# 2021-2022 SCIENCE UNITS

## GRADE 7

BAKERSFIELD CITY SCHOOL DISTRICT

**ACHIEVING EXCELLENCE FOR ALL STUDENTS**

*Through Equity and Innovation*

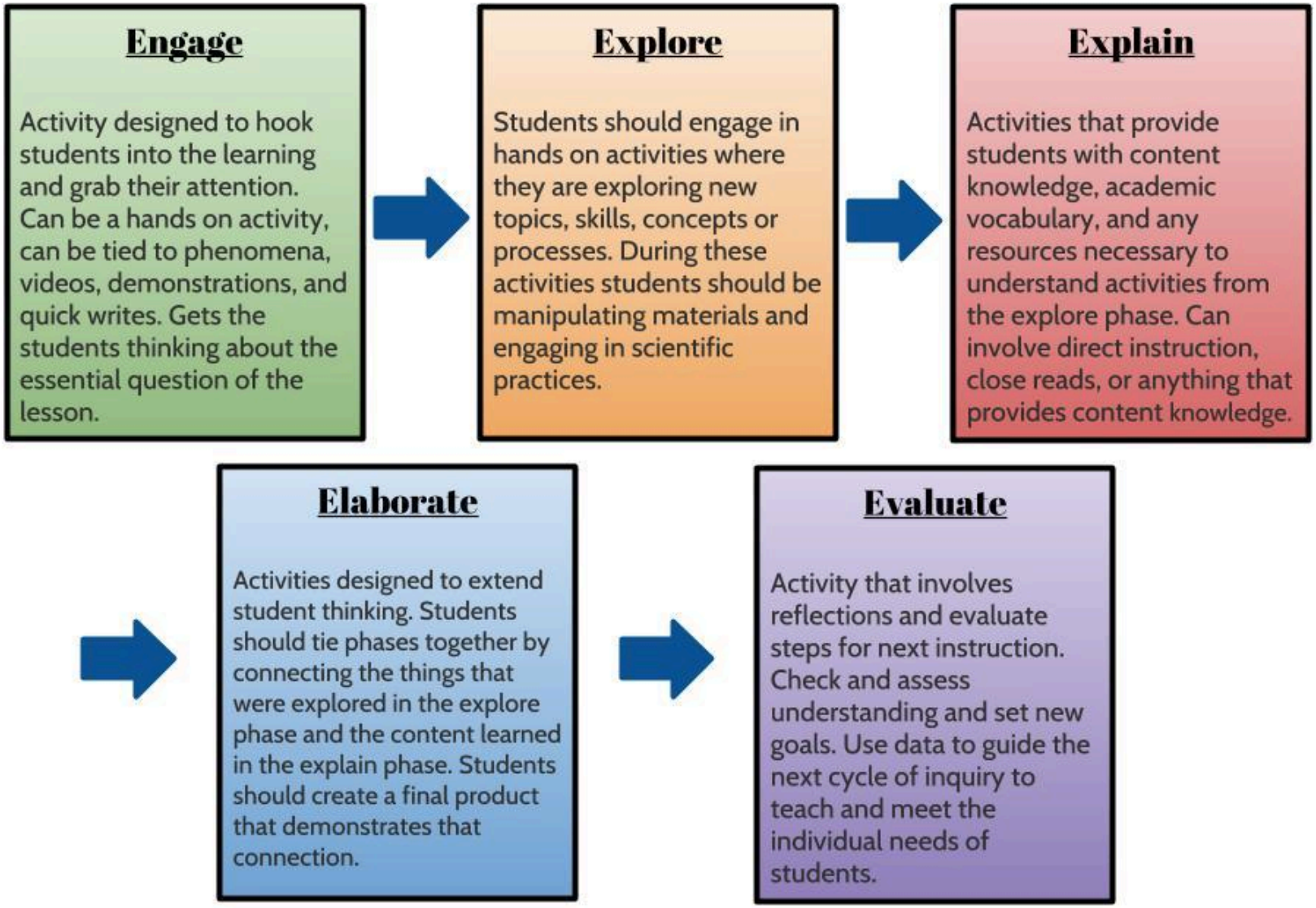
# Middle School- 7th Grade Unit 3

## Ecosystems



Resources: *National Science Teaching Association, nsta.org*

# Writing a 5E Lesson






Resources: *National Science Teaching Association, nsta.org*

# Unit at a Glance

## Link to Unit Standards

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-LS1-6

**Clarification Statement:** Emphasis is on tracing movement of matter and flow of energy.

**Assessment Boundary:** Assessment does not include the biochemical mechanisms of photosynthesis.

Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. MS-LS2-1

**Clarification Statement:** Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.

**Assessment Boundary:** none

Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. MS-LS2-3

**Clarification Statement:** Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.

**Assessment Boundary:** Assessment does not include the use of chemical reactions to describe the processes.

Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. MS-LS2-4

**Clarification Statement:** Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.

**Assessment Boundary:** none

Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. MS-LS2-2

**Clarification Statement:** Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.

**Assessment Boundary:** none

## Evaluate competing design solutions for maintaining biodiversity and ecosystem services. MS-LS2-5

**Clarification Statement:** Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.

**Assessment Boundary:** none

# MS-LS1-6 & MS-LS2-3: The Flow of Matter and Energy in Ecosystems

## Standard Clarification

***Focuses on students knowing that:***

- *Matter and energy move through living and nonliving parts of an ecosystem*
- *Photosynthesis plays a role in this cycling of energy and matter*

# MS-LS1-6 & MS-LS2-3: The Flow of Matter and Energy in Ecosystems

| Academic Vocabulary | Phenomena* | 5E Lessons | Manipulatives | Essential Questions |
|---|---|---|---|---|
| • *Photosynthesis*<br>• *Glucose*<br>• *Producer*<br>• *Consumer*<br>• *Decomposer*<br>• *Apex predator*<br>• *Herbivore*<br>• *Autotroph*<br>• *Heterotroph* | • Watering Hole<br>• Food Web<br>• Food Chain | *Lesson 1- Matter and Energy in Ecosystems*<br><br>*(Modifications for virtual learning are embedded in the 5E lesson)* | • *Food Chain Picture Cards* | • *How do matter and energy move through an ecosystem?*<br>• *How does photosynthesis contribute to matter and energy flowing through an ecosystem?* |
| **Functions** | | **Link to Standard** | | **Achieve 3000** |
| • *Energy moves through an ecosystem by _____.* | | *MS-LS1-6*<br><br>*MS-LS2-3* | | *For the Love of Vultures (6-8) - 5-step lesson*<br><br>*Water These Plants? Maybe Not.* 5-step lesson |
| ***BrainPOP***<br>*Login through Clever*<br><br>***Suggested lesson(s):*** | ***Zingy Learning***<br>*Sign-up/Login*<br><br>***Suggested lesson(s):***<br><br>MS, Subject-specific, | | | |

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|---|---|---|---|---|
| Ecosystems<br>Carbon Cycle<br>Nitrogen Cycle<br>Water Cycle<br>Photosynthesis | Life Science, Unit 22, lessons 1-5: Photosynthesis<br><br>MS, Subject-specific, Life Science, Unit 24, lessons 1-5: Food webs | | | |

**Phenomena supports Academic Language Development through picture prompts*

# *MS-LS2-1 & MS-LS2-4: Resources and Populations in an Ecosystem*

## *Standard Clarification*

***Focuses on students knowing that:***

- *The amount of resources available in an ecosystem can affect the organisms within that ecosystem*
- *Changes to the living and nonliving things in an ecosystem can affect the organisms within that ecosystem*

# MS-LS2-1 & MS-LS2-4: Resources and Populations in an Ecosystem

| Academic Vocabulary | Phenomena* | 5E Lessons | Manipulatives | Essential Questions |
|---|---|---|---|---|
| • *Population*<br>• *Biotic factor*<br>• *Abiotic factor*<br>• *Resource*<br>• *Extinct*<br>• *Coextinction*<br>• *Keystone species* | • Bird's Nest<br>• Polar Bears<br>• Drought in California<br>• Sea Otters and Kelp | *Lesson 2 - Resources & Populations in an Ecosystem*<br><br>*(Modifications for virtual learning are embedded in the 5E lesson)* | • *Plastic cups*<br>• *Green bean seeds*<br>• *Potting soil*<br>• *Water*<br>• *Rubbing alcohol* | • *How do the amount of resources available in an ecosystem affect the organisms that make it up?*<br><br>• *How do changes to the ecosystem affect the living and nonliving things within it?* |
| **Functions** | | **Link to Standard** | | **Achieve 3000** |
| ***BrainPOP***<br>*Login through Clever*<br><br>***Suggested lesson(s):***<br>Ecosystems | ***Zingy Learning***<br>*Sign-up/Login*<br><br>***Suggested lesson(s):***<br>MS, Subject-specific, Life Science, Unit 25, lessons 1-4: Resources<br><br>MS, Subject-specific, Life Science, Unit 21, lesson 1: Ecosystem Changes | *MS-LS2-1*<br><br>*MS-LS2-4* | | *Giants of California* (6-8) - 5-step lesson<br><br>*What's Making the Sea Lions Sick?*<br><br>*Counting Rats From Space* |

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|---|---|---|---|---|
| | | | | *Not To Bug You...* |

**Phenomena supports Academic Language Development through picture prompts*

# *MS-LS2-2: Organisms Across Multiple Ecosystems*

## *Standard Clarification*

***Focuses on students knowing that:***

- *Organisms interact with other organisms in their environment*
- *These interactions are a pattern that can be seen across multiple ecosystems*

# MS-LS2-2: Organisms Across Multiple Ecosystems

| Academic Vocabulary | Phenomena* | 5E Lessons | Manipulatives | Essential Questions |
|---|---|---|---|---|
| • Organism<br>• Predator<br>• Prey<br>• Competition<br>• Beneficial<br>• Predation<br>• Mutual<br>• Parasite | • Crocodile and Bird<br>• Gazelle and Spider<br>• Shark and Fish | Lesson 3 - Organism Interactions<br><br>(Modifications for virtual learning are embedded in the 5E lesson) | • Organism Interactions Stations | • In what ways do organisms interact with the other living and nonliving things in their environments? |
| **Functions** | | **Link to Standard** | | |
| | | MS-LS2-2 | | |
| | | | | **Achieve 3000** |
| **BrainPOP**<br>Login through Clever<br><br>**Suggested lesson(s):**<br>Ecosystems | **Zingy Learning**<br>Sign-up/Login<br><br>**Suggested lesson(s):**<br>MS, Subject-specific, Life Science, Unit 26, lesson 1: Ecological Interactions | | | What's Making the Sea Lions Sick?<br><br>What Snakes Can Do<br><br>Let Them Eat Leaves |

**Phenomena supports Academic Language Development through picture prompts*

# *MS-LS2-5: Maintaining Biodiversity*

| ***Standard Clarification*** |
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| ***Focuses on students knowing that:***<br><br>• *Biodiverse ecosystems provide great benefits to humans and should therefore be protected*<br><br>• *There are solutions for maintaining biodiversity, and those solutions can be evaluated and performed* |

# MS-LS2-5: Maintaining Biodiversity

| Academic Vocabulary | Phenomena* | 5E Lessons | Manipulatives | Essential Questions |
|---|---|---|---|---|
| • *Biodiversity*<br>• *Fossil Fuels* | • Turtle in Plastic<br>• Coral Bleaching | *Lesson 4 - Maintaining Biodiversity*<br><br>*(Modifications for virtual learning are embedded in the 5E lesson)* | • *Importance of Biodiversity Circle Map*<br>• *Importance of Biodiversity Stations* | • *Why is biodiversity something that humans should be concerned with?*<br><br>• *How can humans positively impact the amount of biodiversity in Earth's ecosystems?* |
| **Functions**<br>• | | **Link to Standard**<br>*MS-LS2-5* | | |
| | **BrainPOP**<br>*Login through Clever*<br><br>***Suggested lesson(s):***<br>Tropical Rainforests Ecosystems (listed in lesson 3 also)<br>Air Pollution<br>Water Pollution | **Zingy Learning**<br>*Sign-up/Login*<br><br>***Suggested lesson(s):***<br>MS, Subject-Specific, Life Science, Unit 28, Lessons 1-3: Biodiversity & Ecosystem Services | | **Achieve 3000** |

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|---|---|---|---|---|
| | | | | "One Strange Dinosaur"<br><br>"A Story With Legs"<br><br>"Saving the Spruce Grouse" |

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# Additional Unit Resources

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|---|---|
| Reading/ Navigating the Standards | Standard Codes |
| Writing a 5E Lesson | Unit and Lesson Planning |

# Online Resources

| Resource | Description |
|---|---|
| Teach Engineering | Great hands on activities/ science and engineering lessons |
| Try Engineering | Engineering lesson plans and resources |
| Phet | Wonderful demonstrations, visual models and simulations |
| Better Lesson | Additional lessons and lesson planning strategies |