Georgia EOCT Coach, Gold Edition, Biology

Pretest

Name: _____

Directions:

Today you will be taking a test modeled on the Biology End-of-Course Test. Read each question carefully and then choose the *best* answer.

Be sure that the question number on the answer sheet matches the number on the test. Then mark your answer by filling in the circle on your answer sheet. If you do not know the answer to a question, skip it and go on. You may return to it later if time permits.

If you need to change an answer on your answer sheet, be sure to erase your first mark completely. Do not make any stray marks on the answer sheet.

SECTION I

Pretest

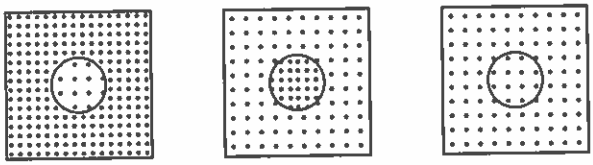
1 **Which of the following factors is MOST likely to affect the function of an enzyme?**

A catalysts
B size of beaker
C proteins
D temperature

2 **Which process helps increase genetic diversity and variation within species?**

A meiosis
B mitosis
C photosynthesis
D bacterial fission

3 **The diagrams below represent three cells that have been placed in salt solutions. The dots represent the concentration of salt inside and outside the cell. More closely placed dots means a higher salt concentration.**



A B C

Diffusion will cause the cell in solution C to do which of the following?

A lose salt
B remain unchanged
C take in salt
D take in water

4 **Which of the following is an advantage of asexual reproduction in an environment that undergoes very few changes?**

A It requires two parents.
B It increases genetic diversity.
C It results in offspring that are genetically identical.
D It does not involve chromosomes.

Go On

5 **Which of the following kingdoms contains only single-celled organisms?**

A Eubacteria and Protista
B Eubacteria and Archaebacteria
C Archaebacteria and Protista
D Protista and Fungi

6 **The table shows several DNA codons and their corresponding amino acids.**

DNA Codon	Amino Acid
AGA	Arginine
AGC	Serine
AGT	Serine
GGA	Glycine
GGC	Glycine
GGG	Glycine
TTG	Leucine
TCG	Serine
TCT	Serine

If a sequence of DNA reads AGTGGGTCT, for what sequence of amino acids does it code?

A arginine-glycine-serine
B serine-arginine-arginine
C serine-arginine-glycine
D serine-glycine-serine

7 **Which cell organelle is the site of protein synthesis?**

A endoplasmic reticulum
B ribosome
C nucleus
D mitochondrion

8 **What part of a bacterial cell is used to make recombinant DNA?**

A cell wall
B plasmid
C nucleus
D gamete

9 Study the picture below.

Which level of organization is BEST represented by the entire picture?

A species
B community
C population
D ecosystem

10 Cell membranes are made up partly of fats. What type of macromolecules are fats?

A lipids
B carbohydrates
C nucleic acids
D proteins

11 Territoriality is a common type of social behavior. Why is territoriality important?

A It allows animals to share resources with one another.
B It helps animals attract mates.
C It indicates which animal is the alpha of the group.
D It allows an animal to protect resources that are important to its survival.

12 The Punnett square shows a cross in pea plants. R represents offspring with round seeds, and r represents offspring with wrinkled seeds.

	R	r
R	RR	Rr
r	Rr	rr

If there are four offspring from the cross, what percentage of offspring will have the round seed phenotype?

A 25%
B 50%
C 75%
D 100%

Go On

13 Which of the following is one way that RNA is different from DNA?

A RNA exists in only one structural form.
B RNA contains ribose rather than deoxyribose.
C RNA contains adenine and phosphates.
D RNA contains thymine instead of uracil.

14 A mountain ridge was excavated by a mining company. The miners removed all vegetation and topsoil from the site. Which of the following sequences is MOST likely once the mining ends?

A shrubs → lichens → grasses → trees
B trees → shrubs → grasses → lichens
C lichens → grasses → shrubs → trees
D grasses → shrubs → trees → lichens

15 How might the overuse of antibiotics lead to resistant strains of bacteria?

A Antibiotics change the structure of bacteria, making them resistant.
B Antibiotics introduce too many bacteria to a population at one time.
C Antibiotics provide a breeding ground in which bacteria can flourish.
D Antibiotics shift natural selection to favor existing resistant bacteria.

16 Genetic engineering techniques have been used to produce all the following effects except

A oil-eating bacteria
B insulin-producing bacteria
C disease-resistant crops
D increased atmospheric oxygen levels

17 A new pesticide that inhibits egg cell development in cockroaches is being widely used in U.S. homes. As predicted, a number of common cockroach species have dramatically declined. However, one species of cockroach initially declined but is now more common than it was before the new pesticide was released. Which of the following is MOST likely true about this species of cockroach?

A The surviving species has learned how to avoid the pesticide.
B There was probably a great deal of genetic variability in this species before the pesticide was introduced.
C This cockroach species was probably the most evolved species in the U.S.
D The cockroach species got used to the pesticide and has learned to live with the chemical.

18 Which would be a reason why scientists would genetically engineer bacteria to produce human insulin?

A Bacteria do not have their own genetic material.
B Bacteria are living.
C Bacteria are very small.
D Bacteria reproduce quickly.

19 A mallard duck's feet have webbing similar to that of a frog. For which of these activities are a mallard's feet BEST adapted?

A swimming
B tearing flesh
C grasping prey
D walking on land

20 Which group of macromolecules includes enzymes?

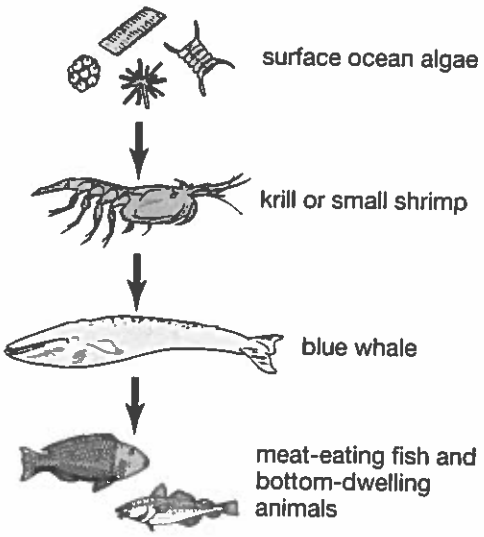
A lipids
B carbohydrates
C nucleic acids
D proteins

21 Similarities in the bones of the human arm and a whale's flipper suggest what about these organisms?

A They have the same DNA.
B They have nothing in common.
C They share a common ancestor.
D Whales evolved from humans.

Go On

22 **Study the food chain below.**



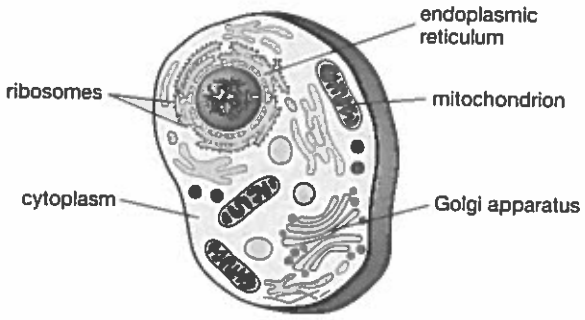
Which statement correctly compares the available energy between trophic levels in this food chain?

A Available energy is highest in the surface ocean algae and lowest in the meat-eating fish and bottom-dwelling animals.
B Available energy is highest in the meat-eating fish and bottom-dwelling animals and lowest in the surface ocean algae.
C Available energy is highest in the blue whale and lowest in the krill.
D The same amount of energy is available to organisms occupying all trophic levels.

23 **Which of the following is an abiotic factor that affects plant growth?**

A taller plants
B bees
C worms
D temperature range

24 **An animal cell is shown below.**



Which of these organelles breaks down sugar molecules in order to release energy the cell can use?

A cytoplasm
B endoplasmic reticulum
C Golgi apparatus
D mitochondrion

25 **A scientist is examining slides of cells from organisms in different kingdoms. What two features would the scientist use to distinguish a plant cell from an animal cell?**

- **A** presence or absence of a nucleus and cell membrane
- **B** presence or absence of mitochondria and ribosomes
- **C** presence or absence of a cell wall and chloroplasts
- **D** presence or absence of a cell membrane and cytoplasm

26 **Auxin is a chemical produced by a plant that makes the plant's stem grow toward light. What type of chemical is auxin?**

- **A** nucleic acid
- **B** fertilizer
- **C** hormone
- **D** pesticide

27 **Which of the following is one way that RNA is different from DNA?**

- **A** RNA exists in four structural forms.
- **B** RNA contains deoxyribose rather than ribose.
- **C** RNA contains three strands of nucleotides.
- **D** RNA contains uracil rather than thymine.

28 **Charles Darwin studied the finches of the Galapagos Islands. He identifies several species of finches living on the different islands. These finches were similar, but they all had different beak shapes. Which of the following is the BEST explanation for their differing beak shapes?**

- **A** More than one animal species was competing for the same food source, so the finches evolved a beak shaped to eat another type of food in order to survive.
- **B** Different food sources were available on the different islands, so the finches had to evolve a beak shape to eat different foods when they migrated to different islands.
- **C** Food sources on the different islands selected in favor of finches with certain beak shapes.
- **D** Reproductive isolation caused the finches to have different shaped beaks.

29 **Study the equation below.**

$$6CO_2 + \underline{\quad} \xrightarrow{\text{sunlight}} C_6H_{12}O_6 + 6O_2$$

Which reactant is missing from the equation?

- **A** sugar ($C_6H_{12}O_6$)
- **B** water (H_2O)
- **C** carbon (C)
- **D** hydrogen (H)

Go On

30 **Although nitrogen gas (N_2) is abundant in the atmosphere, plants cannot use it in this form. What organisms convert nitrogen from N_2 to nitrates, which plants can use?**

A bacteria
B insects
C fungi
D viruses

31 **What is the only way in which viruses are similar to cells?**

A They are made up of cytoplasm enclosed by a membrane.
B They are able to make more viruses like themselves.
C They are able to carry out cellular respiration.
D They are able to obtain nutrition through photosynthesis.

32 **What type of tropism do morning glories display when they wrap around a wire as they grow?**

A geotropism
B phototropism
C hydrotropism
D thigmotropism

33 **Which of the following statements BEST describes a function of an enzyme?**

A Enzymes are specialized proteins that serve as catalysts.
B Enzymes are carbohydrate-based molecules found in all cells.
C The structure of enzymes is changed during a chemical reaction.
D All enzymes work on all substrates.

34 **The wings of a butterfly and a bat share a similar function but have different structures, suggesting that they did not evolve from a common ancestor. What type of structures are the wings?**

A homologous structures
B analogous structures
C fossilized structures
D vestigial structures

35 **What type of mutation can alter DNA by the addition of a nucleotide base?**

A crossing-over
B deletion
C insertion
D base-pair substitution

36 **Which of these human activities is linked to the formation of a hole in the ozone layer?**

A deforestation
B use of coolants that contain CFCs
C burning fossil fuels
D aerobic respiration

37 **On the Galapagos Islands, Charles Darwin studied many species of finches found nowhere else in the world. Each species had developed unique structures for eating different foods. Darwin's finches are among the best examples of an evolutionary process by which new biological species arise. This process is known as**

A adaptive radiation
B speciation
C genetic drift
D magnification

Go On

38 Which types of macromolecules are common to both organisms and viruses?

A proteins and nucleic acids
B proteins and carbohydrates
C nucleic acids and carbohydrates
D lipids and proteins

39 Each scientist listed had some impact on the modern theory of evolution. Which of them had the LEAST influence on Darwin's ideas about evolution?

A Alfred Russel Wallace
B Thomas Malthus
C Charles Lyell
D Jean-Baptiste Lamarck

40 Photosynthesis is a chemical process and can be represented by a chemical equation. What are the products of this chemical process?

A water and carbon dioxide
B carbon dioxide and glucose
C glucose and oxygen
D hydrocarbons and glucose

SECTION II

41 Which of the following statements about diffusion and osmosis is true?

A Both osmosis and diffusion involve the movement of molecules from areas of lower concentration to areas of higher concentration.
B Osmosis requires energy, but diffusion does not.
C Both osmosis and diffusion involve the movement of molecules from areas of higher concentration to areas of lower concentration.
D Diffusion moves water using protein channels in cell membranes, and osmosis moves water without using protein channels.

42 Which of the following is an advantage of sexual reproduction over asexual reproduction?

A It does not require specialized sex cells.
B It requires less energy.
C It leads to greater genetic diversity in a population.
D It requires only one parent.

43 Cells have a selectively permeable membrane. What is the primary purpose of this membrane?

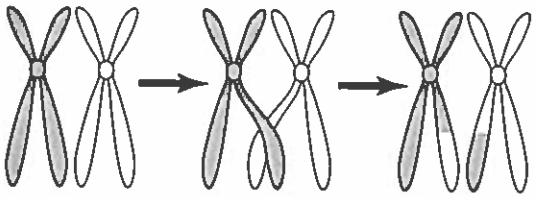
A to keep all the cytoplasm inside the cell
B to control which materials enter and leave the cell
C to allow photosynthesis
D to manufacture proteins

44 Which of these molecules provides the energy for glycolysis?

A DNA
B ATP
C amino acids
D carbon dioxide

Go On

45 **The illustration shows an example of how genetic variation can arise during meiosis.**



What process is shown in this example?

A crossing-over
B independent assortment
C fertilization
D segregation

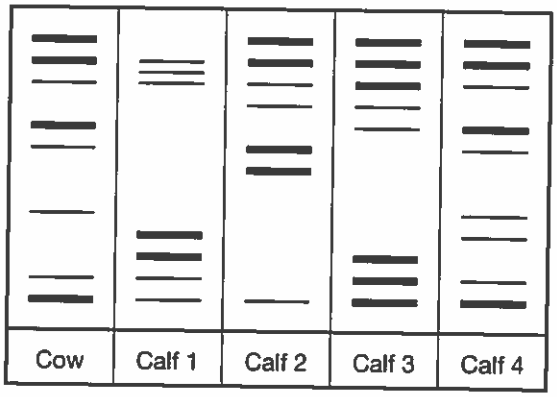
46 **Glucose is formed by plants when they carry out photosynthesis. Glucose is an example of a**

A protein
B carbohydrate
C lipid
D nucleic acid

47 **From which of the following are the other three eukaryotic kingdoms thought to have evolved?**

A Eubacteria
B Protista
C Fungi
D Plantae

48 **The picture in the first panel shows a segment of DNA from a cow. The next four panels show DNA segments from four calves.**



Which of these is MOST likely the calf of this cow?

A Calf 1
B Calf 2
C Calf 3
D Calf 4

49 **Which two bases will be present in equal numbers as a result of base pairing in DNA?**

A adenine and thymine
B guanine and adenine
C guanine and thymine
D cytosine and uracil

50 **A new type of pesticide has been developed. Which of the following will be MOST helpful to the beetle population living where the pesticide is being tested?**

A genetic variation
B speciation
C overpopulation
D the ability to fly to a new ecosystem

51 **A scientist has several types of bacteria to classify. Which of these tests will allow the scientist to correctly classify the bacteria as either Eubacteria or Archaebacteria?**

A the presence or absence of a cell membrane
B the presence or absence of peptidoglycan in the cell wall
C the presence or absence of a nucleus
D how the bacteria obtain food

52 **Study the nucleotide sequence below.**

AGTACGC

Which nucleotide sequence below represents the corresponding portion of an RNA strand formed from the sequence above?

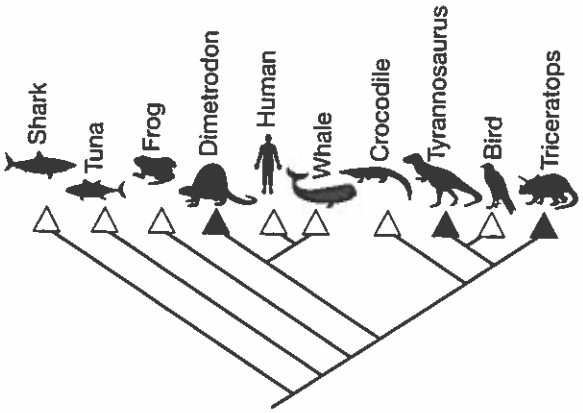
A GTACTGC
B UCAUGCG
C TCUTGCG
D GCUGACA

53 **The plants in an ecosystem produce food for most of the other organisms that live in that ecosystem. The role of a plant in its ecosystem is its**

A habitat
B niche
C mutation
D trophic level

Go On

54 **Scientists construct cladograms to show the evolutionary relationships among organisms. The branching points represent a common ancestor of two groups.**



Based on the cladogram above, which two species are MOST closely related?

A shark and tuna
B human and whale
C whale and crocodile
D shark and bird

55 **Which of the following is an advantage of sexual reproduction?**

A It requires only one parent.
B It can remove harmful traits from a population.
C It involves cells formed through mitosis.
D It increases the mutation rate.

56 **Which of Mendel's laws BEST explains why genetic variations occur in offspring resulting from sexual reproduction?**

A law of segregation
B law of dominance
C law of independent assortment
D law of crossing-over

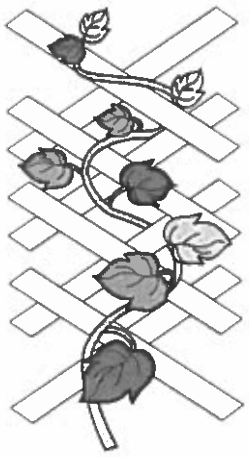
57 **How do enzymes speed up chemical reactions?**

A by raising the activation energy
B by lowering the activation energy
C by becoming part of the reaction
D by releasing proteins

58 **Which process in the water cycle is driven by biological activity?**

A precipitation
B transpiration
C evaporation
D condensation

59 **The plant shown in the picture is climbing a trellis.**



What adaptation is the plant displaying?

A learned behavior
B phototropism
C hydrotropism
D thigmotropism

60 **Which of the following nucleotides is found only in RNA?**

A adenine
B thymine
C uracil
D guanine

61 **If the producers in an ecosystem provide 100,000 kcal of energy, approximately how much of the original energy is available for the secondary consumers?**

A 100 kcal
B 1000 kcal
C 10,000 kcal
D 100,000 kcal

Go On

62 Whales are aquatic mammals. They are descended from land-dwelling mammals related to modern cattle and deer. Which of the following is a structural adaptation to living in the ocean?

A Whales are carnivorous.
B Some whales have a lifespan of more than 100 years.
C Sperm whales can hold their breath for more than an hour.
D There is a strong bond between newborn whales and their mothers.

63 Which of these processes that help maintain homeostasis in cells does NOT require energy?

A active transport
B endocytosis
C exocytosis
D osmosis

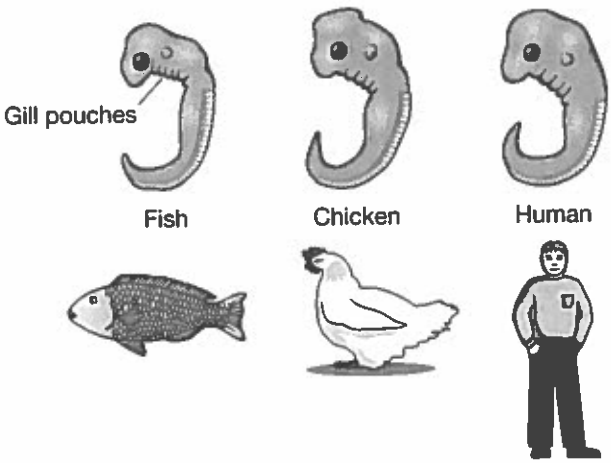
64 Major theories in science often result from the work done by many scientists over time. Much of Charles Darwin's work built upon the ideas of other scientists working in several fields. The chart below lists two of the key ideas of Darwin's theory of evolution by natural selection.

• **Organisms compete for limited natural resources.** The amount of space, food, and other resources in nature is finite. Organisms must compete for these resources.
• **Organisms produce more offspring than can survive.** Animals and plants have tremendous reproductive potential, yet most offspring are lost to predators, disease, or other factors. Relatively few survive to reproduce.

Which scientist's work MOST likely influenced Darwin in his development of these ideas?

A Thomas Malthus
B Jean-Baptiste Lamarck
C Charles Lyell
D Carolus Linnaeus

65 Use the diagram to answer question 65.



The diagram shows the embryos and the adult forms of animals from different classification groups. What do the embryos suggest about these three animals?

A The animals are not related.
B The animals share a common ancestor and are therefore related.
C Fish are more closely related to humans than are chickens.
D Fish and chickens are closely related, but humans are not related to either fish or chickens.

66 Which of the following BEST describes the evolutionary theory of punctuated equilibrium?

A Events that have occurred throughout the history of life have caused the extinction of species.
B Biological change occurs slowly and steadily over a long period of time.
C Biological change occurs quickly over a short period of time and is followed by long periods of little or no change.
D Periodically, a major catastrophe kills all forms of life. After the catastrophe, new forms of life spontaneously emerge to occupy available habitats.

67 Some eukaryote cells contain organelles called chloroplasts. In what process do chloroplasts play a role?

A respiration
B protein synthesis
C mitosis
D photosynthesis

68 In Darwin's classic observations of variation among closely related species, he noted that finches on different islands in the Pacific Ocean had different beak shapes, as shown in the illustrations.

The vegetarian finch has a strong, stout beak.

The small tree finch has a small, short beak.

The cactus finch has a long, thin beak.

Based on Darwin's evolutionary theory, which of the following statements BEST explains the differences in the beak shapes of these finches?

A The different finch species have migrated and separated to their own islands to minimize competition.
B At some point in the past, the small tree finch must have bred with the cactus finch to create the vegetarian finch species.
C Each species developed beaks that made it easier to obtain the food they most liked to eat.
D Through adaptation, the species of finches have developed beaks that are better suited to the different foods available on their island.

69 Suppose a short plant is growing close to the ground in a forest. The trees have created a thick covering of leaves and branches above the plant. Which adaptation would MOST likely help the shorter plant survive?

A shorter trunk
B wide, flat leaves
C thick roots
D thinner branches

70 Which of the following describes the relationship among organisms seeking to use the same resources?

A predator-prey relationship
B competition
C carrying capacity
D limiting factor

71 The diagram below shows a chain of amino acids.

Which type of organic compound is shown?

A protein
B carbohydrate
C nucleic acid
D lipid

72 Which of these structures is unique to viruses?

A cell wall
B cell membrane
C capsid
D chloroplast

73 Which of these organisms is MOST likely to be a pioneer species during primary ecological succession?

A alligator
B saw grass
C turtle
D moss

74 In some parts of the world, rain forests are being cut down to make land available for homes, businesses, and farms. How does the loss of these trees affect the carbon cycle?

A It causes oxygen to be added to the atmosphere.
B It decreases the amount of carbon removed from the atmosphere.
C It increases the amount of carbon removed from the atmosphere.
D It decreases the amount of fossil fuels produced.

75 How do some insects become resistant to a pesticide?

A The insects develop a method of surviving.
B Some insects have an adaptation that enables them to survive the pesticide and pass that adaptation to their offspring.
C The insects grow in habitats that protect them from pesticides.
D Pesticides change over time, becoming weaker and less effective.

76 Which of the following is a learned behavior?

A a duckling follows its mother to a pond just after hatching from its egg
B a bee collects nectar from a flower
C a cat sheds excess fur in hot weather
D a dog goes into the kitchen when it hears a can opener

Go On

77 **A paleontologist has discovered a fossil of a jawbone from a prehistoric carnivore. It is similar to other fossils found in nearby areas, but has some unique characteristics and was found in a much deeper rock layer. Which of the following is a reasonable conclusion about the fossilized animal?**

A The animal was the same species as the other fossils, but lived much more recently.
B The animal was a descendant of the other fossils, but became extinct due to poor adaptations to the environment.
C The animal was an ancestor of the other fossils.
D The animal was an unrelated carnivore that lived in the area long before the other fossils.

78 **In the cells of a living organism, enzymes control the rate of chemical reactions. Each enzyme has a specific three-dimensional shape that allows it to recognize and bind with its**

A substrate
B coenzyme
C temperature equivalent
D product

79 **Which of these substances is NOT part of cellular respiration?**

A oxygen
B DNA (deoxyribonucleic acid)
C ADP (adenosine diphosphate)
D ATP (adenosine triphosphate)

80 **Which of the following mutations is MOST likely to produce a phenotypic change in offspring that will be passed to future generations?**

A a deletion in a gene carried in the chromosomes of a somatic cell
B a substitution in a gene carried in the chromosomes of a somatic cell
C a mutation in the chromosomes of a gamete
D a mutation in the gamete that results in a fatal disease