Name _____ Date _____ Class _____

Genetics: The Science of Heredity

Multiple Choice

Write the letter of the correct answer on the line at the left.

____ **1.** The cytoplasm is the part of the cell in which

a. DNA is located.
b. proteins are made.
c. chromosomes are located.
d. RNA is made.

____ **2.** A mutation that causes antibiotic resistance in bacteria is a(n)

a. mutation that harms the organism.
b. neutral mutation.
c. mutation that helps the organism.
d. environmental mutation.

____ **3.** The process by which the number of chromosomes is reduced by half to form sex cells is

a. protein synthesis.
b. heredity.
c. meiosis.
d. probability.

____ **4.** In the first step of protein synthesis,

a. messenger RNA attaches to a ribosome.
b. messenger RNA is made using DNA as the pattern.
c. the ribosome releases the completed protein chain.
d. transfer RNA carries a specific amino acid to the ribosome.

____ **5.** Gregor Mendel's work was the foundation for understanding why

a. the results of one genetic cross do not affect the outcome of a second cross.
b. sex cells have half the number of chromosomes as body cells.
c. protein synthesis occurs in the cytoplasm.
d. offspring have traits similar to those of their parents.

____ **6.** In the genetic code, a group of three nitrogen bases codes for the attachment of a specific

a. messenger RNA.
b. protein.
c. transfer RNA.
d. amino acid.

____ **7.** For codominant traits, heterozygous organisms have a phenotype that shows

a. both alleles.
b. only the recessive allele.
c. neither the dominant nor the recessive allele.
d. only the dominant allele.

____ **8.** During meiosis, sex cells form when chromosome pairs are
- **a.** doubled.
- **b.** copied.
- **c.** separated.
- **d.** combined.

____ **9.** An organism's phenotype is its
- **a.** physical appearance.
- **b.** genetic makeup.
- **c.** allele combination.
- **d.** probability of occurring.

____ **10.** An allele whose trait always shows up in an organism when the allele is present is a
- **a.** gene.
- **b.** dominant allele.
- **c.** recessive allele.
- **d.** hereditary factor.

Completion

Fill in the line to complete each statement.

11. According to the chromosome theory of inheritance, _____ are carried from parents to offspring on chromosomes.

12. A _____ is a change in a gene or chromosome.

13. When a plant has two dominant alleles for tall stems, its alleles are written as _____.

14. A(n) _____ organism is the offspring of many generations that have the same trait.

15. The different forms of a gene are called _____.

True or False

If the statement is true, write true. *If it is false, change the underlined word or words to make the statement true.*

_____ **16.** Each time a coin is tossed, there is a <u>75 percent</u> chance that the coin will land heads up.

_____ **17.** Chromosomes are made up of <u>proteins</u> joined together like beads on a string.

_____ **18.** The passing of traits from parents to offspring is called <u>codominance</u>.

_____ **19.** Unlike DNA, RNA contains the nitrogen base <u>uracil</u>.

_____ **20.** <u>Probability</u> is a number that describes how likely it is that an event will happen.

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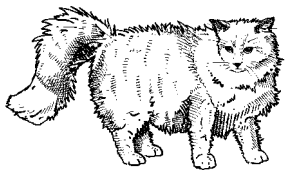
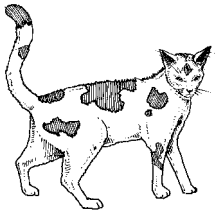
Using Science Skills

Use the diagram below to answer questions 21–23. Write your answers in the spaces provided.

Inheritance of Hair Length in Cats

H = Short hair
h = Long hair





Sperm \ Eggs	h	h
H	Hh	Hh
h	hh	hh

21. Classifying What are the genotypes of the offspring? What are their phenotypes?

_____

_____

22. Calculating What percentage of the offspring will have short hair? What percentage will have long hair?

_____

_____

23. Applying Concepts Suppose the heterozygous short-haired cat parent was replaced with a homozygous short-haired cat. What would be the genotypes of the offspring? What would be their phenotypes?

_____

_____

Essay

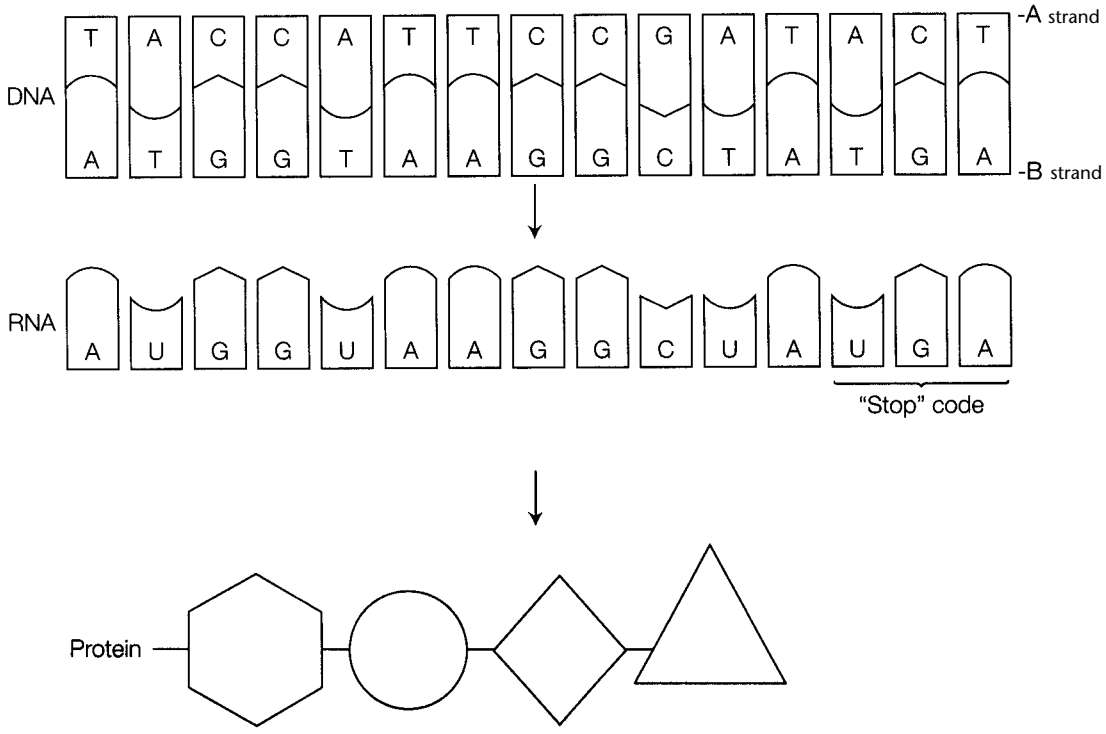
Write an answer for each of the following on a separate sheet of paper.

24. Describe what occurs during the process of protein synthesis.

25. Green (*G*) is the dominant color for pods in pea plants. Yellow (*g*) is recessive. Is it possible to have a heterozygous yellow pod? Explain.

Using Science Skills

Use the figure below to answer questions 26–28. Write your answers in the spaces provided.



26. Applying Concepts What process is illustrated in the figure above?

_____

27. Inferring Which strand of the DNA molecule, A or B, was used to produce the messenger RNA? Explain your answer.

_____

_____

28. Interpreting Diagrams What three-letter code tells that the protein is complete?

_____

Essay

Write an answer for each of the following questions on a separate sheet of paper.

29. Why is messenger RNA necessary for protein synthesis?

30. Explain how you could determine whether the seeds in a packet of round pea seeds have the genotype *RR* or *Rr,* in which *R* represents round seeds and *r* represents wrinkled seeds.