Unit 05: Cell Division 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 6: Cell Growth, Division and Reproduction

Essential Questions

- How do cells differentiate into different cell types?
- How do changes in genetic information affect organisms?
- How do new traits affect an organism and a population?
- How do organisms grow and repair tissue?
- How does DNA structure relate to its function?
- How does sexual reproduction produce more diversity within a population?
- How is genetic information passed from one generation to the next?
- What are organs? How do they develop? What are organ systems and how do they work together to form a multicellular organism?
- What are the similarities and differences between mitosis and meiosis?

Objectives

- Compare outcomes of cell division in body and reproductive cells.
- Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions.
- Describe modern applications of the regulation of cell differentiation and analyze the benefits and risks.
- Distinguish between the processes of cellular growth and development.
- Identify the structure and function of DNA components.
- Model the process of DNA replication.
- 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.

Standards

SCI.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.
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-LS1-4	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

Instructional Tasks/Activities

- Build DNA modes.
- Cell cycle diagram activity
- Compare mitosis/meiosis
- 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.
- Crossing over simulation
- DNA comic strip or meiosis skit
- 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.
- Mitosis Microscope Slides Lab: students observe pre-prepared slides of onion root tip. Students indicate which phase of mitosis each slide shows. Students describe what is occurring during each phase
- Monster CHNOPS: students determine traits of a monster using base pairing, transcription and translation concepts.
- Onion root tip slides
- Review game
- Surface Area vs. Volume Cubes: Students may create their own cubes of indicated sizes or they may use prepared cubes to measure their surface area and volume. Students combine cubes then compare the surface area volume ratio as the cube grows larger. Students compare this process to a cell as it grows larger

Assessment Procedure

- Classroom Total Participation Technique
- Classwork
- DBQ
- Essay
- Exit Ticket/Entrance Ticket/Do Now
- Exit tickets
- Foldables – organization of material (surface area vs. volume, movement of materials across cell membrane, phases of mitosis)
- Group discussion
- Journal / Student Reflection
- Kahoot
- Other named in lesson
- Peer Review
- Performance
- 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
- 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