LESSON MAKER PRO

Predict the Traits

Use Punnett squares to predict offspring.

GRADE 8 · L.8.2B.3

L.8.2B.3 "Use mathematical and computational thinking to analyze data and make predictions about the outcome of specific genetic crosses (monohybrid Punnett Squares) involving simple dominant/recessive traits."

NAME _____ DATE _____

COUNT THE BOXES

Each parent passes one allele to an offspring. Put one parent's alleles across the top of a Punnett square and the other's down the side, then combine them to fill four boxes. Count the boxes that match the trait or genotype you want to find its probability.

WORKED EXAMPLE

In a model of flower color, R is dominant to r. Two Rr plants are crossed. What is the probability that an offspring shows the dominant trait?

RR × RR

	R	**r**
R	RR	Rr
r	Rr	rr

1. Each parent can pass on R or r.
2. Three of the four boxes have at least one R.
3. The probability is 3/4, or 75%.

Answer: 75%

PRACTICE 6 problems

1 A tall pea plant (TT) is crossed with a short pea plant (tt). T is dominant. What is the probability that an offspring has genotype Tt?

ANSWER _____

2 In a model of beetle shell color, B gives brown shells and is dominant to b. A Bb beetle is crossed with a bb beetle. What is the probability of a brown-shelled offspring?

ANSWER _____

3 D is dominant to d. A DD parent is crossed with a Dd parent. What is the probability of an offspring with genotype dd?

ANSWER _____

4 F is dominant to f. Two Ff parents are crossed. What is the probability of an offspring showing the recessive trait?

ANSWER _____

5 The Punnett square shows a cross between Gg and gg parents. What genotype belongs in the box marked ?

GG × GG

	G	**g**
g	Gg	gg
g	Gg	?

ANSWER _____

6 P is dominant to p. A Pp parent is crossed with a pp parent. Out of 12 offspring, how many would you expect to show the dominant trait?

ANSWER _____

APPLY IT Show your work

1 Your school's garden club crosses two pea plants. Purple flowers (S) are dominant to white flowers (s). The parents are Ss and ss. If the club grows 20 offspring, how many would you expect to have white flowers?

WORK SPACE

ANSWER _____

2 A community garden is planning space for pea plants. Tall stems (A) are dominant to short stems (a). Two Aa plants are crossed. Out of 16 offspring, how many would you expect to have short stems?

WORK SPACE

ANSWER _____

CHALLENGE One step up

In a school science simulation, smooth seeds (S) are dominant to wrinkled seeds (s). One parent has genotype ss. The table shows offspring from its cross with another parent. What must the other parent's genotype be? Explain using the alleles each parent can pass on.

OFFSPRING FROM THE SIMULATION

Seed type	Number of offspring
Smooth	18
Wrinkled	18

WORK SPACE AND ANSWER

ANSWER KEY

Predict the Traits

GRADE 8 · L.8.2B.3

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A tall pea plant (TT) is crossed with a short pea plant (tt). T is dominant. What is the probability that an offspring has genotype Tt?	**100%**
2	In a model of beetle shell color, B gives brown shells and is dominant to b. A Bb beetle is crossed with a bb beetle. What is the probability of a brown-shelled offspring?	**50%**
3	D is dominant to d. A DD parent is crossed with a Dd parent. What is the probability of an offspring with genotype dd?	**0%**
4	F is dominant to f. Two Ff parents are crossed. What is the probability of an offspring showing the recessive trait?	**25%**
5	The Punnett square shows a cross between Gg and gg parents. What genotype belongs in the box marked ?	**gg**
6	P is dominant to p. A Pp parent is crossed with a pp parent. Out of 12 offspring, how many would you expect to show the dominant trait?	**6 offspring**

PART 2 · APPLY IT

1. **10 offspring** The cross Ss × ss gives ss in 2 of 4 boxes. Half of 20 is 10.
2. **4 offspring** The cross Aa × Aa gives aa in 1 of 4 boxes. One-fourth of 16 is 4.

CHALLENGE

The other parent must be Ss. The ss parent can pass on only s. Smooth offspring need an S from the other parent, while wrinkled offspring need an s from that parent.

Accept equivalent fractions or percentages for probabilities. Expected offspring counts are predictions, not guarantees for a real group of offspring.