8.5 Genetics

Content Area: **Science**
Course(s): **Science 8**
Time Period: **Marking Period 3**
Length: **20 days**
Status: **Published**

Established Goals/Standards

SCI.MS-LS3	Heredity: Inheritance and Variation of Traits
SCI.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.
SCI.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.
SCI.MS-LS4	Biological Evolution: Unity and Diversity
SCI.MS-LS4-5	Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

Technology Standards

TECH.8.1.8.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.8.D.2	Demonstrate the application of appropriate citations to digital content.
TECH.8.1.8.D.3	Demonstrate an understanding of fair use and Creative Commons to intellectual property.
TECH.8.1.8.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.

NJ 21st Century Life and Careers/NJ Career Ready Practices

CAEP.9.2.8.B.7	Evaluate the impact of online activities and social media on employer decisions.

Interdisciplinary Connections

ELA/Literacy -

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. *(MS-LS3-1)*

RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. *(MS-LS3-1)*

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS3-1)

SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. *(MS-LS3-1)*

Essential Questions

- How do asexual reproduction and sexual reproduction affect the genetic variation of offspring?
- How do structural changes to genes (mutations) located on chromosomes affect proteins or affect the structure and function of an organism?
- Why do kids look similar to their parents?

Enduring Understanding

- Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited.

Content

- Complex and microscopic structures and systems, such as genes located on chromosomes, can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among the parts of the system; therefore, complex natural structures/systems can be analyzed to determine how they function.
- Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes.
- Each distinct gene chiefly controls the production of specific proteins, which in turn affect the traits of the individual.
- In addition to variations that arise from sexual reproduction, genetic information can be altered due to mutations.
- Some changes to genetic material are beneficial, others harmful, and some neutral to the organism.
- Changes in genetic material may result in the production of different proteins.
- Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits.
- 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
- Though rare, mutations may result in changes to the structure and function of proteins.

Organisms reproduce either sexually or asexually and transfer their genetic information to their offspring.

Asexual reproduction results in offspring with identical genetic information.

- Sexual reproduction results in offspring with genetic variation.

- Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited.
- In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring.
- Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other.
- Punnett squares, diagrams, and simulations can be used to describe the cause-and-effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.

Accommodations and Modifications

Accommodations and Modifications according to student IEP, 504, I&RS goals, and/or gifted status.

Assessment

Summative assessment: students who understand the concepts are able to:

- • 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.
- Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information.
- Develop and use a model to describe why sexual reproduction results in offspring with genetic variation.
- Use models such as Punnett squares, diagrams, and simulations to describe the cause-and effect-relationship of gene transmission from parent(s) to offspring and resulting genetic variation.

Formative Assessments

- Participation/Observations
- Questioning
- Discussion Circles
- Science Notebook
- Exit Slips
- Peer/Self Assessment
- Rubrics
- Teacher-created project-based assessment
- Turn & Talk

Alternate Assessments

- Teacher-created project-based assessment
- Alternate running records
- Discussion Circles
- Turn and Talks

Benchmark Assessments

- Teacher-created assessment

Resources

- Amplify
- BrainPOP
- Discovery Education