LESSON MAKER PRO

Pea Plant Predictions

Use genetic crosses to predict inherited traits.

GRADE 8 · L.8.2B

L.8.2B "Students will demonstrate an understanding of the differences in inherited and acquired characteristics and how environmental factors (natural selection) and the use of technologies (selective breeding..."

NAME _____ DATE _____

THE BIG IDEA

An offspring gets one allele from each parent. In a simple dominant/recessive cross, a dominant trait appears when the offspring has at least one dominant allele. A Punnett square shows the possible allele pairs, and each box represents an equally likely outcome.

WORKED EXAMPLE

In a fictional beetle species, spotted shells (S) are dominant to plain shells (s). Two beetles with genotype Ss have offspring. What fraction of their offspring are predicted to have spotted shells?

SS X SS

	S	**s**
S	SS	Ss
s	Ss	ss

1. Each parent can pass on S or s.
2. The four possible pairs are SS, Ss, Ss, and ss.
3. Three of the four pairs contain S, so three outcomes produce spotted shells.

Answer: 3/4

PRACTICE 6 problems

1 In pea plants, purple flowers (P) are dominant to white flowers (p). Use the Punnett square for a Pp x pp cross. What percent of the offspring are predicted to have purple flowers?

PP X PP

	P	**p**
p	Pp	pp
p	Pp	pp

ANSWER _____

2 In pea plants, tall stems (T) are dominant to short stems (t). Use the Punnett square for a Tt x Tt cross. What percent of the offspring are predicted to have short stems?

TT X TT

	T	**t**
T	TT	Tt
t	Tt	tt

ANSWER _____

3 In pea plants, round seeds (R) are dominant to wrinkled seeds (r). A plant with genotype RR is crossed with a plant with genotype rr. What genotype is predicted for every offspring?

ANSWER _____

4 In pea plants, green pods (G) are dominant to yellow pods (g). Use the Punnett square for a Gg x GG cross. What percent of the offspring are predicted to have green pods?

GG X GG

	G	**g**
G	GG	Gg
G	GG	Gg

ANSWER _____

5 In pea plants, yellow seeds (Y) are dominant to green seeds (y). Two plants with genotype Yy are crossed. What percent of the offspring are predicted to have genotype Yy?

ANSWER _____

6 In pea plants, purple flowers (P) are dominant to white flowers (p). A purple-flowered plant is crossed with a white-flowered plant (pp). One offspring has white flowers. What must the purple-flowered parent's genotype be?

ANSWER _____

APPLY IT Show your work

1 The school garden club crosses two pea plants with round seeds. Both plants have genotype Rr, where round seeds (R) are dominant to wrinkled seeds (r). If the club grows 32 seeds from this cross, how many plants are predicted to produce wrinkled seeds?

WORK SPACE

ANSWER _____

2 Students are growing purple-flowered pea plants for a school plant sale. They cross a Pp plant with a pp plant, where purple flowers (P) are dominant to white flowers (p). If 24 seeds grow, how many plants are predicted to have purple flowers?

WORK SPACE

ANSWER _____

CHALLENGE One step up

In pea plants, tall stems (T) are dominant to short stems (t). Two plants with genotype Tt are crossed. One offspring is tall. Given that it is tall, what is the probability that its genotype is Tt? Explain using the Punnett square.

TT X TT

	T	**t**
T	TT	Tt
t	Tt	tt

WORK SPACE AND ANSWER

ANSWER KEY

Pea Plant Predictions

GRADE 8 · L.8.2B

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	In pea plants, purple flowers (P) are dominant to white flowers (p). Use the Punnett square for a Pp x pp cross. What percent of the offspring are predicted to have purple flowers?	**50%**
2	In pea plants, tall stems (T) are dominant to short stems (t). Use the Punnett square for a Tt x Tt cross. What percent of the offspring are predicted to have short stems?	**25%**
3	In pea plants, round seeds (R) are dominant to wrinkled seeds (r). A plant with genotype RR is crossed with a plant with genotype rr. What genotype is predicted for every offspring?	**Rr**
4	In pea plants, green pods (G) are dominant to yellow pods (g). Use the Punnett square for a Gg x GG cross. What percent of the offspring are predicted to have green pods?	**100%**
5	In pea plants, yellow seeds (Y) are dominant to green seeds (y). Two plants with genotype Yy are crossed. What percent of the offspring are predicted to have genotype Yy?	**50%**
6	In pea plants, purple flowers (P) are dominant to white flowers (p). A purple-flowered plant is crossed with a white-flowered plant (pp). One offspring has white flowers. What must the purple-flowered parent's genotype be?	**Pp**

PART 2 · APPLY IT

1. **8 plants** An Rr x Rr cross gives rr in 1 of 4 outcomes. Calculate 1/4 of 32 to get 8 plants.
2. **12 plants** A Pp x pp cross gives purple flowers in 2 of 4 outcomes. Calculate 1/2 of 24 to get 12 plants.

CHALLENGE

2/3. Of the three outcomes that produce tall plants, two have genotype Tt.

Accept equivalent fractions, decimals, or percentages for probability answers. Predicted counts are expectations, not guarantees about an actual group of offspring.