**ANSWER KEY.**

ZornScience
zornscience.org

# Mendelian Inheritance

Biology | ANSWER KEY

Show your work in the blank space. Use units and complete sentences where asked.

**1.** In pea plants, P = purple flowers (dominant) and p = white flowers (recessive). Complete the table.

| Genotype | Homozygous or heterozygous? | Phenotype |
|---|---|---|
| PP | | |
| Pp | | |
| pp | | |

**PP: homozygous, purple. Pp: heterozygous, purple. pp: homozygous, white.**

**2.** In one of Mendel's crosses, the F2 generation had 882 plants with inflated pods and 299 plants with constricted pods.

(a) Find the ratio of inflated to constricted pods (divide the first number by the second).

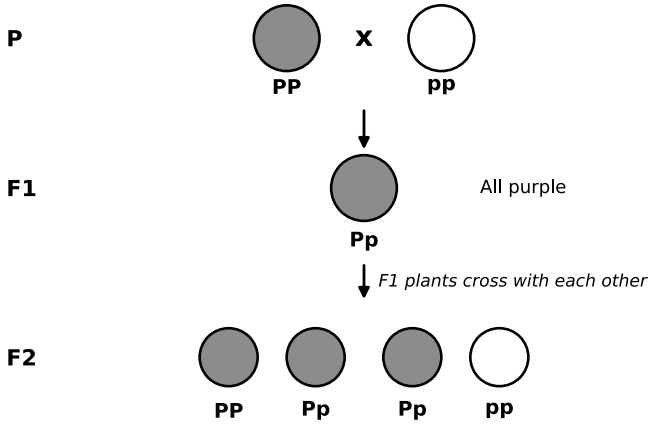
(b) How many constricted pods would exactly a 3 : 1 ratio predict for 1,181 plants? Is the result close to 3 : 1?

**(a)** 882 / 299 = **2.95 : 1**.

**(b)** 1/4 x 1,181 = **295** (about 295.2). **Yes**, the data show 299, which is close. Each offspring gets its alleles by chance, so real counts vary a little from the prediction.


CC BY-NC-SA 4.0 | zornscience.org

**3.** The diagram shows a cross of true-breeding purple (PP) and white (pp) pea plants.




(a) What fraction of the F2 plants are white?

(b) What fraction of the purple F2 plants are heterozygous?

(c) Why do the white flowers come back in the F2 when all F1 plants are purple?

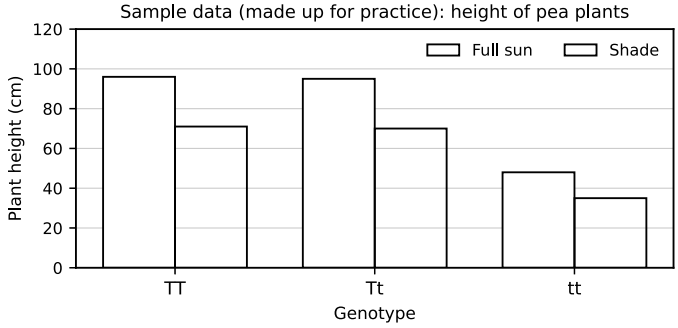
**(a) 1/4** (the pp plant).

**(b) 2/3**: of the 3 purple plants, 2 are Pp.

**(c)** Each F1 plant (Pp) still carries the recessive p allele, hidden by P. When two F1 plants cross, a p from each parent can join to make pp.

---

**4.** The graph shows made-up practice data for pea plant height.




Does the graph support the claim that height depends only on genotype? Use evidence.

**No.** In full sun TT plants are 96 cm, but in shade the same genotype is only 71 cm (25 cm shorter). The environment changes the phenotype. Genotype still matters, since TT is taller than tt in both settings (96 vs 48, and 71 vs 35).

*A correct answer includes: the same genotype with two different heights, and a conclusion that height depends on genes and environment.*

---

**5.** A classmate says, "A dominant allele is the one that is most common in a population." Explain what is wrong with this.

**Dominant** describes how an allele is expressed in a heterozygote: it shows when one copy is present. It says nothing about how common the allele is. A dominant allele can be rare, and a recessive allele can be common.


CC BY-NC-SA 4.0 | zornscience.org