

7.1 Cells and Systems

Content Area: **Science**
Course(s):
Time Period: **Marking Period 1**
Length: **6 weeks**
Status: **Published**

Course Pacing Guide

Unit	Marking Period	Length
Chemical Reactions and Matter Transformation	1	6 weeks
Cells and Systems (2019 only)	1	6 weeks
Metabolic Reactions	2	6 weeks
Genetics (2019 only)	2,3	4 weeks
Evolution (2019 only)	3	4 weeks
Photosynthesis and Matter Cycling	4	8 weeks
Ecosystems	4	6 weeks

Unit Overview

This unit focuses on the structure of living organisms and their growth, development and reproduction. Students first encounter a series of news reports about the growing prevalence of backyard chicken coops, and develop questions about why some chicken eggs hatch chicks and others don't, and what is going on inside an egg before it hatches. Students engage in investigations as they build understanding and move toward explaining how an organism grows and builds new body structures. They determine how the structure of cells support the movement of water, food and gas molecules that are needed in these processes.

Enduring Understandings

- Embryological development of different species reveals relationships not evident in the fully-formed anatomy.
- All living things are made up of cells, which is the smallest unit that can be alive.
- An organism may consist of one single cell (unicellular) or many cells (multicellular).
- Within cells, different structures are responsible for different functions; the cell membrane forms the boundary that controls what materials enter and leave the cell.
- In multicellular organisms, the body is a system of multiple interacting subsystems.
- These subsystems are groups of cells working together to form tissues and organs that are specialized for particular body functions.
- New cells are made from old cells, which use food as building blocks, to make more cell parts.

Essential Questions

- Why do some eggs hatch into chickens and others don't?
- What do eggs need to hatch?
- What is going on inside the egg that is getting ready to hatch?
- Is this the sort of thing happening in eggs that are laid by other creatures?
- What is inside any chicken egg?
- How can we use this microscope to see really small things up close?
- What is in all that blood?
- Do we find cells in other parts of living things?
- Are other kinds of living things made of cells?
- Where do all these cells come from?
- Where else are cells multiplying....and how and why does this happen?
- Where do cells get the building materials they need to grow and reproduce?
- How does the stuff a cell needs to grow get inside of it?
- How do eggs become chickens and other living things?
- Why don't store eggs develop into chicks?
- Does any of this happen with any other living things?

New Jersey Student Learning Standards (No CCS)

SCI.MS-LS4-3	Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.
SCI.MS-LS1-3	Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
SCI.MS-LS1-2	Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function.
SCI.MS-LS1-1	Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.

Interdisciplinary Connections

LA.RI.6.1	Cite textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.
LA.W.6.1	Write arguments to support claims with clear reasons and relevant evidence.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables

LA.SL.6.5

using graphs and tables, and relate these to the equation.

Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.

Technology Standards

TECH.8.1.8

Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

21st Century Themes/Careers

CRP.K-12.CRP2

Apply appropriate academic and technical skills.

CRP.K-12.CRP4

Communicate clearly and effectively and with reason.

CRP.K-12.CRP6

Demonstrate creativity and innovation.

CRP.K-12.CRP7

Employ valid and reliable research strategies.

CRP.K-12.CRP8

Utilize critical thinking to make sense of problems and persevere in solving them.

CRP.K-12.CRP11

Use technology to enhance productivity.

CRP.K-12.CRP12

Work productively in teams while using cultural global competence.

Instructional Strategies & Learning Activities

Throughout this unit, students will:

- View video clips of backyard chicken coops
- Read non-fiction excerpts
- Examine and chart chicken development
- Examine embryo sketches of various organisms
- Dissect store egg
- Analyze nutrition labels
- Use microscopes to view prepared slides from various organisms
- Use microscopes to view plant and bacteria samples
- Plan and carry out multiple investigations
- Develop and use models to show increased understanding as unit progresses
- Write scientific explanations

Differentiated Instruction

- Inquiry/Problem-Based Learning
- Learning preferences integration (visual, auditory, kinesthetic)
- Sentence & Discussion Stems
- Tiered Learning Targets

- Meaningful Student Voice & Choice
- Relationship-Building & Team-Building
- Self-Directed Learning
- LMS use
- Student Data Inventories
- Mastery Learning (feedback toward goal)
- Grouping
- Rubrics
- Jigsaws
- Assessment Design & Backwards Planning

Formative Assessments

Including, but not limited to:

- Science notebook entries
- Scientist circle
- Initial models
- Google reflection forms/exit tickets

Summative Assessment

- Final Model and final Scientific Explanation (CER)

Benchmark Assessments

- Fall/Winter LinkIt Assessments

Resources & Technology

Adapted from Nextgenstorylines unit, "How do eggs become chickens and other living things?"

- Student chromebook use
- (optional) incubator
- Microscopes, prepared slides

BOE Approved Texts

N/A

Closure

Individual classes and lessons will end with a closure activity that reinforces what students figured out during class, and helps navigate toward next steps.

Closure activities may include:

- Scientists' Circle
- Post-it reflection
- Google form exit ticket
- Group performance reflection
- Science notebook jot

ELL

- Alternate Responses
- Extended Time
- Teacher Modeling
- Simplified Written and Verbal Instructions
- Frequent Breaks
- Google Translate

Special Education

Accommodations will be made in accordance with students' IEPs. The following list provides examples:

- Shorten assignments to focus on mastery of key concepts.
- Substitute alternatives for written assignments (clay models, posters, panoramas, collections, etc.)
- Keep workspaces clear of unrelated materials.
- Provide a computer for written work.
- Seat the student close to the teacher or a positive role model.
- Provide an unobstructed view of the chalkboard, teacher, movie screen, etc.
- Keep extra supplies of classroom materials (pencils, books) on hand.
- Maintain adequate space between desks.
- Give directions in small steps and in as few words as possible.

- Number and sequence the steps in a task.
- Have student repeat the directions for a task.
- Provide visual aids.
- Go over directions orally.
- Allow the student to complete an independent project as an alternative test.
- Show a model of the end product of directions (e.g., a completed math problem or finished quiz).
- Stand near the student when giving directions or presenting a lesson.
- Mark the correct answers rather than the incorrect ones.
- Use a pass-fail or an alternative grading system when the student is assessed on his or her own growth.

504

Examples of accommodations in 504 plans include but are not limited to:

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits

At Risk

Examples may include:

- Have student restate information
- Provision of notes or outlines
- Concrete examples
- Assistance in maintaining uncluttered space
- Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
- Peer or scribe note-taking
- Use of manipulatives
- No penalty for spelling errors or sloppy handwriting
- Follow a routine/schedule
- Teach time management skills
- Verbal and visual cues regarding directions and staying on task
- Adjusted assignment timelines
- Visual daily schedule
- Immediate feedback
- Work-in-progress check

- Pace long-term projects
- Preview test procedures
- Film or video supplements in place of reading text
- Pass/no pass option
- Cue/model expected behavior
- Use de-escalating strategies
- Use peer supports and mentoring
- Have parent sign homework/behavior chart

Gifted and Talented

Examples may include:

- Offer choice
- Speak to Student Interests
- Allow G/T students to work together
- Tiered learning
- Focus on effort and practice
- Encourage risk taking