

**CHAPTER 12.2—12.6: Beyond Mendelian Genetics****Incomplete Dominance**

1. In radishes, the gene that controls color exhibits incomplete dominance. Pure-breeding red radishes crossed with pure-breeding white radishes make purple radishes. What are the genotypic and phenotypic ratios when you cross a purple radish with a white radish?


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2. Certain breeds of cattle show incomplete dominance in coat color. When pure breeding red cows are bred with pure breeding white cows, the offspring are roan (a pinkish coat color). Summarize the genotypes & phenotypes of the possible offspring when a roan cow is mated with a roan bull.


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**Co-Dominance**

3. A man with type AB blood marries a woman with type B blood. Her mother has type O blood. List the expected phenotype & genotype frequencies of their children.


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4. The father of a child has type AB blood. The mother has type A. Which blood types can their children NOT have?
5. A woman with type A blood and a man with type B blood could potentially have offspring with what blood types?
6. The mother has type A blood. Her husband has type B blood. Their child has type O blood. The father claims the child can't be his. Is he right?
7. The mother has type B blood. Her husband has type AB blood. Their child has type O blood. The father claims the child can't be his. Is he right?
8. The mother has type AB blood. The father has type B blood. His mother has type O blood. What are all the possibilities of blood type for their children?

**Lethal Dominant**

9. Achondroplasia (dwarfism) is caused by a dominant gene. A woman and a man both with dwarfism marry. If homozygous achondroplasia results in death of embryos, list the genotypes and phenotypes of all potential live-birth offspring.


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What is the expected ratio of dwarfism to normal offspring?

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**Sex-Linked**

10. The genes for hemophilia are located on the X chromosome. List the possible genotypes and phenotypes of the children from a man normal for blood clotting and a woman who is a carrier. (HINT: You have to keep track of what sex the children are!)


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11. Define and give an example of pleiotropy.

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12. Describe and give an example of incomplete dominance.

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13. Describe and give an example of environmental effects on gene expression.

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14. Define and give an example of epistasis.

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15. Explain what a quantitative trait is. Give an example. What causes a trait to exhibit continuous variation?

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Name: \_\_\_\_\_

Question Set 31

16. Describe and give an example of codominance.

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17. How is blood type an example of multiple alleles?

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18. Describe Thomas Hunt Morgan's first mutant fruit fly. Why was this fly so significant?

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19. Show the cross P, F1, F2 for the white-eyed male mutant, with a wild type female.

20. What is meant by a trait being sex-linked?

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21. Why are sex-linked recessive traits more common in males than females?

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22. What happens when we trace the inheritance of traits found on the same chromosome?

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Name: \_\_\_\_\_

Question Set 31

23. Explain how two genes on the same chromosome can still assort independently.

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24. What is genetic recombination and when does it occur?

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25. How is recombination frequency used to develop a genetic map?

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26. Explain the difference between autosomal chromosomes and sex chromosomes.

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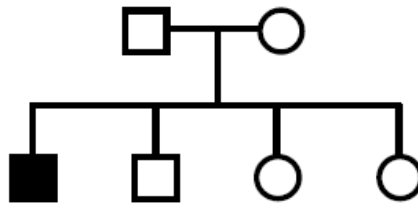
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27. What determines sex in humans? \_\_\_\_\_

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28. How many X chromosomes are typically expressed in humans? \_\_\_\_\_

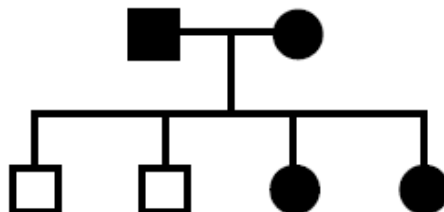
29. Could the following pedigree be inherited as a simple...



If "YES", then  
suggested genotypes of  
**father**      **mother**

- |                         |            |           |                      |
|-------------------------|------------|-----------|----------------------|
| a. autosomal recessive? | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| b. autosomal dominant?  | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| c. X-linked recessive?  | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| d. X-linked dominant?   | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| e. Y-linked trait?      | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |

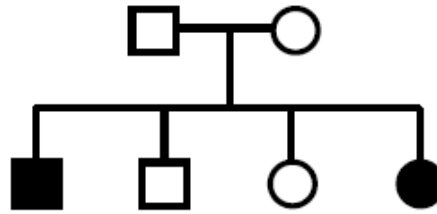
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- |                         |            |           |                      |
|-------------------------|------------|-----------|----------------------|
| a. autosomal recessive? | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| b. autosomal dominant?  | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| c. X-linked recessive?  | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| d. X-linked dominant?   | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| e. Y-linked trait?      | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |

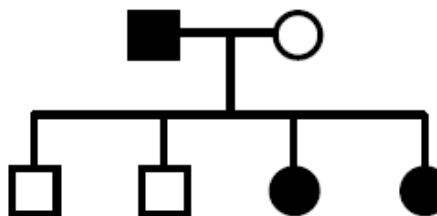
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- |                         |            |           |                      |
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| a. autosomal recessive? | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| b. autosomal dominant?  | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| c. X-linked recessive?  | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| d. X-linked dominant?   | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| e. Y-linked trait?      | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |

32. Could the following pedigree be inherited as a simple...



If "YES", then  
suggested genotypes of  
**father**      **mother**

- |                         |            |           |                      |
|-------------------------|------------|-----------|----------------------|
| a. autosomal recessive? | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| b. autosomal dominant?  | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| c. X-linked recessive?  | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| d. X-linked dominant?   | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |
| e. Y-linked trait?      | <b>YES</b> | <b>NO</b> | _____ <b>X</b> _____ |

Name: \_\_\_\_\_

Question Set 31

33. How do variations arise in bacteria considering they reproduce mostly by asexual means?

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34. What is a plasmid and identify its role in bacterial conjugation?

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