Name _____ Date _____ Class _____

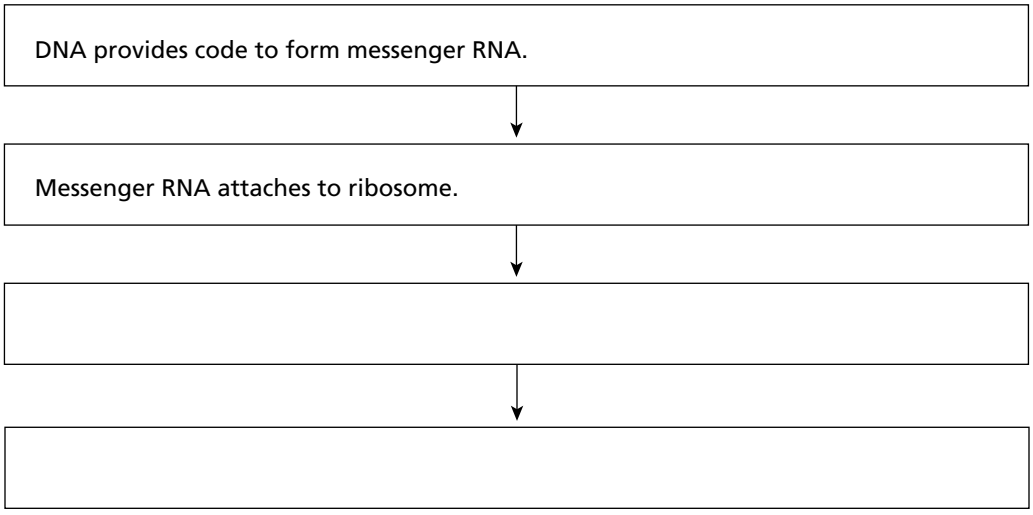
The DNA Connection

This section tells how the DNA molecule is related to genes, chromosomes, and the inheritance of traits.

Use Target Reading Skills

As you read, complete the flowchart below to show protein synthesis. Put the steps of the process in separate boxes in the flowchart in the order in which they occur.

Protein Synthesis



The Genetic Code

1. Circle the letter of each sentence that is true about genes, chromosomes, and proteins.

- **a.** Genes control the production of proteins in an organism's cells.
- **b.** Proteins help determine the size, shape, and other traits of an organism.
- **c.** Chromosomes are made up mostly of proteins.
- **d.** A single gene on a chromosome contains only one pair of nitrogen bases.

2. A DNA molecule is made up of these four nitrogen bases.

a. _____ b. _____

c. _____ d. _____

The DNA Connection *(continued)*

3. What is the genetic code?

_____

_____

_____

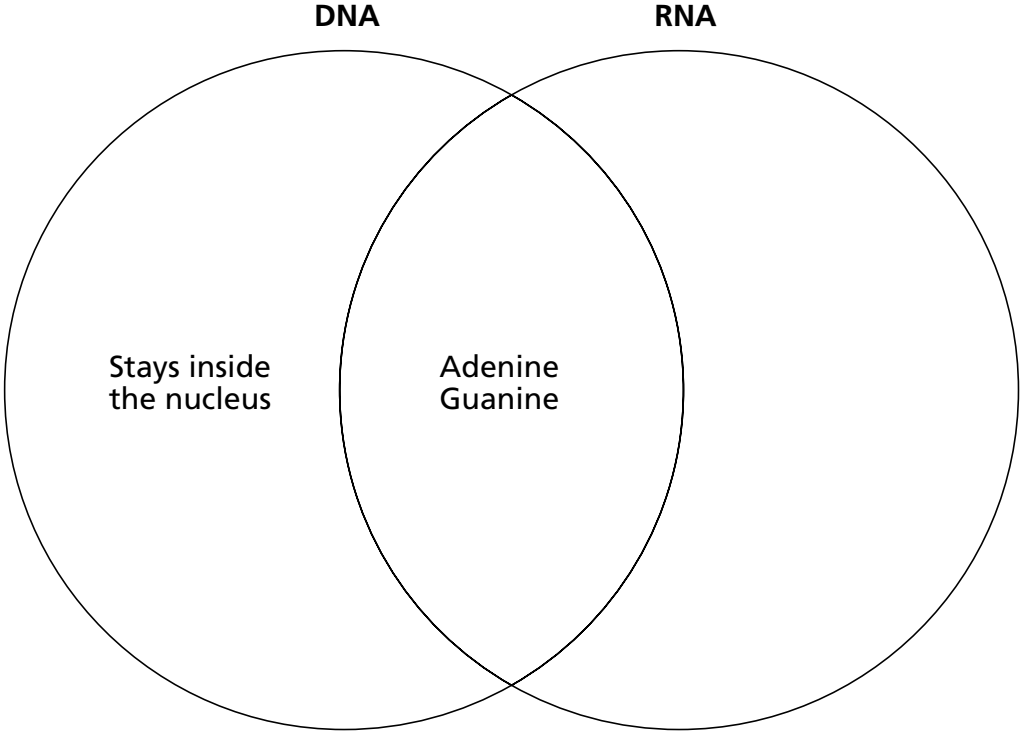
4. One group of three nitrogen bases codes for one _____.

How Cells Make Proteins

5. During protein synthesis, the cell uses information from a _____ on a chromosome to produce a specific _____.

6. Proteins are made on _____ in the cytoplasm of the cell.

7. Complete this Venn diagram to show some of the similarities and differences between DNA and RNA. Tell where each nucleic acid is located and what bases it contains.



8. List the two kinds of RNA and tell their jobs.

a. _____

_____

_____

b. _____

_____

_____

9. Circle the letter of the first step in protein synthesis.

a. Transfer RNA carries amino acids to the ribosome.
b. The ribosome releases the completed protein chain.
c. Messenger RNA enters the cytoplasm and attaches to a ribosome.
d. DNA "unzips" to direct the production of a strand of messenger RNA.

10. Circle the letter of the last step in protein synthesis.

a. Transfer RNA carries amino acids to the ribosome.
b. The protein chain grows longer as each transfer RNA molecule adds an amino acid.
c. Messenger RNA enters the cytoplasm and attaches to a ribosome.
d. DNA "unzips" to direct the production of a strand of messenger RNA.

Mutations

11. What is a mutation?

_____

_____

_____

12. How can mutations affect protein synthesis in cells?

_____

_____

_____

_____

The DNA Connection *(continued)*

13. Circle the letter of each sentence that is true about mutations.

a. Cells with mutations will always make normal proteins.
b. Some mutations occur when one nitrogen base is substituted for another.
c. Some mutations occur when chromosomes don't separate correctly during meiosis.
d. Mutations that occur in a body cell can be passed on to an offspring.

14. Mutations can be a source of genetic _____.

15. Is the following sentence true or false? All mutations are harmful.

_____

16. Mutations that are _____ improve an organism's chances for survival and reproduction.

17. Whether a mutation is harmful or helpful depends partly on an organism's _____.