

Section 17.3 Review Answers

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1. Corn and canola have been developed through selective breeding techniques.
2. Researchers studying human genetics use pedigrees to study human patterns of inheritance and traits in a family over many generations. Researchers studying *Drosophila* can breed large numbers of flies and many generations

over months, which is not possible with organisms that have longer life cycles.

- 3. (a)** The trait is autosomal dominant. It is present in both sexes in each generation.
- (b)** Polydactyly, Huntington's disease, and Marfan syndrome are autosomal dominant genetic conditions in humans. There are approximately 2 200 known autosomal dominant conditions, some of the most common being:
- Disorder and frequency / 1000 births
- dominant otosclerosis 3
 - familial hypercholesterolemia 2
 - dominant congenital deafness 0.1
- (c)** Individual II₁'s genotype is heterozygous.
- (d)** II₂ is heterozygous and II₁ is recessive; therefore, the predicted genotypic ratios for their children would be 0.5 heterozygous and 0.5 recessive. Chance accounts for this difference. The probability is $0.5 \times 0.5 \times 0.5 = 0.125$ or 12.5 percent that they could have three children who all carry the recessive trait.
- 4.** Whether the condition is eliminated or not from the population over time depends on the frequency in the population. One would expect the frequency to be low, but since it is recessive this allele can remain in the population in the heterozygous genotype.
- 5.** Genetic counsellors can estimate the risk of inheriting a particular genetic condition. As well, they can explain the symptoms of genetic conditions and the available treatments, provide other information, and, equally importantly, give emotional support. Students may suggest they would like the genetic counsellor to be intelligent, caring, a good listener, and well educated in the field of genetics.