

## **The Chromosomal Basis of Inheritance**

### **Chapter 15**

1. Use the steps in meiosis to describe how the law of segregation explains the inheritance of alleles for a single trait and to describe how the law of independent assortment explains the inheritance of alleles for two traits on separate chromosomes.
2. Propose a possible reason that the first naturally occurring mutant fruit fly Morgan saw involved a gene on a sex chromosome and was found in a male.
3. State the phenotype and genotype of the offspring of a cross between a white-eyed female fruit fly and a red-eyed male fruit fly.
4. Neither Jim nor Suzanne have Duchenne muscular dystrophy, but their firstborn son does.
  - a) Determine the probability that, if their second child is a boy, it will have the disease.
  - b) Determine the probability that, if their second child is a girl, it will have the disease.
5. If a disorder were caused by a dominant X-linked allele, describe how the inheritance pattern would differ from what we see for recessive X-linked disorders.
6. Describe how gametes with an abnormal number of chromosomes can be formed.
7. Describe how deletions, duplications, and translocations can alter the structure of a chromosome.
8. Gene dosage ensures the correct number of copies of a gene are actively being expressed. The process is important for normal development. Explain how X-inactivation and genomic imprinting establish the proper dosage of certain genes.
9. Reciprocal crosses between two primrose varieties, A and B, produced the following results: A Female x B male → offspring with all green (nonvariegated) leaves; B Female x A Male → offspring with patterned (variegated) leaves. Explain these results.
10. Explain why mitochondrial genes are inherited only from a maternal parent.