ANSWER KEY.

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Punnett Squares

Biology | ANSWER KEY

Show your work in the blank space. Write probabilities as fractions.

1. In pea plants, R = round seeds (dominant) and r = wrinkled seeds (recessive). Two heterozygous plants are crossed.

Rr x Rr

(R = round, r = wrinkled)

	R	**r**
R		
r		

(a) Fill in the Punnett square.

(b) What is the probability that an offspring has wrinkled seeds?

(c) What is the probability that an offspring has round seeds?

(a) RR, Rr, Rr, rr (see the figure).

(b) 1/4 (rr). **(c) 3/4** (RR, Rr, Rr).

2. In pea plants, T = tall (dominant) and t = short (recessive). A heterozygous tall plant is crossed with a short plant.

(a) Draw a Punnett square and give the probability that an offspring is tall.

(b) The cross produces 80 offspring. About how many are expected to be short?

(a) Tt x tt: Tt, Tt, tt, tt. Probability of tall = **1/2**.

(b) 1/2 x 80 = **40 short plants**.

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3. A purple pea plant (P = purple, p = white) has an unknown genotype. A scientist crosses it with a white plant. This is a test cross.

If the purple plant is PP

PP x pp

	P	**P**
p		
p		

If the purple plant is Pp

Pp x pp

	P	**p**
p		
p		

(a) Fill in both Punnett squares.

(b) The cross gives 31 purple and 29 white offspring. What is the genotype of the purple parent?

(a) If PP: all Pp. If Pp: Pp, pp, Pp, pp (see the figure).

(b) Pp. The result is close to 1 purple : 1 white, which matches the Pp x pp square. If the parent were PP, all offspring would be purple.

4. Cystic fibrosis is a recessive trait. Two parents are both carriers (Cc).

(a) What is the probability that a child has cystic fibrosis?

(b) What is the probability that two children, born separately, both have cystic fibrosis?

(c) A child of these parents does not have cystic fibrosis. What is the probability that this child is a carrier?

(a) 1/4 (cc).

(b) 1/4 x 1/4 = **1/16**.

(c) 2/3. Of the 4 squares, 3 are unaffected (CC, Cc, Cc), and 2 of those 3 are Cc.

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