Unit 7: Genetics and DNA

Content Area: **Template**
Course(s):
Time Period:
Length:
Status: **Published**

State Mandated Topics Addressed in this Unit

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N/A	N/A

Unit 7: Genetics and DNA

Learning Objectives

- How do changes in genetic information affect organisms?
- How do new traits affect an organism and a population?
- How does sexual reproduction produce more diversity within a population?
- How does the structure of a molecule relate to its function in a living thing?
- How is genetic information passed from one generation to the next?

Essential Skills

- Account for the appearance of a novel trait that arose in a given population.
- Apply data representations and new models to revise predictions and explanations
- Demonstrate through modeling how the sorting and recombination of genes during sexual reproduction has an effect on variation in offspring (meiosis, fertilization).
- Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions.
- Engage in multiple forms of discussion in order to process, make sense of, and learn from others' ideas, observations, and experiences.
- Predict the potential impact on an organism given a change in a specific DNA code, and provide specific real world examples of conditions caused by mutations.
- Reflect on and revise observations as new evidence emerges
- Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams

Standards

9-12.HS-LS1-1	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.
9-12.HS-LS3-3	Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
9-12.HS-LS3-2	Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
9-12.HS-LS3-1	Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

Instructional Tasks/Activities

- Chapter Test
- Construct a Family Pedigree: students choose a trait, record this trait in their family members, design a pedigree diagram to indicate how the trait was passed from parents to offspring according to the pattern of inheritance they determine.
- DNA Extraction from Strawberry: Students use detergent to remove DNA from crushed strawberries, then make observations of the physical characteristics and predictions of the structure of DNA.
- DNA Structure Activities: in each activity listed, students use manipulatives to demonstrate the structure of DNA, including base pairing, 5’ to 3’ arrangement of sugars and phosphates, etc.
- DNA, RNA, and Snorks: Students use codons to determine amino acids, protein, and trait. Students then use this information to draw an example of these hypothetical alien organisms.
- Genetics and Chance – Coin Flip: students, in groups, predict the outcome for varying numbers of coin tosses. Students observe and record actual coin tosses. Students compare results with other groups. Then offer reasoning using probability concepts for the observed outcomes. Then relate to outcomes of monohybrid crosses and predict outcomes for dihybrid and other crosses.
- Meiosis Flip Book: students create a flipbook indicating a step- by-step knowledge of what occurs during each phase of meiosis
- Monster CHNOPS: students determine traits of a monster using base pairing, transcription and translation concepts.
- Review game
- Vocabulary Quizzes

Assessment Procedure

- Classroom Total Participation Technique
- Classwork
- DBQ
- Essay
- Exit Ticket/Entrance Ticket/Do Now
- Foldables – organization of material (phases of meiosis, transcription vs. translation, DNA vs. RNA
- Journal / Student Reflection

- Kahoot
- Other named in lesson
- Peer Review
- Performance
- PowerPoint presentation of material
- PowerPoint presentation of material
- Problem Correction
- Project
- Quiz
- Rubric
- Teacher Collected Data
- Test
- Think, pair, share (read assigned section of text individually, discuss with a partner, present material in pairs to class – use PowerPoint as a reference)
- Worksheet

Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI
- Other- Specified in Lesson
- Quiziz
- Screencastify

Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

Instruction/Materials

- alter format of materials (type/highlight, etc.)
- color code materials
- eliminate answers
- extended time
- extended time
- large print
- modified quiz
- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally
- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

Honors Modifications

N/A

Resources

- Resource 1
- Resource 2
- Resource 3
- Resource 4
- Resource 5