Introduction to Punnett Squares

Name _____ **Pd** _____ **Date** _____

Punnett Square – a tool developed by Reginald C. Punnett to determine the probability of offspring having a particular genotype.

Example Problem: What are the possible offspring and probability of each offspring of a cross between a tulip with yellow flowers (Yy) and a tulip with white flowers (yy)

Completing a Punnett Square:

1. **Read the problem and identify the parents'.**

2. **Determine the genotypes of the parents. Assign a letter to represent the dominant and recessive alleles if necessary.**

3. **Draw a Punnett Square, and Place the genotypes of the parents at the appropriate place on the Punnett Square.**

4. **Complete the cross by matching one allele from each parent to determine the possible genotypes of the offspring, do this for each possible allele, until the Punnett Square is filled in. (As a general rule, the capital letter, when present, is always written first.)**

5. **Use your results of the Punnett Square to write the genotypes and phenotypes of the offspring along with their probability.**
   Probability can be written as a ratio (2 out of 4) or a percentage (50%)

Example Problem: What are the chances of having a baby white rhinoceros for a cross of a male black rhinoceros that is homozygous dominant with a female white rhinoceros which is homozygous recessive. Black skin pigment is dominant over white skin pigment in rhinoceroses.

1. **Read the problem and identify the parents'.**

2. **Determine the genotypes of the parents. Assign a letter to represent the dominant and recessive alleles if necessary.**

3. **Draw a Punnett Square, and Place the genotypes of the parents at the appropriate place on the Punnett Square.**

4. **Complete the cross by matching one allele from each parent to determine the possible genotypes of the offspring, do this for each possible allele, until the Punnett Square is filled in. (As a general rule, the capital letter, when present, is always written first.)**

5. **Use your results of the Punnett Square to write the genotypes and phenotypes of the offspring along with their probability.**
   Probability can be written as a ratio (2 out of 4) or a percentage (50%)

Punnett Square Worksheet

Directions: Complete the following problems. Fill in the Punnett square, and then list the offspring genotypes and phenotypes and number of each.

Example) A green pea plant (GG) is being crossed with a green pea plant (Gg).

	G	G
G	GG	GG
g	Gg	Gg

GG=2/4=50% Gg=2/4=50%

Green pea plants = 4/4 = 100%

1) A green pea plant (Gg) is crossed with a yellow pea plant (gg).

2) A tall plant (TT) is crossed with a tall plant (Tt).

3) A red flower (Rr) is crossed with a red flower (Rr).

4) A white flower (rr) is crossed with a white flower (rr).

5) A black chicken (BB) is crossed with a black chicken (BB).

Directions: Complete the following problems. List the parent genotypes, draw and fill in a Punnett square, and then list the offspring genotypes and phenotypes and number of each.

1. A homozygous dominant brown mouse is crossed with a heterozygous brown mouse (tan is the recessive color).

2. Two heterozygous white rabbits are crossed (brown fur is recessive).

3. Two heterozygous red flowers are crossed (white flowers are recessive).

4. A homozygous tall plant is crossed with a heterozygous tall plant (short is the recessive size).

5. A heterozygous blue bird is crossed with a homozygous grey bird.