

KEY CONCEPTS:

- Mendel used the scientific approach to identify two laws of inheritance
- Probability laws govern Mendelian inheritance
- Inheritance patterns are often more complex than predicted by simple Mendelian genetics
- Many human traits follow Mendelian patterns of inheritance

READ:

- Chapter 14



KEY TERMS: Here is a list of key terms and concepts you will hear about and see during the chapter readings. Get to know them!

<i>Trait</i>	<i>Alleles</i>	<i>Genotype</i>	<i>Test cross</i>
<i>True-breeding</i>	<i>Genes</i>	<i>Phenotype</i>	<i>Monohybrid</i>
<i>Hybridization (hybrid)</i>	<i>Dominant allele</i>	<i>Punnett square</i>	<i>Dihybrid</i>
<i>P generation</i>	<i>Recessive allele</i>	<i>Law of segregation</i>	<i>Probability</i>
<i>F₁ generation</i>	<i>Homozygous</i>	<i>Law of independent assortment</i>	<i>Multiplication rule</i>
<i>F₂ generation</i>	<i>Heterozygous</i>		<i>Addition rule</i>

Gregor Mendel's Discoveries

1. Prior to Mendel's work, it was commonly thought that traits from each parent blended to yield the traits shown in the offspring. Explain how Mendel's ideas about inheritance differ from what was previously thought.
2. Explain what the purpose of a test cross is. How is it conducted?
3. Discuss Mendel's law of segregation and his law of independent assortment. Explain how both are related to the process of meiosis and when during the meiotic process these things occur.
4. Mendel used pea plants to conduct his studies on heredity. Explain why pea plants were a good study organism for him to use.
5. Discuss the multiplication rule and the addition rule of probability.
6. Incomplete dominance and epistasis are both terms that describe genetic relationships. What is the most basic distinction between these terms?

COMPLETE the following problems on page 284- 285 SHOWING YOUR WORK

#5, 6, 7, 8, 12, 13, and 14

THINGS YOU SHOULD MAKE SURE YOU UNDERSTAND:

(Feel free to ask questions about them in class)

- Terms associated with genetic problems: P, F₁, F₂, dominant, recessive, homozygous, heterozygous, phenotype, and genotype.
- How to derive the proper gametes when working a genetic problem.
- The difference between an allele and a gene.
- How to use data sets to determine Mendelian patterns of inheritance.
- Use a *Punnett square* to predict the results of a monohybrid cross, stating the phenotypic and genotypic ratios of the F₂ generation.
- Use a Punnett square to predict the results of a *dihybrid cross* and state the phenotypic and genotypic ratios of the F₂ generation.
- Use the *rule of multiplication* to calculate the *probability* that a particular F₂ individual will be homozygous recessive or dominant.
- Given a Mendelian cross, use the *rule of addition* to calculate the probability that a particular F₂ individual will be heterozygous.
- Use the *laws of probability* to predict, from a trihybrid cross between two individuals that are heterozygous for all three traits, the expected proportion of the offspring that would be:
 - homozygous dominant for the three traits
 - heterozygous for all three traits
 - homozygous recessive for two specific traits and heterozygous for the third

SUPPLEMENTARY RESOURCES: Click the links below for more information to help you learn more about this lesson.

Interactives

- **Pearson's BioCoach Activity:** [Mendelian Genetics](#)
- DNA From The Beginning: [Classical Genetics Tutorials and Animations](#)
- University of Arizona Biology Project: [Mendelian Genetics Monohybrid Problem Set](#)
- University of Arizona Biology Project: [Mendelian Genetics Dihybrid Problem Set](#)
- DNA Learning Center Online Lab: [Mendelian Genetics](#)
- Utah Learn Genetics: [Heredity and Traits](#)
- Kansas State University: [Interactive Genetic Problems](#)
- Biology UC: [Interactive Genetic Problems 2](#)

Lectures

- Bozeman Biology's "[Mendelian Genetics](#)" video.
- Bozeman Biology's "[Genetics](#)" video.
- Crash Course Biology's video: [Heredity](#)

HYPERLINK

"http://www.youtube.com/watch?v=CBezq1fUEA&list=PL3EED4C1D684D3ADF&index=9&feature=plpp_video"