Winslow Township School District

Grade 6 Science

Unit 3: Interactions Within Ecosystems

Overview: In this unit students will analyze and interpret data, develop models, construct arguments, and demonstrate a deeper understanding of the cycling of matter, the flow of energy, and how organisms interact with their environment, and resources in ecosystems. They consider factors in an ecosystem and the effects these factors have on individuals and populations. They will also analyze the health of ecosystems by studying the biodiversity of an area as well as how interactions within the ecosystem can make changes over time. Students demonstrate grade-appropriate proficiency in analyzing and interpret data, developing models, and constructing arguments.

Overview	Standards for Science	Unit Focus	Essential Questions
Unit **Interactions Within Ecosystems**	**MS-LS1-6** **MS-LS1-7** **MS-LS2-1** **MS-LS2-2** **MS-LS2-3** **MS-LS2-4** **MS-LS2-5** **WIDA 1,4**	• Matter and Energy in Ecosystems • Dynamic Ecosystems • Biodiversity in Ecosystems	• How do plants and animals obtain and process energy? • How does energy move in an environment? • How does matter cycle through the environment? • How do limited resources affect populations and communities? • How do organisms interact in symbiotic and nonsymbiotic relationships? • How do natural and human disruptions to physical and biological components of

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Unit 3: Enduring Understandings	• Light energy is used to make sugars from carbon dioxide and water through the process of photosynthesis • Food must move through a series of chemical reactions in organisms to support growth • In an ecosystem, energy is transferred between producers, consumers, and decomposers • Matter cycles through both the living and nonliving parts of an ecosystem • Limiting factors exist in an ecosystem on different organisms • Symbiotic and nonsymbiotic relationships occur between living things within an ecosystem • Changes to any component of an ecosystem affect other populations within an ecosystem • There are different types of biodiversity and biodiversity can be measured • Changes to an ecosystem can affect its stability • Identify strategies to maintain biodiversity and protect from threats	ecosystems result in shifts in populations? • Why is biodiversity important? • What can be done to protect biodiversity?

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Curriculum Unit 3	Standards		Pacing	
			Days	Unit Days
Unit 3: **Interactions Within Ecosystems**	**MS-LS1-6**	Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	6	45
	MS-LS1-7	Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.	6	
	MS-LS2-1	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	6	
	MS-LS2-2	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	6	
	MS-LS2-3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	6	

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	MS-LS2-4	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	6	
	MS-LS2-5	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	6	
	Assessment, Re-teach and Extension		3	

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Disciplinary Core Ideas	**Indicator #**	**Indicator**
LS1.C: Organization for Matter and Energy Flow in Organisms Plants, algae, and many microorganisms use the energy from light to make sugars from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use. (MS-LS1-6) Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. (MS-LS1-7) **PS3.D: Energy in Chemical Processes and Everyday Life** The chemical reaction by which plants produce complex food molecules requires an energy input to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. (MS-LS1-6) Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex	**MS-LS1-6**	Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
	MS-LS1-7	Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

molecules containing carbon react with oxygen to produce carbon dioxide and other materials. (MS-LS1-7) **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 an 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)	**MS-LS2-1**	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
	MS-LS2-2	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
	MS-LS2-3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

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LS2.B: Cycle of Matter and Energy Transfer in Ecosystems Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3)	**MS-LS2-4**	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
LS2.C: Ecosystem Dynamics, Functioning, and Resilience Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component 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. (MS-LS2-5)	**MS-LS2-5**	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

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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) 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.B: Cycle of Matter and Energy Transfer in Ecosystems** Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3)		

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<table>
<tr><th colspan="2">Unit 3 Grade 6</th></tr>
<tr><th colspan="2">Assessment Plan</th></tr>
<tr><td>• Exploratory activities
• Warm-up activities
• Individual/Group Lab report
• Class discussions
• Student Participation
• Teacher Observations</td><td>•Quizzes
• Tests
• Authentic assessments and projects
• Exploratory activities
• Presentations</td></tr>
<tr><th>Resources</th><th>Activities</th></tr>
<tr><td>• Chromebooks
• Textbook
• Reading Essentials Workbook
• Web Quests
• Virtual Field Trips
• Video Streaming
• BrainPOP
• Puzzlemaker: Game Based Learning | Discovery Education

Diversity, Equity & Inclusion Educational Resources
https://www.nj.gov/education/standards/dei/</td><td>• Students observe examples of plant structures that could affect the probability of plant reproduction These could be plant experiments (e.g., students could count the number of butterflies on brightly colored plants vs. the number of butterflies on other types of plants and record the data they collect in a table), using microscopes/magnifiers to view plant structures (e.g., dissecting a lily), going on field trips, both virtual and actual (e.g., butterfly garden/botanical garden).
• mini-lessons
• independent reading
• films
• website exploration
• discussions, dialogues
• debates
• partner or small group work
• student presentations, reports, journals, reflections,
• in-class assessments,
• written reports, essays, research, and homework</td></tr>
</table>

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Instructional Best Practices and Exemplars	
1. Identifying similarities and differences 2. Summarizing and note taking 3. Reinforcing effort and providing recognition 4. Homework and practice 5. Nonlinguistic representations	6. Cooperative learning 7. Setting objectives and providing feedback 8. Generating and testing hypotheses 9. Cues, questions, and advance organizers 10. Manage response rates

9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training & 9.4 Life Literacies and Key Skills

9.1.8.CR.4: Examine the implications of legal and ethical behaviors when making financial decisions.
9.4.8.CI.3: Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2).
9.4.8.CT.1: Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).
9.4.8.CT.3: Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome.
9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.

The implementation of the 21st Century skills and standards for students of the Winslow Township District is infused in an interdisciplinary format in a variety of curriculum areas that include, English language Arts, Mathematics, School Guidance, Social Studies, Technology, Visual and Performing Arts, Science, Physical Education and Health, and World Language.

Additional opportunities to address 9.1, 9.2 & 9.4:

Philadelphia Mint

https://www.usmint.gov/learn/kids/resources/educational-standards

Different ways to teach Financial Literacy.

https://www.makeuseof.com/tag/10-interactive-financial-websites-teach-kids-money-management-skills/

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Modifications for Special Education/504

Students with special needs: The students' needs will be addressed on an individual and grade level using a variety of modalities. Accommodations will be made for those students who need extra time to complete assignment. Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

- Small group instruction
- Audio books/ Text-to-speech platforms
- Leveled texts/Vocabulary Readers
- Leveled informational texts via online
- Modeling and guided practice
- Read directions aloud
- Repeat, rephrase and clarify directions
- Extended time as needed
- Break down assignments into smaller units
- Provide shortened assignments
- Modify testing format
- Repeat directions as needed
- Graphic organizers
- Study Guides, Study Aids and Re teaching as needed

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Modifications for At-Risk Students

Formative and summative data will be used to monitor student success. At first signs of failure, student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations

- Audio books and Text-to-speech platforms
- Leveled texts/Vocabulary Readers
- Leveled informational texts via online
- Extended time as needed
- Read directions aloud
- Assist with organization
- Use of computer
- Emphasize/highlight key concepts
- Recognize success
- Provide timelines for work completion
- Break down multi-step tasks into smaller chunks
- Provide copy of class notes and graphic organizer

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English Language Learners	Modifications for Gifted Students
All WIDA Can Do Descriptors can be found at this link: https://wida.wisc.edu/teach/can-do/descriptors ☐ Grades 6-8 WIDA Can Do Descriptors: ☐ Listening ☐ Speaking ☐ Reading ☐ Writing ☐ Oral Language Students will be provided with accommodations and modifications that may include: • Relate to and identify commonalities in science studies in student's home country • Assist with organization • Use of computer • Emphasize/highlight key concepts • Teacher Modeling • Peer Modeling • Label Classroom Materials - Word Walls	Students excelling in mastery of standards will be challenged with complex, high level challenges related to the topic. • Raise levels of intellectual demands • Require higher order thinking, communication, and leadership skills • Differentiate content, process, or product according to student's readiness, interests, and/or learning styles • Provide higher level texts • Expand use of open-ended, abstract questions • Critical and creative thinking activities that provide an emphasis on research and in-depth study • Enrichment Activities/Project-Based Learning/ Independent Study Additional Strategies may be located at the links: ❖ Gifted Programming Standards ❖ Webb's Depth of Knowledge Levels and/or Revised Bloom's Taxonomy ❖ REVISED Bloom's Taxonomy Action Verbs

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Interdisciplinary Connections
ELA Standards: **RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. **RST.6-8.2** Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. **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). **RST.6-8.8** Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. **RI.8.8** Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced. **WHST.6-8.**1 Write arguments focused on discipline content. **WHST.6-8.2** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. **WHST.6-8.8** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation **WHST.6-8.9** Draw evidence from literary or informational texts to support analysis, reflection, and research. **SL.8.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly. **SL.8.4** Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. **SL.8.5** Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. **Math Standards:** **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 using graphs and tables, and relate these to the equation. **6.SP.B.5** Summarize numerical data sets in relation to their context. **MP.4** Model with mathematics. **6.RP.A.3** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations

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Integration of Computer Science and Design Thinking NJSLS 8
8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose. 8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis. 8.1.8.DA.5: Test, analyze, and refine computational models. 8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users