

Exercises

Lesson 3: Genetics

1. Define "genetics" in your own words.
2. Describe Mendel's experiments with peas.
3. What do P, F1, and F2 represent?
4. What were Mendel's findings regarding tall vs short crosses?
5. According to Mendel's law of segregation, what are dominant and recessive traits?
6. What is a Punnett Square?
7. An orange amoeba and a red amoeba walk into a bar. Several years later they get married and have a batch of beautiful, red kids. The kids then marry each other and have kids. 75% of that last generation is red, and 25% is blue. According to Mendel's theories, which color is dominant? Which is recessive? How do we know?
8. What are genes?
9. What is the difference between phenotypes and genotypes?
10. What is the difference between incomplete dominance and codominance?
11. What are genetic disorders?
12. If a gene is sex-linked, which chromosomes could it be found on?
13. In a study on the gene that gives flies wings, 30 of the F1 generation were wingless, and 100 looked like normal flies. How many were wild-type?
14. What are restriction enzymes?
15. What did the Human Genome Project accomplish?

Answers to Exercises

Answers to Lesson 3: Genetics Exercises

1. Define "genetics" in your own words. **Something close to: the science of heredity, dealing with resemblances and differences of related organisms resulting from the interactions of their genes and the environment.**
2. Describe Mendel's experiments with peas. **Mendel observed traits in pea plants over many generations. He kept careful note of which traits appeared in each generation.**
3. What do P, F1, and F2 represent? **P represents the parental generation, F1 represents the generation of the offspring of P, and F2 represents the generation of the offspring of F1.**
4. What were Mendel's findings regarding tall vs short crosses? **In the F1 generation was 100% tall, and the F2 generation was 75% tall and 25% short.**
5. According to Mendel's law of segregation, what are dominant and recessive traits? **Dominant traits are always expressed when present, recessive traits are only expressed when they both alleles are recessive.**
6. What is a Punnett Square? **A table used for keeping track of the inheritance of genes.**
7. An orange amoeba and a red amoeba walk into a bar. Several years later they get married and have a batch of beautiful, red kids. The kids then marry each other and have kids. 75% of that last generation is red, and 25% is blue. According to Mendel's theories, which color is dominant? Which is recessive? How do we know? **Red. Orange. Mendel's law of segregation predicts that dominant genes when crossed with the recessive allele will only express the dominant genes in the F1 generation, then express the dominant gene 75% of the time in the F2.**
8. What are genes? **The individual codes for making proteins located in the DNA.**

9. What is the difference between phenotypes and genotypes?
Phenotypes are the appearance of the organism—the physical traits.
Genotypes are the genes that produce the trait.
10. What is the difference between incomplete dominance and codominance? Incomplete dominance is a shared expression of two traits. Codominance is the dual expression of two dominant traits.
11. What are genetic disorders? Inherited genetic disorders—defective genes or chromosomes.
12. If a gene is sex-linked, which chromosomes could it be found on? X or Y.
13. In a study on the gene that gives flies wings, 30 of the F1 generation were wingless, and 100 looked like normal flies. How many were wild-type? 100.
14. What are restriction enzymes? Enzymes used to cut specific sequences of DNA.
15. What did the Human Genome Project accomplish? The Human Genome Project successfully sequenced over 20,000 human genes and mapped them on the 23 human chromosomes.