

Topic: Punnett Squares Worksheet – Pea Plant Genetics

Summary: Students will learn about the genotypes, phenotypes, and probabilities by completing Punnett squares for different characteristics of pea plants.

Goals & Objectives: Students will be able to determine the probability of different crosses. Students will be able to recognize the differences between inheritance patterns.

NGSS Standards: *HS-LS3-3.* Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

Time Length: 20 minutes

Prerequisite Knowledge: Students know how to complete a Punnett square for dominant and recessive traits. Students know vocabulary words like homozygous, heterozygous, dominant, recessive, genotype and phenotype. Students know how to calculate simple percentages.

Materials:

Calculators

Class notes or textbook or online textbook:

- <https://flexbooks.ck12.org/cbook/ck-12-biology-flexbook-2.0/section/3.5/primary/lesson/probability-and-inheritance-bio/>
- <https://flexbooks.ck12.org/cbook/ck-12-biology-flexbook-2.0/section/3.6/primary/lesson/punnett-squares-bio/>

Procedures:

1. Students work on the handout by themselves.

Accommodations: Students with an IEP can take the handout home if they need extra time, and/or do the even-numbered questions.

Editable DOCX File and Answer Key:

Available at www.ngsslifescience.com

Punnett Squares Worksheet - Pea Plant Genetics

1) Yellow seeds are dominant over green seeds in pea plants. Fill in the Punnett square and determine the expected genotypes and phenotypes along with the probabilities from crossing homozygous recessive and homozygous dominant parents.

F₁ generation

Possible genotypes of offspring: _____

Possible phenotypes of offspring: _____

Percentage of offspring that are yellow: _____% green: _____%

% of offspring that are homozygous dominant: _____%

heterozygous: _____% homozygous recessive: _____%

If there were 100 seeds collected, predict how many would be yellow? _____, green? _____

Predict how many seeds would be homozygous dominant? _____, heterozygous? _____,

homozygous recessive: _____

2) Green pod color is dominant over yellow pod color in pea plants. Fill in the Punnett square and determine the probabilities from crossing homozygous dominant and heterozygous parents.

Possible Genotypes: _____

% of offspring that will be green? _____% and be yellow? _____%

% of offspring that are homozygous dominant: _____%

heterozygous: _____% homozygous recessive: _____%

If there were 200 seeds collected, predict how many would be green? _____, yellow? _____

Predict how many seeds would be homozygous dominant? _____, heterozygous? _____,

homozygous recessive: _____

3) Round seeds are dominant over wrinkled seeds in pea plants. Fill in the Punnett square and determine the expected probabilities from crossing homozygous recessive and heterozygous parents.

Possible Phenotypes: _____

% of offspring that will be green? _____% and be yellow? _____%

% of offspring that are homozygous dominant: _____%

heterozygous: _____% homozygous recessive: _____%

If there were 3500 seeds collected, predict how many would be round? _____, wrinkled? _____

Predict how many seeds would be homozygous dominant? _____, heterozygous? _____,

homozygous recessive: _____

4) Smooth pod shape is dominant over constricted pod shape in pea plants. Fill in the Punnett square and determine the probabilities from crossing homozygous recessive and homozygous dominant parents.

Possible Genotypes: _____

% of offspring that will be smooth? _____% and be constricted? _____%

% of offspring that are homozygous dominant: _____%

heterozygous: _____% homozygous recessive: _____%

If there were 400 seeds collected, predict how many would be smooth? _____, constricted? _____

Predict how many seeds would be homozygous dominant? _____, heterozygous? _____,

homozygous recessive: _____

5) Tall pea plants are dominant over short pea plants. Fill in the Punnett square and determine the expected probabilities from crossing heterozygous and heterozygous dominant parents.

Possible Phenotypes: _____

% of offspring that will be tall? _____% and be short? _____%

% of offspring that are homozygous dominant: _____%

heterozygous: _____% homozygous recessive: _____%

If there were 224 seeds collected, predict how many would be tall? _____, short? _____

Predict how many seeds would be homozygous dominant? _____, heterozygous? _____,

homozygous recessive: _____

6) The axial flower position is dominant over the terminal flower position. Fill in the Punnett square and determine the expected genotypes and phenotypes along with the probabilities from crossing heterozygous and homozygous dominant parents.

Possible Genotypes: _____

Possible Phenotypes: _____

% of offspring that will be axial? _____% and be terminal? _____%

% of offspring that are homozygous dominant: _____%

heterozygous: _____% homozygous recessive: _____%

If there were 1176 seeds collected, predict how many would be axial? _____, terminal? _____

Predict how many seeds would be homozygous dominant? _____, heterozygous? _____,

homozygous recessive: _____