"Practice Midterm"

Using...

End of Year Biology Practice Questions

Parent/Guardian Signature: ______________________
Part A—Multiple Choice

1. As time passes, the universe becomes
   1. more organized
   2. less organized
   3. simpler
   4. smaller

2. To maintain organization, living things need
   1. time
   2. patience
   3. money
   4. energy

3. The densest region of an atom is the
   1. space around its nucleus
   2. nucleus at its center
   3. inner electron shells
   4. outer electron shells

4. Which event is most like an electron moving from an outer shell to an inner shell?
   1. a ball rolling down a hill
   2. a fish swimming upstream
   3. a soccer ball rolling across a field
   4. a pole-vaulter rising into the air

5. All transformations of energy involve
   1. a change in height
   2. the use of sunlight
   3. the organization of atoms
   4. the movement of electrons

6. How do molecules differ from atoms?
   1. Atoms occur naturally, whereas molecules do not.
   2. Atoms are individual particles, whereas molecules are combinations of atoms.
   3. There are many different types of atoms but only a few different types of molecules.
   4. Atoms are found in living things, whereas molecules are found in nonliving things.

7. The two elements found in every organic compound are
   1. nitrogen and oxygen
   2. oxygen and hydrogen
   3. carbon and hydrogen
   4. carbon and oxygen

8. In a cell, all organelles work together to carry out

9. Which statement concerning simple sugars and amino acids is correct?
   1. They are both wastes resulting from protein synthesis.
   2. They are both needed for the synthesis of larger molecules.
   3. They are both building blocks of starch.
   4. They are both stored as fat molecules in the liver.

Refer to the diagram below to answer question 10.

10. What substance could the letter X represent?
    1. carbohydrates
    2. carbon dioxide
    3. ozone
    4. water

11. Which family of organic compounds is used mainly to store energy and to build certain materials in cells?
    1. lipids
    2. carbohydrates
    3. proteins
    4. nucleic acids

12. An iodine test of a tomato plant leaf revealed that starch was present at 5:00 p.m. on a sunny afternoon in July. When a similar leaf from the same tomato plant was tested with iodine at 6:00 a.m. the next morning, the test indicated that less starch was present. This reduction in starch content most likely occurred because starch was
1. changed directly into proteins
2. transported downward toward the roots through tubes
3. transported out of the leaves through the guard cells
4. changed into simple sugars

13. The subunits that make up proteins are
1. amino acids
2. single atoms
3. fats and lipids
4. nucleic acids

Refer to the diagram below, which provides some information about proteins, to answer question 14.

A Influences Protein shape Determines Protein function

14. Which phrase does the letter A most likely represent?
1. sequence of amino acids
2. sequence of starch molecules
3. sequence of simple sugars
4. sequence of ATP molecules

15. The subunits of DNA are called
1. amino acids
2. nucleotides
3. polysaccharides
4. cell units

16. How is RNA related to proteins?
1. Proteins are made up of RNA molecules.
2. RNA determines which proteins are made.
3. RNA is copied into DNA to build a protein.
4. DNA is copied into RNA to build a protein.

17. DNA molecules are important because they store
1. fats for energy
2. genetic information
3. carbohydrates
4. polysaccharides

18. Which of the following is not an idea of the cell theory?
1. Organisms are made up of one or more cells.
2. Cells bond together much like atoms do.
3. The cell is the basic unit of structure in all living things.
4. All cells arise from previously existing cells.

19. Which sequence represents the correct order of levels of organization found in a complex organism?
1. cells→organelles→organs→organ systems→tissues
2. organelles→cells→tissues→organs→organ systems
3. tissues→organs→organ systems→organelles→cells
4. organs→organ systems→cells→tissues→organelles

20. In terms of levels of organization, a biosphere is most like
1. a cell
2. a tissue
3. an organ
4. an organism

Refer to the diagrams of the organisms shown below to answer question 21.

Single-celled Organism A  Multicellular Organism B

21. Which statement concerning organism A and organism B is correct?
1. Organism A contains tissues and organs, while organism B lacks these structures.
2. Organism A and organism B have structures that help them maintain homeostasis.
3. Organism A and organism B have the same organs to perform their life functions.
4. Organism A lacks structures that maintain homeostasis, while organism B has them.

22. Every single-celled organism is able to survive because it carries out
1. metabolic activities
2. heterotrophic nutrition
3. autotrophic nutrition
4. sexual reproduction

Part B—Analysis and Open Ended

23. How do living things maintain the high level of organization that they need to stay alive?
24. Why is carbon particularly important for the existence of life on Earth?

25. List four important functions of organic compounds in living things.

Refer to the diagram below to answer questions 26 and 27. (Molecule shown as a straight chain.)

26. Based on the elements in glucose, and the way the atoms are attached, you could determine that glucose is an example of

1. a carbon molecule
2. a hydrogen molecule
3. an organic compound
4. an inorganic compound

27. When many of these glucose subunits join together, they make up:

1. protein molecule
2. polysaccharide
3. lipid molecule
4. DNA molecule

28. Explain why athletes need to eat lots of complex carbohydrates during training.

29. The diagram below illustrates a reaction in which

30. Identify three important characteristics of proteins. Your answer should include the following:

♦ what the subunits are that make up proteins
♦ four main functions of proteins in living things
♦ what determines structure and function of a protein

31. Hemoglobin and hair are both proteins, yet they have different structures. Explain.

32. In what way do the particular proteins in our bodies depend on our DNA?

33. In terms of levels of organization, what is the difference between a tissue and an organ; that is, how do their structures and functions differ? Give an example of each.

34. List the main levels of organization of living things, from atoms to organism.
**Part A—Multiple Choice**

1. An organism's typical life span is its
   1. body length, from head to tail
   2. time between birth and death
   3. average age when it reproduces
   4. normal population size

2. The survival of a species depends on
   1. an environment that never changes
   2. a continuously increasing life span
   3. reproduction within populations
   4. a limit of no more than two populations

3. During the first stage of the cell cycle, a cell
   1. grows in size
   2. divides in half
   3. duplicates its genetic material
   4. makes a copy of itself

4. What causes a cell to grow in size?
   1. The cell takes in other cells.
   2. The genetic material of the cell replicates.
   3. The cell divides into two parts.
   4. The cell takes in organic and inorganic materials.

5. The genetic material of the cell is most like
   1. the blueprints for a building
   2. the tracks for a train
   3. an advertisement for a store
   4. a fence for a house

6. A cell's DNA is located within structures known as
   1. mitochondria
   2. chromosomes
   3. chloroplasts
   4. cytoplasm

7. The number of chromosomes
   1. is specific for each type of organism
   2. is the same for every species of organism
   3. decreases from one generation to the next
   4. increases from one generation to the next

8. Before cell division, the genetic material must undergo a process called
   1. reduction
   2. disintegration
   3. replication
   4. reproduction

9. During the process of mitosis, the chromosomes
   1. are cut in half twice
   2. are equally divided
   3. form a circle in the cell
   4. spread through the cell

10. The diagram below represents the chromosomes in a cell. Which of the following diagrams best illustrates the daughter cells that result from the normal division of this cell?

   ![Diagram](image)

   1. diagram 1
   2. diagram 2
   3. diagram 3
   4. diagram 4

11. What happens after mitosis has occurred?
   1. The cell grows in size again.
   2. The genetic material replicates.
   3. The genetic material forms a parent cell.
   4. The cytoplasm of the cell divides in two.

12. Compared to the parent cell, each daughter cell that results from the normal mitotic division of the parent cell contains
   1. the same number of chromosomes, but different genes from those of the parent cell
   2. half the number of chromosomes, but different genes from those of the parent cell
   3. the same number of chromosomes and identical genes to those of the parent cell
   4. twice the number of chromosomes and identical genes to those of the parent cell
Chapter 16 Review

Part A—Multiple Choice

1. During sexual reproduction, the chromosomes of
   1. two separate individuals are combined together
   2. one individual are transferred to another
   3. one parent only are copied for its offspring
   4. two separate individuals are split apart

2. If each human body cell has 46 chromosomes, how many were in your very first body cell?
   1. 23 3. 92
   2. 46 4. 100

3. Most cells in the body of a fruit fly contain eight chromosomes. How many of these chromosomes were contributed by each parent of the fruit fly?
   1. 8 3. 2
   2. 16 4. 4

4. Sperm cells of the Russian dwarf hamster contain 14 chromosomes. What is the total number of chromosomes that would be found in each cell of a normal, newly formed zygote of this species?
   1. 7 3. 14
   2. 28 4. 42

5. The gamete (sex cell) for any species should always contain
   1. an even number of chromosomes
   2. the normal number of chromosomes
   3. twice the normal number of chromosomes
   4. half the normal number of chromosomes

6. The following diagram represents some events in a cell undergoing normal meiotic cell division.

   A → B → C

   Which of the following diagrams most likely represents the next cell that would result from the process shown in the diagram above?

7. Compared to human cells resulting from mitotic cell division, human cells resulting from meiotic cell division should have
   1. twice as many chromosomes
   2. one-half as many chromosomes
   3. the same number of chromosomes
   4. one-quarter as many chromosomes

8. During fertilization, the parts of the sex cells that join are the
   1. membranes
   2. nuclei
   3. ribosomes
   4. vacuoles

9. Which of these is formed during fertilization?
   1. an egg cell
   2. a sperm cell
   3. a zygote
   4. a gamete

10. Most cells in the body of a fruit fly contain eight chromosomes. In some cells, only four chromosomes are present, a condition that is a direct result of
   1. mitotic cell division
   2. embryonic differentiation
   3. meiotic cell division
   4. internal fertilization

11. Which statement best explains the significance of meiosis in the evolution of a species?
   1. Meiosis produces egg cells and sperm cells that are completely alike.
   2. Meiosis ensures the continuation of a species by asexual reproduction.
Part A—Multiple Choice

1. Genes can best be described as
   1. directions for making DNA
   2. directions for making proteins
   3. subunits of proteins
   4. molecules that transfer information out of the nucleus

2. Which path correctly describes the flow of information in cells?
   1. DNA → RNA → protein
   2. protein → RNA → DNA
   3. protein → DNA → RNA
   4. RNA → DNA → protein

3. The kinds of genes that an organism has is determined by the
   1. type of amino acids in its cells
   2. size of simple sugar molecules in its organs
   3. sequence of the subunits A, T, C, and G in its DNA
   4. shape of the protein molecules in its organelles

4. A change in the order of DNA bases that code for a respiratory protein will most likely cause
   1. the production of a starch that has a similar function
   2. a change in the sequence of amino acids determined by the gene
   3. the digestion of the altered gene by enzymes
   4. the release of antibodies by certain cells to correct the error

5. The role of messenger RNA is to
   1. prevent mutations during DNA replications
   2. match ribose-containing subunits to subunits of DNA
   3. move the information in a base sequence out to the ribosomes
   4. translate the base sequence at the ribosomes

6. RNA receives information from DNA by
   1. binding with a double helix as a third strand
   2. matching with subunits of a single strand of DNA
   3. making an exact copy of the DNA molecule
   4. accepting proteins through pores in the nuclear membrane

7. What happens at the ribosome?
   1. The DNA strands separate.
   2. RNA matches up with DNA strands.
   3. Genetic information is mutated.
   4. RNA is translated into amino acids.

8. The diagram below represents a process that occurs within a cell in the human pancreas.
   This process is known as
   ![Diagram](image)
   1. digestion by enzymes
   2. energy production
   3. protein synthesis
   4. replication of DNA

9. How many bases make up a codon?
   1. one
   2. two
   3. three
   4. four

10. What does a codon represent?
    1. a specific amino acid
    2. a specific base
    3. an RNA molecule
    4. an enzyme

11. The genetic code is
    1. different for every organism
    2. the same for all organisms
    3. constantly changing
    4. impossible to identify
People have bred animals for many different purposes, too. For example, sheep have been bred to produce more wool of better quality, turkeys have been bred to produce more white meat, chickens to lay larger eggs, cows for more milk, and pigs to produce meat that contains less fat.

**Figure 21.1** As a result of centuries of selective breeding, the small kernels of wild wheat have been transformed into the large kernels of bread wheat, which is a more useful crop for people.

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**Chapter 21 Review**

**Part A—Multiple Choice**

1. Mendel studied inheritance patterns in
   1. pink roses
   2. fruit flies
   3. Siamese cats
   4. pea plants

2. Mendel is credited with
   1. discovering the structure of DNA
   2. beginning the science of genetics
   3. recognizing the role of RNA
   4. beginning animal-breeding programs

3. An allele is a
   1. version of a gene
   2. specialized enzyme
   3. subunit of DNA
   4. three-base code

4. One of Mendel’s ideas was that
   1. alleles are responsible for mitosis
   2. alleles can cause mutations
   3. there are two alleles for each trait
   4. each gene exists as only one allele

5. In the plants Mendel studied, one allele produces purple flowers while the other produces white flowers because
   1. it depends on how the sunlight reflects off the flowers’ petals
   2. the DNA subunits at those alleles code for two different proteins

6. According to Mendel, for each trait inherited, offspring receive
   1. just one allele per cell
   2. one allele from each parent
   3. two alleles from each parent
   4. several pairs of alleles

7. How are an organism’s traits related to the environment?
   1. An organism inherits different genes depending on the environment.
   2. Genetic information is never affected by the environment.
   3. The environment can affect the expression of genetic traits.
   4. The environment affects genetic traits only in wild organisms.

8. In a particular variety of corn, the kernels turn red when exposed to sunlight. In the absence of sunlight, the kernels remain yellow. Based on this information, it can be concluded that the color of these corn kernels is due to
   1. a different type of DNA that is produced when sunlight is present
   2. the effect of sunlight on the number of chromosomes inherited
   3. a different species of corn that is produced only in sunlight
4. The effect of the environment on gene expression in the corn.

9. In Siamese cats, the fur on the ears, paws, tail, and face (that is, the extremities) is usually black or brown, while the rest of the body fur is almost white. If a Siamese cat stays indoors, where it is warm, it may grow fur that is almost white on its extremities. In contrast, if a Siamese cat mostly stays outside, where it is cold, it will grow fur that is quite dark on its extremities. The best explanation for these changes in fur color is that:

1. An environmental factor influences the expression of this inherited trait.
2. Skin cells that produce pigments have a higher mutation rate than other cells.
3. The location of pigment-producing cells determines the DNA code of the genes.
4. The alleles for fur color are mutated by interactions with the environment.

10. The diagram below represents the change in a sprouting onion bulb when sunlight is present and then when sunlight is no longer present. Which statement best explains this change?

![Diagram showing the effect of sunlight on onion bulb growth]

1. Plants need carbon dioxide to survive.
2. Plants produce hormones for growth.
3. Environmental conditions never affect genetic traits.
4. The environment can influence the expression of traits.

11. Fruit flies with the curly-wing trait will develop straight wings if kept at a temperature of 16°C during development and curly wings if kept at 25°C. The best explanation for this change in the shape of wings is that:

1. Genes for curly wings and for straight wings are found on different chromosomes.
2. Outside environment affects the expression of the genes for this trait.
3. Type of gene present in the fruit fly is dependent on environmental temperature.
4. Lower outside temperature always produces the same genetic mutation.

12. To produce large tomatoes that are resistant to cracking and splitting, some seed companies use the pollen from one variety of tomato plant to fertilize a different variety of tomato plant. This process is an example of:

1. Selective breeding
2. Direct harvesting
3. DNA sequencing
4. Plant cloning

13. Mendel experimented by carrying out selective breeding and:

1. Natural selection
2. Mathematical analysis
3. Molecular selection
4. Animal husbandry

14. Research applications of the basic principles of genetics have contributed greatly to the rapid production of new varieties of plants and animals. Which activity is an example of such an application?

1. Testing new chemical fertilizers on food crops
2. Developing new irrigation methods to conserve water
3. Selective breeding of crops that show a resistance to disease
4. Using natural predators to control insect pests

15. Which process has been used by farmers for hundreds of years to develop new animal varieties?

1. Genetic cloning
2. DNA splicing
3. Genetic engineering
4. Selective breeding

16. When humans first domesticated dogs, there was very little physical diversity in the species. Today there are many varieties, such as the German shepherd and the Boston terrier. This increase in diversity is most closely associated with:

1. Cloning of selected body cells
2. Years of mitotic cell division
3. Selective breeding for desirable traits
4. Environmental influences on inherited traits

Part B—Analysis and Open Ended

17. Even though Mendel did not know about genes, he can be called the "founder" of the science of genetics. Why?
Practice Midterm Reflection

Grade: _______

How did you do on your practice midterm? Why?

What did you find most challenging about the questions?

How do you think you could improve your grade?

Explain how you plan to study for the biology final and the end of year bio exam? (be very specific)

When should you begin preparing for the upcoming exams?