7.7 Ecosystems

Content Area: **Science**
Course(s):
Time Period: **Marking Period 4**
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

In this unit, students will build on their understanding from previous units about energy and matter cycling as they explore ecosystems. Ecosystems are complex, interactive systems that include both biological communities (biotic) and physical (abiotic) components of the environment. Ecosystems are dynamic, experiencing shifts in population composition and abundance and changes in the physical environment over time, which ultimately affects the stability and resilience of the entire system.

Enduring Understandings

LS2.A: Interdependent Relationships in Ecosystems

- Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1)
- In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (MS-LS2-1)
- Growth of organisms and population increases are limited by access to resources. (MS-LS2-1)
- Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory,

and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. (MS-LS2-2)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological components of an ecosystem can lead to shifts in all its populations. (MS-LS2-4)
- Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. (MS-LS2-5)

LS4.D: Biodiversity and Humans

- Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5)

ETS1.B: Developing Possible Solutions

There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (secondary to MS-LS2-5)

Essential Questions

LS2: Ecosystems: Interactions, Energy, and Dynamics

How (and why} do organisms interact with their environment and what are the effects of these interactions?

- LS2.A: Interdependent Relationships in Ecosystems

  How do organisms interact with the living and nonliving environments to obtain matter and energy?

- LS2.C: Ecosystems Dynamics, Functions and Resilience

  What happens to ecosystems when the environment changes?

- LS2.D: Social Interactions and Group Behavior

  How do organisms interact in groups so as to benefit individuals?

New Jersey Student Learning Standards (No CCS)

SCI.HS-LS2-1	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
SCI.HS-LS2-5	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
SCI.HS-LS2-4	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
SCI.HS-LS2-2	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

Interdisciplinary Connections

LA.RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
LA.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).
LA.WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
LA.WHST.6-8.9	Draw evidence from informational texts to support analysis, reflection, and research.
MA.6.SP.B.5	Summarize numerical data sets in relation to their context, such as by:

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.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.

Instructional Strategies & Learning Activities

- Warm-ups
- Group and classroom discussion
- Hands-on activities

- Inquiry-based Learning Activities
- Group Demonstrations
- Internet Technology (visual aids, videos, and interactive websites)
- Class Surveys/Debates
- Field Trip

Differentiated Instruction

Examples may include:
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
Student Interest & Inventory Data

Formative Assessments

Include, but are not limited to:

- Classwork on various topics
- Homework Assignments
- Differentiated Projects
- Teacher observations
- Discussion/Class participation
- Labs
- Resource Checks

Summative Assessment

Final Student-choice Project and/or end of unit assessment
Scientific Model and Explanation

Benchmark Assessments

Fall/Winter LinkIt Assessments

Alternate Assessments

Modifications to assessments based on IEP/504; alternate assessments may include oral explanations, scaffolded templates, digital choice for final model representations

Resources & Technology

Internet Technology (visual aids, videos, and interactive websites)

BOE Approved Texts

McGraw-Hill Education “Life Science”

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-escalation 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