Name _____ Class_____Date_____

ACTIVE READING WORKSHEETS

PROCESS OF MEIOSIS

Meiosis

Read the passage below, which covers topics from your textbook. Answer the questions that follow.

Meiosis is a process of nuclear division that reduces the number of chromosomes in new cells to half the number in the original cell. In animals, meiosis produces haploid reproductive cells called gametes. Human gametes are sperm cells and egg cells, each of which contains 23 (1*n*) chromosomes. The fusion of a sperm and egg results in a zygote that contains 46 (2*n*) chromosomes. Cells begin meiosis with a duplicate set of chromosomes, just as cells beginning mitosis do. Because cells undergoing meiosis divide twice, diploid (2*n*) cells that divide meiotically result in four haploid cells (1*n*) rather than two diploid (2*n*) cells.

The stages of the first cell division are called meiosis I, and the stages of the second cell division are called meiosis II. During the first stage of meiosis I, prophase I, DNA coils tightly into chromosomes and spindle fibers appear. Then the nuclear membrane and nucleolus disassemble, and every chromosome lines up next to its homologue. This pairing of homologous chromosomes is called **synapsis**. During synapsis, the chromatids within a homologous pair twist around one another. Portions of chromatids may break off and attach to adjacent chromatids on the homologous chromosome—a process called **crossing-over**. This process permits the exchange of genetic material between maternal and paternal chromosomes. Thus, crossing-over results in **genetic recombination** by producing a new mixture of genetic material.

In a cause-and-effect relationship, one event, or cause, triggers a second event, or effect, to occur. Listed below are exercises with cause-and-effect relationships. Complete each relationship with the missing event.

SKILL: Recognizing Cause-and-Effect Relationships

1. Cause: In humans, meiosis produces haploid reproductive cells called gametes.

   Effect:_____

2. Cause:_____

   Effect: A zygote contains 46 chromosomes.

3. Cause: During synapsis, chromatids within a homologous pair may twist around one another.

   Effect:_____

4. Cause:_____

   Effect: A new mixture of genetic material results in genetic recombination.

Read the question and write your answer in the space provided.

SKILL: Vocabulary Development

5. The term *synapsis* comes from a Greek word meaning "point of contact." How is the term *synapsis* related to its Greek word of origin?

   _____

   _____

   _____

Circle the letter of the phrase that best completes the statement.

6. During prophase I,
   a. DNA coils into chromosomes.
   b. spindle fibers appear.
   c. gametes fuse.
   d. Both (a) and (b)

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ACTIVE READING WORKSHEETS

FUNDAMENTALS OF GENETICS

Genetic Crosses

Read the passage below, which covers topics from your textbook. Answer the questions that follow.

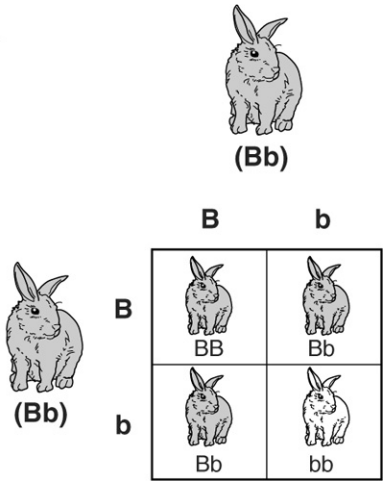
Biologists use a diagram called a **Punnett square** to aid them in predicting the probable distribution of inherited traits in the offspring.

In rabbits, the allele for black coat color (*B*) is dominant over the allele for brown coat color (*b*). The Punnett square below shows the predicted results of crossing two rabbits that are both heterozygous (*Bb*) for coat color. As you can see, 1/4 (25 percent) of the offspring are predicted to have the genotype *BB*, 1/2 (50 percent) are predicted to have the genotype *Bb*, and 1/4 (25 percent) are predicted to have the genotype *bb*. Thus, 3/4 (75 percent) of the offspring resulting from this cross are predicted to have a black coat. One-fourth (25 percent) of the offspring are predicted to have a brown coat. The ratio of the genotypes that appear in offspring is called the **genotypic ratio**. The ratio of the offspring's phenotypes is called the **phenotypic ratio.**

Read each question and write your answer in the space provided.

SKILL: Interpreting Graphics

1. The figure below is a Punnett square. Using the information provided in the passage and the figure, answer the questions that follow.



a. What is the purpose of this figure?

_____

b. The passage states that both parents are heterozygous for coat color. What does this statement mean?

_____

_____

c. How can you use the information in the figure to determine the coat color of the parents?

_____

_____

d. What are the genotypes of predicted homozygous offspring?

_____

_____

e. What is the probable genotypic ratio of the cross represented in the graphic?

_____

f. What is the probable phenotypic ratio of the cross represented in the graphic?

_____

Read the question and write your answer in the space provided.

SKILL: Vocabulary Development

2. The prefix *pheno-* is derived from a Greek term meaning "to show." How does knowledge of this word part aid in decoding the term *phenotype*?

_____

_____

_____

Circle the letter of the word or phrase that best completes the statement.

3. Another Punnett square yielded 2 black: 2 brown. This is an example of a
   a. genotypic ratio.
   b. probability equation.
   c. percentage.
   d. phenotypic ratio.