PUNNETT SQUARES— CROSSES INVOLVING ONE TRAIT

Name _____

In a certain species of animal, black fur (B) is dominant over brown fur (b). Using the following Punnett square, predict the genotypes and phenotypes of the offspring whose parents are both Bb or have heterozygous black fur.

	B	b
B		
b		

Genotypes: _____% homozygous black fur (BB)
_____% heterozygous black fur (Bb)
_____% homozygous brown fur (bb)

Phenotypes: _____% black fur
_____% brown fur

Now do the same when one parent is homozygous black and the other is homozygous brown.

Genotypes: _____% homozygous black fur (BB)
_____% heterozygous black fur (Bb)
_____% homozygous brown fur (bb)

Phenotypes: _____% black fur
_____% brown fur

Repeat this process again when one parent is heterozygous black and the other is homozygous brown.

Genotypes: _____% homozygous black fur (BB)
_____% heterozygous black fur (Bb)
_____% homozygous brown fur (bb)

Phenotypes: _____% black fur
_____% brown fur

Monohybrid Crosses

Alleles

B= Black Coat

b= Brown Coat

Ex. 1 Homozygous Black x Homozygous Brown

Genotype % Phenotype %

Ex. 2 Homozygous Brown x Heterozygous for color

Genotype % Phenotype %

Ex. 3 Heterozygous for color x Heterozygous for color

Genotype % Phenotype %

Ex. 4 Testcross: Homozygous Recessive x Unknown(Homozygous or Heterozygous)

Genotype % Phenotype %

NAME _____ DATE _____ CLASS _____

CHALLENGE Chapter 15

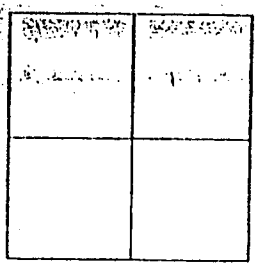
Incomplete Dominance

Incomplete dominance occurs when two inherited traits combine and produce a third trait. When working problems with incomplete dominance, small letters are not used in the Punnett square. Instead, all traits are represented by capital letters. For example, black Andalusian chickens have BB genes for feather color. White Andalusian chickens have WW genes for feather color. Blue Andalusian chickens have BW genes for feather color.

A. Feather Color of Andalusian Chickens

Use the information in the paragraph above to complete the following Punnett squares. Determine what percentage of the offspring will have each feather color.

1. Determine the genes of offspring of one black and one white Andalusian chicken.

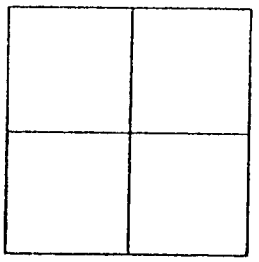


% of offspring with black feathers _____

% of offspring with white feathers _____

% of offspring with blue feathers _____

2. Determine the genes of offspring of two blue Andalusian chickens.

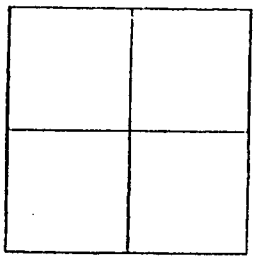


% of offspring with black feathers _____

% of offspring with white feathers _____

% of offspring with blue feathers _____

3. Determine the genes of offspring of one blue and one white Andalusian chicken.



% of offspring with black feathers _____

% of offspring with white feathers _____

% of offspring with blue feathers _____

4. How might the term *codominant* describe the action of genes in an incomplete dominance trait?

_____

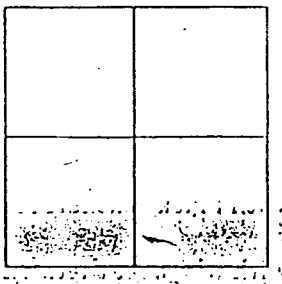
NAME _____ DATE _____ CLASS _____

B. Coat Color of Shorthorn Cattle

Use the information below to complete the following Punnett squares. Determine what percentage of the offspring will have each coat color.

Red shorthorn cattle have RR genes.
White shorthorn cattle have WW genes.
Roan shorthorn cattle have RW genes.

1. Determine the genes of offspring of one red and one roan parent.

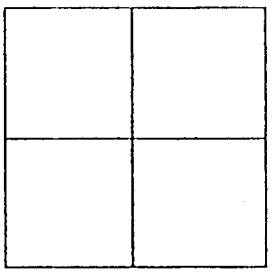


% of offspring with red coats _____

% of offspring with white coats _____

% of offspring with roan coats _____

2. Determine the genes of offspring of two roan parents.



% of offspring with red coats _____

% of offspring with white coats _____

% of offspring with roan coats _____

C. Petal Color of Four O'Clocks

Petal color of four o'clocks is inherited by incomplete dominance. Plants with RR genes have red flowers. Plants with FF genes have white flowers. Plants with RF genes have pink flowers.

1. Sarah planted four o'clocks in her garden. All the seeds came from one set of parent plants. When the flowers bloomed, Sarah saw that all her flowers were pink. What were the genes of the parent plants?

_____

_____

2. Matthew also planted four o'clocks. All of his seeds came from one set of parents. When his plants bloomed, 50% were white and 50% were pink. What were the genes of the parent plants?

_____

_____

3. When Sarah went to plant her garden the following year, she decided that she wanted more colors of four o'clocks than just pink. She decided that she wanted 25% red flowers, 25% white flowers, and 50% pink flowers. What genes must the parent plants have to produce offspring in these percentages?

_____

_____