treeless areas

B cold Arctic temperatures

C numerous animal species

D abundant nesting material

Biology I Form 2
Answer Key

Item Number	Correct Answer
1	B
2	C
3	D
4	B
5	B
6	C
7	C
8	B
9	C
10	B
11	D
12	B
13	C
14	C
15	C
16	D
17	A
18	C
19	C
20	D
21	B
22	B

Item Number	Correct Answer
23	D
24	A
25	B
26	B
27	B
28	C
29	D
30	C
31	B
32	A
33	A
34	B
35	A
36	D
37	B
38	D
39	B
40	C
41	C
42	C
43	C
44	A

Item Number	Correct Answer
45	A
46	C
47	B
48	C
49	A
50	C
51	C
52	B
53	D
54	B
55	C
56	B
57	C
58	B
59	B
60	A
61	D
62	C
63	A
64	D
65	C

Reporting Categories

Below you will find that each item has been linked to its corresponding Reporting Category. These six Reporting Categories will be used to report scores from the actual test.

You can find the Reporting Categories and their Performance Indicators grouped together in the Tennessee End of Course Item Sampler for Biology I located on the Tennessee Department of Education Web site at http://tennessee.gov/education/assessment/sec_samplers.shtml.

Item	Reporting Category
1	5 – Heredity
2	4 – Flow of Matter and Energy
3	2 – Cells
4	5 – Heredity
5	2 – Cells
6	4 – Flow of Matter and Energy
7	1 – Inquiry, Technology and Engineering, Mathematics
8	5 – Heredity
9	6 – Biodiversity and Change
10	1 – Inquiry, Technology and Engineering, Mathematics
11	1 – Inquiry, Technology and Engineering, Mathematics
12	2 – Cells
13	2 – Cells
14	1 – Inquiry, Technology and Engineering, Mathematics
15	4 – Flow of Matter and Energy
16	2 – Cells
17	2 – Cells
18	5 – Heredity
19	6 – Biodiversity and Change
20	2 – Cells
21	3 – Interdependence
22	1 – Inquiry, Technology and Engineering, Mathematics
23	1 – Inquiry, Technology and Engineering, Mathematics
24	2 – Cells
25	5 – Heredity
26	3 – Interdependence
27	3 – Interdependence
28	4 – Flow of Matter and Energy
29	4 – Flow of Matter and Energy
30	4 – Flow of Matter and Energy

Item	Reporting Category
31	2 – Cells
32	1 – Inquiry, Technology and Engineering, Mathematics
33	5 – Heredity
34	5 – Heredity
35	2 – Cells
36	4 – Flow of Matter and Energy
37	5 – Heredity
38	3 – Interdependence
39	5 – Heredity
40	3 – Interdependence
41	5 – Heredity
42	3 – Interdependence
43	5 – Heredity
44	5 – Heredity
45	1 – Inquiry, Technology and Engineering, Mathematics
46	4 – Flow of Matter and Energy
47	6 – Biodiversity and Change
48	2 – Cells
49	3 – Interdependence
50	2 – Cells
51	6 – Biodiversity and Change
52	6 – Biodiversity and Change
53	1 – Inquiry, Technology and Engineering, Mathematics
54	2 – Cells
55	4 – Flow of Matter and Energy
56	1 – Inquiry, Technology and Engineering, Mathematics
57	6 – Biodiversity and Change
58	2 – Cells
59	3 – Interdependence
60	4 – Flow of Matter and Energy
61	5 – Heredity
62	2 – Cells
63	5 – Heredity
64	2 – Cells
65	6 – Biodiversity and Change