Name: _____ Date: _____

SKILL and PRACTICE 11.2

Punnett Squares

READ

A punnett square helps scientists predict the possible genotypes and phenotypes of offspring when they know the genotypes of the parents. The *phenotype* is the physical appearance of an organism and the *genotype* is the inherited combination of alleles.

EXAMPLE

In rabbits, black fur is dominant to white fur. If you cross a **BB** male with a **Bb** female, what are the possible genotypes and phenotypes of the offspring?

To solve the problem, write the alleles of one parent across the top and the alleles of the other parent along the left side. Then, fill in the squares. Each box represents one of the possible genotypes of the offspring.

	B	**B**
B	**BB**	**BB**
b	**Bb**	**Bb**

BB appears in 2 out of 4 squares. This means that there is a 50% for a genotype of **BB**. **Bb** also appears in 2 out of 4 squares, or 50%. The genotype BB (two dominant alleles) will produce only black rabbits. The genotype Bb (one dominant and one recessive allele) will also produce black rabbits, because the dominant trait hides the recessive trait. Therefore the phenotype of the offspring will be 100% black. It is easier to interpret a punnett square if you fill in a table like this one:

Genotype	Phenotype	Chance
BB	Black fur	50%
Bb	Black fur	50%

SKILL and PRACTICE 11.2

PRACTICE

1. In pea plants, tall height is dominant to short height. If a **TT** pea plant fertilizes a **Tt** pea plant, what are the possible genotypes and phenotypes and the chances for each?

	T	**T**
T		
t		

Fill in the table:

Genotype	Phenotype	Chance

2. Having dimples is a dominant trait in humans. If the mother and father both are **Dd** for dimples, what are the possible genotypes and phenotypes of their children?

	D	**d**
D		
d		

Fill in the table:

Genotype	Phenotype	Chance

SKILL and PRACTICE 11.2

3. Suppose a man with no dimples marries a woman with **Dd** for dimples. What are the possible genotypes and phenotypes of their children?

	d	**d**
D		
d		

Fill in the table:

Genotype	Phenotype	Chance

4. Phenylketonuria (PKU) is a genetic disorder in which a person cannot use the amino acid phenylalanine. It is carried by a recessive allele. Individuals with PKU must follow a strict diet that is low in phenlyalanine.
Let PP = normal, Pp = carrier, and pp = PKU.
Suppose a man who is a carrier marries a woman who is also a carrier. What are the chances that they will have a child with PKU?

Fill in the table:

Genotype	Phenotype	Chance