

Unit 2 Review

Summary

- Genetics is the branch of science that studies heredity. Heredity is the passing of traits from parents to offspring. To understand heredity, you need to understand the chemistry of genes.
- Organisms are made mostly of protein. Therefore, protein determines what traits an organism will have. DNA holds the code that tells how amino acids should be arranged to make a protein.
- mRNA carries the information in the DNA code from the nucleus to the ribosomes.
- The mRNA and tRNA come together at the ribosomes to arrange amino acids in a particular order. The order and kinds of amino acids determine the types of proteins made.
- Genes are passed from parents to offspring. Meiosis is the first step in this process. Meiosis is a type of cell division that produces sex cells, or gametes. As a result of meiosis, gametes contain half the number of chromosomes of the body cells of an organism.
- During sexual reproduction, two gametes join. The resulting cell contains the same number of chromosomes as were present in the body cells of the parent organisms. Genes contained on these chromosomes are copies of the parents' genes.
- By understanding how a pair of genes interact, you can predict the inheritance of certain traits.
- Errors can occur when genetic information is passed from parent to offspring. These errors, called mutations, can occur either during cell division or during DNA replication.
- A mutation is a permanent change to a gene or chromosome. If the changed cell is a gamete, an organism formed from the cell may inherit a genetic disorder.



For Your Portfolio

1. Make a labeled model of DNA showing 9 base pairs. Show and label the strand of RNA that would match the strand of your DNA.
2. Along with other students in your class, put on a play that demonstrates how protein is synthesized. You will need to have people play the following roles: two base triplets on a DNA molecule; two matching triplets on a piece of mRNA; two amino acids; a ribosome; and two pieces of tRNA.
3. There are 20 important kinds of amino acids. There are 61 base triplets that “code” them. Use a biology textbook or an encyclopedia to find out which base triplets code each kind of amino acid. Make a chart showing the amino acids in one column and the base triplets that “code” them in a second column. Use your chart to explain to the class why there are so many different kinds of proteins.
4. Imagine you are a chromosome in a parent cell. Write a diary entry that describes what happens to you during the process of meiosis.
5. Use reference texts to identify five different human traits controlled by a single gene pair. Make a chart that identifies the traits and the dominant and recessive forms of the gene.
6. With a group of classmates, role-play a situation in which you are a group of pet store owners trying to breed a goldfish with iridescent scales. You know that iridescent scales in goldfish are recessive. Discuss what your plan would be to breed the goldfish.
7. With a group of classmates, role-play a situation in which a married couple is informed that they both carry the gene for sickle cell anemia. Professionals must explain to the couple that while neither of them show the disease, it is likely their offspring will have the sickle cell trait.

Unit 2 PRACTICE TEST

Match the terms in Column A with their definitions in Column B.

Column A	Column B
_____ 1. amino acid	a. passing of traits from parent to offspring
_____ 2. chromosome mutation	b. living material inside a cell <i>not</i> including the nucleus
_____ 3. cytoplasm	c. type of chemical used to build protein found in the cytoplasm
_____ 4. gametes	d. permanent change in the DNA of a gene
_____ 5. gene mutation	e. sex cells
_____ 6. heredity	f. change in the number or structure of chromosomes in a cell

Fill in the blanks.

7. Protein synthesis occurs at the _____.
8. A type of cell division that produces gametes is _____.
9. A chain of amino acids arranged in a particular order is a _____.
10. A _____ is altered genetic information carried on the X or Y chromosome.

Write a brief answer in the space provided.

11. What is the difference in the types of bases found in DNA and RNA?

12. What is the difference between diploid number and haploid number? _____

13. Would a carrier for sickle cell anemia show the disorder? Explain why or why not.

Answer one of the following questions.

14. Explain why colorblindness occurs mainly in males. Draw a Punnet square to support your answer.
15. What role does meiosis play in the passing of genetic information from parent to offspring? Use a drawing or sentences to answer the question.