

Lesson Topic: Unit 3 Genetics
Grade level: 7th
Length of Unit: 6-7 weeks

Content Standards

Students who demonstrate understanding can:

MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.

Big Ideas:

Students will understand

- Genetic material/traits are transferred to offspring
- Chromosomes are composed of DNA
- In sexual or asexual reproduction, favorable genetic qualities will be passed down to the offspring to ensure success of the organism
- Genetic mutations can be harmful, beneficial, or neutral.

Essential Question(s):

- How is genetic material transferred from a parent organism to offspring?
- Design a Punnett square to predict the genotype/phenotype of the offspring.
- Find/discuss examples of mutations in organisms that have varying effects.
- How does natural selection change species over time?

Student objectives (outcomes):

Students will be able to:

- Explain how cells produce more cells.
- Discuss the importance of mitosis.
- Explain how cells division differs in animals and plants.
- Explain the experiments of Gregor Mendel.

- Explain how genes and alleles are related to genotypes and phenotypes.
- Use information in a Punnett squares.
- Explain the difference between mitosis and meiosis.
- Describe how Mendel's ideas are supported by the process of meiosis.
- Explain the difference between male and female sex chromosomes.
- Describe the basic structure of the DNA molecule.
- Explain how DNA molecules can be copied.
- Explain some of the exceptions to Mendel's heredity principles.
- Explain the relationship between genes and proteins.
- Outline the basic steps in making a protein.
- Define mutation, and give an example.
- Evaluate the information in a pedigree.

Assessment Evidence

Performance Task(s):

Cell Reproduction Test
Genetics Test
DNA Test

Mitosis MS Lab
Mitosis Claymation Activity
Mitosis Flip-book
Web Quest Meiosis and Mitosis Internet activities
Punnett Square Activity Labs
DNA Extraction Lab
DNA Base-Pair Model Activity

Other Evidence:

Learning Plan

Learning Activities:

Probability & Punnett Squares Activity
Notes on Mitosis & Meiosis (Cell Reproduction)
Notes on Mendelian Genetics
Notes on DNA

Resources

Discovery Ed videos
Bozeman Science Videos:-Meiosis, Mitosis, Phases of., Cell Cycle, What is DNA,
Mendelian Genetics, Genetics, Punnett Squares, Chromosomes

On-line lab resources:

<http://www.science-class.net/archive/science-class/Biology/Genetics.htm>
http://science-class.net/archive/science-class/Biology/Cell_Division.htm
http://www.most.org/curriculum_project/Life_Sciences/high/Post/Gummy_Bear_Genetics.pdf
<http://www.nclark.net/Genetics>
<http://www.stemmom.org/2013/11/engineering-cell-division-ngss-lesson.html>
<http://www.ck12.org/>

