

DNA Replication 2014-15

Name: _____

Date: _____

Students are to provide an explanation for responses AND have parental/guardian signature prior to submission.

1. The discovery of which of the following has most directly led to advances in the identification of suspects in criminal investigations and in the identification of genetic diseases?

- A. antibiotics B. cell structure
C. DNA structure D. sterile procedures

2. Which sequence of DNA bases would pair with the ones shown in the partial strand below?

1 2 3
ATG TGA CAG

- A. 1 2 3
 ATG TGA CAG
B. 1 2 3
 TAC ACT GTC
C. 1 2 3
 GTA AGT GAC
D. 1 2 3
 CAT TCA CTG

3. What molecules do both DNA and RNA contain?

- A. uracil B. thymine
C. nucleotides D. deoxyribose

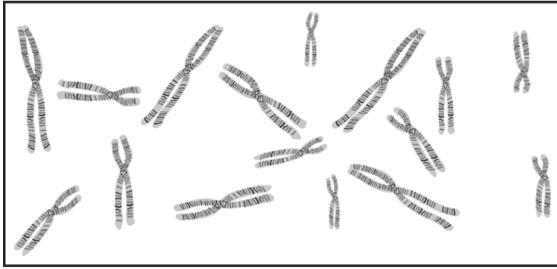
4. A chromosome is best described as a

- A. gene that has more than one form.
B. green cell found in many plants.
C. strand of DNA containing genetic information.
D. reproductive cell found in certain kinds of bacteria.

5. Which statement about DNA is correct?

- A. A child's DNA will be unrelated to the mother's or father's DNA.
B. A child's DNA will show similarities to both the mother's and father's DNA.
C. A female child's DNA will exactly match the mother's DNA.
D. A male child's DNA will exactly match the father's DNA.

6. The diagram below shows the chromosomes from a cell after they were photographed under a microscope.



Which of the following questions may *best be* answered by studying an organism's chromosomes?

- A. What sex is the organism?
 - B. Is the organism endangered?
 - C. Where is the organism's ecosystem?
 - D. How does the organism obtain its food?
7. Which of the following statements *best* describes a DNA molecule?
- A. It is a double helix.
 - B. It contains the sugar ribose.
 - C. It is composed of amino acids.
 - D. It contains the nitrogenous base uracil.

8. A mutation in which of the following types of cells could be passed on to an organism's offspring?

- A. blood
- B. egg
- C. muscle
- D. nerve

9. In a molecule of double-stranded DNA, the amount of adenine present is always equal to the amount of

- A. cytosine.
- B. guanine.
- C. thymine.
- D. uracil.

10. What is the role of hydrogen bonds in the structure of DNA?

- A. to code for proteins
- B. to synthesize proteins
- C. to separate the strands
- D. to connect the base pairs

11. A segment of a DNA strand has the following bases:

TAC GAT

What is the complementary strand of DNA?

- A. UAG CAU B. TAG CAT
C. ATG CTA D. AUG CUA

12. 5' ATCAGCGCTGGC 3'

The above sequence of DNA is part of a gene. How many amino acids are coded for by this segment?

- A. 4 B. 8 C. 12 D. 20

13. Which of the following base pair sequences could be produced in DNA replication?

- A. 5' AGTCUT 3' B. 5' AGTCAT 3' 3'
3' TCUGTA 5' TCAGTA 5'
C. 5' AGTCAT 3' 3' D. 5' AGTCAT 3' 3'
CTGACG 5' UCAGUA 5'

14. 5' G T A _____ A A 3'
3' C A T G C A T T 5'

This segment of DNA has undergone a mutation in which three nucleotides have been deleted. A repair enzyme would replace them with

- A. CGT. B. GCA. C. CTG. D. GTA.

15. Use the information below to answer the following question(s).

Scientists genetically modified a variety of corn to protect it against pests like the corn borer. The corn borer is an insect caterpillar that feeds on the corn stalk, which weakens the stalk and makes it fall over. A new gene in the genetically modified corn causes the plant to produce a chemical that is toxic to the corn borer. Some people are concerned that the genetically modified corn could harm other insects such as the monarch butterfly caterpillar. The monarch caterpillar eats leaves of milkweed plants that might be coated with toxic corn pollen. However, not all researchers agree with the concerns regarding the monarch butterfly caterpillar. They state that it is unusual for large amounts of harmful corn pollen to be found on milkweed leaves. Also, only a small percentage of caterpillars feed on the milkweed plants near corn fields.

Which was *most likely* introduced into corn that made it pest-resistant?

- A. gene B. lipid
C. toxin D. protein

16. In the nucleus of a cell, the DNA molecule functions most like
- A. a pair of scissors.
 - B. a computer memory chip.
 - C. a ballpoint pen.
 - D. a zipper.
17. Double-stranded chromosomes are produced as a direct result of the
- A. synapsis of homologous chromosomes
 - B. formation of spindle fibers
 - C. replication of chromosomes
 - D. formation of cell plates
18. What is the result of normal chromosome replication?
- A. Lost or worn out chromosomes are replaced.
 - B. Each daughter cell is provided with twice as many chromosomes as the parent cell.
 - C. The exact number of centrioles is provided for spindle fiber attachment.
 - D. Two identical sets of chromosomes are produced.

19. With respect to normal base pairing, when a molecule of DNA replicates, thymine will most likely pair with

- A. adenine
- B. cytosine
- C. guanine
- D. uracil

20. During replication, the strands of a double-stranded DNA molecule separate from each other when bonds are broken between their

- A. nitrogenous bases
- B. 5-carbon sugar
- C. phosphate groups
- D. amino acids