



Genetics (Meiosis and Fertilization)

2 Mutation and sexual reproduction lead to genetic variation in a population. As a basis for understanding this concept:

- 2.a *Students know* meiosis is an early step in sexual reproduction in which the pairs of chromosomes separate and segregate randomly during cell division to produce gametes containing one chromosome of each type.
- 2.b *Students know* only certain cells in a multicellular organism undergo meiosis.
- 2.c *Students know* how random chromosome segregation explains the probability that a particular allele will be in a gamete.
- 2.d *Students know* new combinations of alleles may be generated in a zygote through the fusion of male and female gametes (fertilization).
- 2.e *Students know* why approximately half of an individual's DNA sequence comes from each parent.
- 2.f *Students know* the role of chromosomes in determining an individual's sex.
- 2.g *Students know* how to predict possible combinations of alleles in a zygote from the genetic makeup of the parents.

SAMPLE QUESTION

1. A female pea plant has a genotype of $RRYy$. Female gametes, or egg cells, are produced through meiosis. What are the possible genetic combinations that could be present in a single egg produced by this plant? **2.c**

- A RR only
- B Yy only
- C Ry and rY
- D RY and Ry

Answer: 1d

WHAT IT MEANS TO YOU

The moment that you were conceived, your entire genetic identity was formed. The process of meiosis produces sperm and egg cells, which have only one copy of each chromosome. So, when you were conceived, you received half of your DNA from your father and half from your mother.

STANDARD	CHAPTERS	PUPIL EDITION
2.a	6	173–176
2.b	6	168–171
2.c	6	183–187
2.d	6	189–191
2.e	6	173–176, 189–191
2.f	6	168–171
2.g	6	183–187

