

Probability and Heredity (pages 118–123)

Principles of Probability (pages 118–119)

Key Concept: Probability is a number that describes how likely it is that an event will occur.

- **Probability** is a number that tells how likely it is that something will happen.
- In a coin toss, the coin will land either tails up or heads up. Each event is equally likely to occur.
- The probability that the coin will land heads up is one event in two possible events, or 1 in 2.
- A 1 in 2 probability can be described as a fraction, $1/2$. It can also be described as a percent—50 percent.
- Probability predicts what is likely to occur, not what will actually occur. If you tossed a coin 20 times, you might expect the coin to land heads up 10 times and tails up 10 times. Your actual tosses will likely be different.
- The more coin tosses you make, the closer your actual results will be to the results predicted by probability.
- Each coin toss is an independent event. That is, one coin toss does not affect the results of the next coin toss.

Answer the following questions. Use your textbook and the ideas above.

1. Circle the letter of each sentence that is true about probability.
 - a. In a coin toss, the coin will land heads up most of the time.
 - b. Probability predicts what events will actually occur.
 - c. One coin toss does not affect the results of the next coin toss.

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2. What is the probability that a tossed coin will land tails up? Circle the letter of the correct answer.
- a. 1 in 2
 - b. 2 in 1
 - c. 1 in 4

Probability and Genetics (pages 120–121)

Key Concept: In a genetic cross, the allele that each parent will pass on to its offspring is based on probability.

- A **Punnett square** is a chart that shows all the possible combinations of alleles that can occur in a genetic cross. Geneticists use Punnett squares to predict the results of a cross.
- The boxes in a Punnett square represent the possible combinations of alleles that offspring can inherit from their parents.
- You can use a Punnett square to find the probability that offspring will have a certain combination of alleles.
- In a cross between two hybrid pea plants with round seeds (Rr), the Punnett square gives four possible combinations of alleles in the offspring. These combinations are RR , two Rr , and rr .

Answer the following questions. Use your textbook and the ideas above.

3. Fill in the Punnett square to show the possible allele combinations from a cross between two hybrid pea plants with round seeds (Rr).

	R	r
R	RR	a. _____
r	Rr	b. _____

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4. In the cross between two hybrid pea plants with round seeds (Rr), what is the probability that a pea plant will have seeds that are wrinkled (rr)? Circle the letter of the correct answer.
- 3 in 4, or 75 percent
 - 2 in 4, or 50 percent
 - 1 in 4, or 25 percent

Phenotypes and Genotypes (page 122)

Key Concept: An organism's phenotype is its physical appearance, or visible traits. An organism's genotype is its genetic makeup, or allele combinations.

- **Phenotype** (FEE noh typ) is the way an organism looks. You can see that pea pods are smooth. Smooth pea pods is a phenotype.
- **Genotype** (JEN uh typ) is the genetic makeup, or combination of alleles in an organism. The genotype for smooth pea pods can be either SS or Ss .
- An organism that has two of the same alleles for a trait is **homozygous** (hoh moh ZY gus). A pea plant with smooth pods is homozygous when its genotype is SS . A pea plant with pinched pods is always homozygous, ss .
- An organism with two different alleles for a trait is **heterozygous** (het ur oh ZY gus). A hybrid plant is heterozygous. A pea plant with smooth pods is heterozygous when it has the alleles Ss .

Answer the following questions. Use your textbook and the ideas above.

5. Circle the letter of the homozygous genotype.
- Ss
 - SS
 - smooth pea pods

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6. Draw a line from each term to its meaning.

Term	Meaning
phenotype	a. an organism with two different alleles for a trait
genotype	b. the way an organism looks
heterozygous	c. an organism with two of the same alleles for a trait
homozygous	d. an organism's genetic makeup

Codominance (page 123)

Key Concept: In codominance, the alleles are neither dominant nor recessive. As a result, both alleles are expressed in the offspring.

- Not all alleles for a trait are simply dominant or recessive.
- In **codominance**, the alleles are neither dominant nor recessive. Neither allele is hidden by the other allele. The phenotypes of both alleles can be seen in the offspring with both alleles, which are the heterozygous offspring.

Answer the following question. Use your textbook and the ideas above.

7. Circle the letter of each sentence that is true about codominance.
- All traits have either dominant or recessive alleles.
 - Heterozygous offspring show the phenotype for both alleles.
 - One allele is hidden by the other allele.