ASSOCIATION of FISH & WILDLIFE AGENCIES

Flying WILD®

Correlations

of the

Flying WILD Online Course Activities

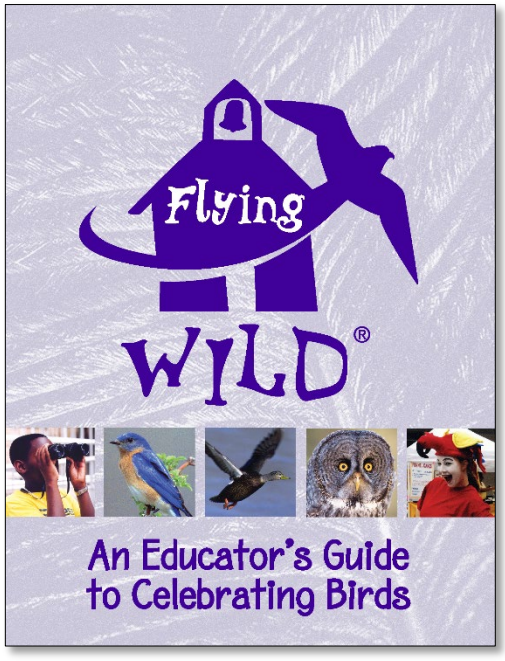
to

Next Generation Science Standards

and the

Framework for K-12 Science Education

2023



Flying WILD Activity Correlations

Introduction

Purpose:

Flying WILD: An Educator's Guide to Celebrating Birds is interdisciplinary, offering activities that focus on everything from mathematics to social studies, but Flying WILD is especially relevant to science, specifically the 6-8 grade levels in both formal and nonformal settings. Most states have now adopted *The Next Generation Science Standards* (NGSS) or standards based on *A Framework for K-12 Education.* The foundations for both are three dimensions of science: Disciplinary Core Ideas, Science and Engineering Practices, and Crosscutting Concepts. Project WILD materials—including *Flying WILD*—provide phenomenon-based experiences and activities that are three-dimensional, supporting the standards teachers must work to help their students achieve. Now more than ever, WILD materials can be viewed as tools to help teachers get students outside while engaging in standards-based teaching and learning. This document was developed in 2023 as a companion for the Flying WILD online course to highlight the three-dimensionality and phenomenon-based aspects of the seven activities included from *Flying WILD: An Educator's Guide to Celebrating Birds*.

NGSS & the Framework:

The NGSS are national K–12 science content standards. They set the expectations for what students should know and be able to do at the end of instruction. The NGSS were developed by states to improve science education for all students by providing a set of research-based, up-to-date K–12 science standards. These benchmarks give local educators the flexibility to design classroom learning experiences that stimulate students' interests in science and prepare them for college, careers, and citizenship.

Learn more about how Achieve coordinated the work of twenty-six Lead State Partners and collaborated with critical partners, including the National Research Council, the National Science Teachers Association, and the American Association for the Advancement of Science, to develop the NGSS based on the NRC's K-12 Framework for Science Education.

Terms to Know

DCI: Disciplinary Core Idea | SEP: Science and Engineering Practice | CCC: Crosscutting Concept

PE: Performance Expectation

Phenomenon-Based & The Untethered Dimensions:

According to NGSS, natural phenomena are observable events that occur in the universe and that we can use our science knowledge to explain or predict. Framing the phenomenon at the crux of the activity for each correlation is a "Guiding Question." This question or phenomenon is meant to drive the instruction and allow students to use SEPs to explain or predict and CCCs to make sense of that phenomenon.

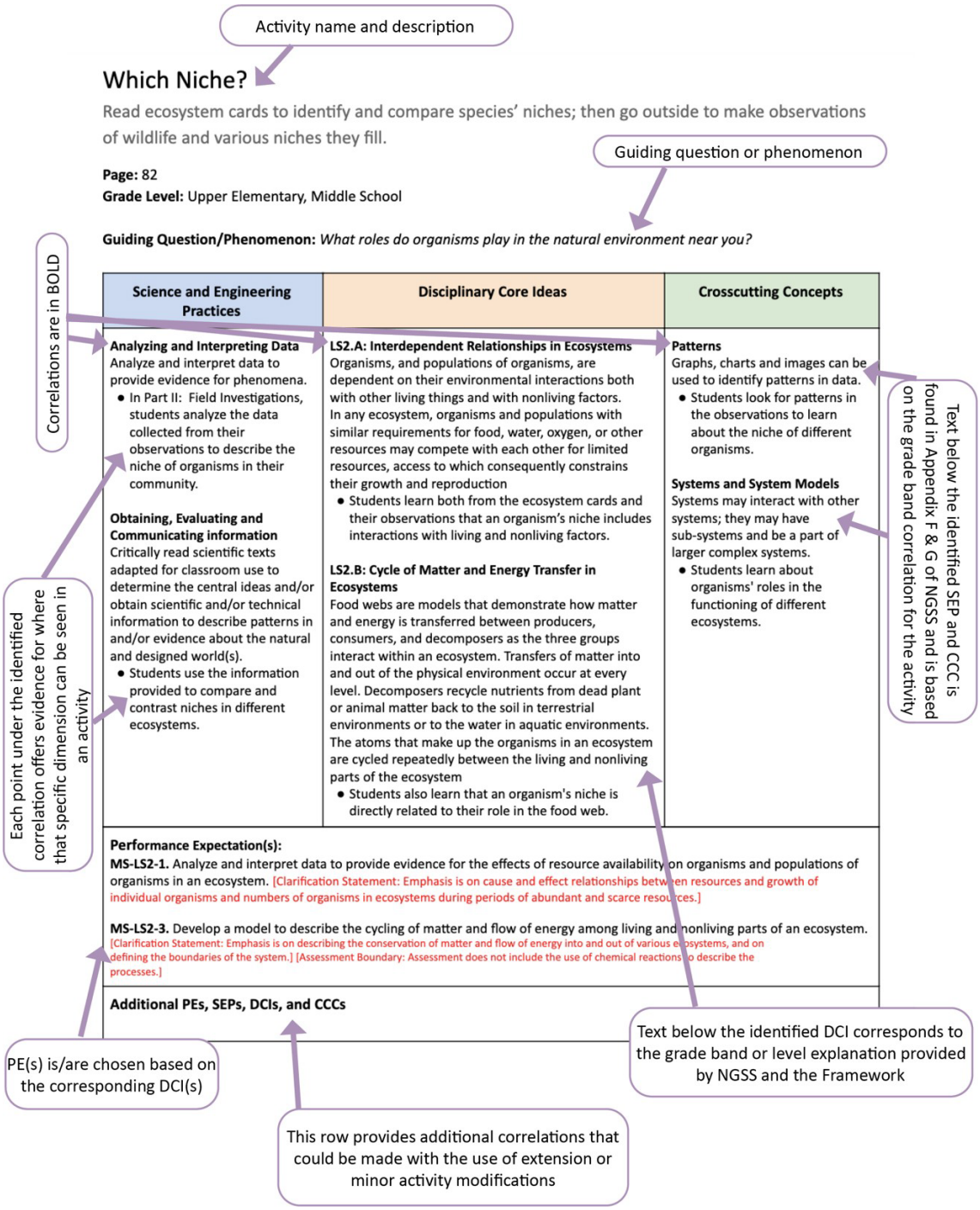
The actual "standard" in NGSS is the three-dimensional Performance Expectation (PE). The PEs are not the focus of these correlations because any single standard (or PE) cannot be effectively taught in one lesson or activity. Consequently, the approach for developing these correlations is known as "untethered," where the appropriate DCI from the Performance Expectation is used but is not necessarily the stated SEPs or CCCs. Rather, the SEPs and CCCs actually used by students in the activity are specified in the correlations.

The Correlation Document:

Each correlation document begins with basic details about the activity and a guiding question/phenomenon. The guiding question is meant to serve teachers with an idea for how the experience can be based on and driven by phenomena. Teachers are encouraged to adapt the guiding question to make it as relevant to students and their environment as possible.

The actual correlations can be found in the table on each document. The correlations are broken down by the three-dimensions and three columns: SEPs, DCIs, and CCCs. The bold words in each column signify the specific correlation(s). In most instances, there are

multiple correlations for each dimension. Each correlation has a bullet providing evidence of the specified dimension from the activity. The Performance Expectation (the actual standard) supported by the learning experience is in the row below the three columns. As stated above, however, we have used the untethered approach as recommended by Nextgenscience for connecting the SEPs and CCCs. Both the SEP and the CCC text below the bolded correlations are found in the NGSS progressions, Appendix F and Appendix G respectively. These progressions show how each SEP or CCC relates directly to an activity's specified grade band. Some activities can be easily modified to support additional correlations. Notes about these additional correlations, where applicable, have been made in the last row of the table. Below is a diagram to help with understanding each correlation page.



Adaptation Artistry

Design and construct birds and describe your bird creation's adaptations and habitat.

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Grade Level: Middle School

Guiding Question/Phenomenon: *The birds resting and feeding outside the classroom window look very different from birds on the seashore, or those that live in the tropics or polar regions. Why are there so many variations in beaks, feet, legs, wings, and coloration?*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Develop models to describe phenomena. ● Students develop a model to represent the adaptations (trait variations) of the bird they design to live in a particular habitat. **Constructing Explanations and Designing Solutions** Construct an explanation using models or representations. ● Students use evidence represented by their bird's designed characteristics to explain how it could live successfully in the selected habitat the students created for it.	**LS1.B: Growth and Development of Organisms** Animals engage in characteristic behaviors that increase the odds of reproduction. ● Students explain how the birds they design are adapted to successfully move, eat, and raise their young based on the habitat in which they live.	**Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. ● Students explain how inherited or environmentally influenced traits have caused their birds to be able to survive and thrive in their habitats. **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. Models can be used to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. ● Students describe how each structure (subsystem) works with the other structures of the bird (system) to ensure its success in its habitat (ecosystem).

Performance Expectation(s):

Additional PEs, SEPs, DCIs, and CCCs
This activity also correlates well with the same SEPs and CCCs at the 3-5 level.

The DCIs below align well with this activity at the 3-5 level:

DCI – LS1.A: Structure and Function
Animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.
● Students assign specialized functions to the structures they assign to their designed bird.

DCI – LS3.B: Variations of Traits
Different organisms vary in how they look and function because they have different inherited information. The environment also affects the traits that an organism develops.
● Students explain how inherited information and/or environmental factors influence how the bird looks and acts.

DCI – LS4.B: Natural Selection
Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding

mates, and reproducing.
● Students explain how the structures assigned to their bird gives it advantages to survive and thrive in their habitat.

Grades 3-5 PEs:

3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. [Clarification Statement: Examples of cause and effect relationships could plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]

Bird Behavior Scavenger Hunt

Explore behavioral adaptations including migration, courtship, preening, flocking, feeding, and more.

Page: 84
Grade Level: Middle School

Guiding Question/Phenomenon: *See a bird outside? What is it doing, and why do you think it's behaving that way?*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyze and interpret data to provide evidence for phenomena. ● Students make observations to understand how birds meet their needs. **Constructing Explanations and Designing Solutions** Construct an explanation that includes qualitative or quantitative relationships between variables that predict(s) and/or describe(s) phenomena. Apply scientific ideas, principles, and/or evidence to construct, revise and/or use an explanation for real-world phenomena, examples, or events. ● Students describe how an observed bird behavior helps it survive.	**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. ● Through their observations and subsequent discussion, students learn how the birds they find in their community are dependent on the living and nonliving factors of the environment. **LS1.B: Growth and Development of Organisms** Animals engage in characteristic behaviors that increase the odds of reproduction. ● Students observe and reflect on bird behaviors, including singing to attract mates and nest building.	**Patterns** Patterns can be used to identify cause and effect relationships. ● Students observe similarities and differences in bird behavior, and how those behaviors help the bird meet its needs.

Performance Expectation(s):

MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. [Clarification Statement: Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds, and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.]

Additional PEs, SEPs, DCIs, and CCCs

This activity also correlates with the SEP Constructing Explanations and Designing Solutions at the 3-5 level. The following DCIs and PEs correlate with the 3-5 level as well:

LS1.A: Structure and Function Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.

LS2.D: Social Interactions and Group Behavior Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size (Note: Moved from K–2).

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

3-LS2-1. Construct an argument that some animals form groups that help members survive.

Bird Heroes

Research and interview people who have contributed to bird conservation.

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Grade Level: Middle School

Guiding Question/Phenomenon: *How are people in your community helping birds?*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Obtaining, Evaluating, and Communicating Information Communicate scientific and/or technical information (e.g., about a proposed object, tool, process, system) in writing and/or through oral presentations. ● Students research and share information about a Bird Hero in their community.	**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. ● Students read about and research bird heroes who conserve habitat (including living and nonliving factors) and thereby conserve the organisms who live there. **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. ● Students read about and research bird heroes who conserve habitat, why the conservation measures were needed, and how the populations have shifted as a result. **ESS3.C: Human Impacts on Earth Systems** Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. ● Students read about and research bird heroes who have contributed to the conservation of their community's birds and bird habitats, oftentimes reversing damage previously done by humans.	**Patterns** Patterns can be used to identify cause and effect relationships. ● Students discuss similarities and differences among the local bird heroes whom they profiled. They interview these heroes to understand what prompted them to act. **Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. ● Students research and interview bird heroes to understand what the problem was, what actions the hero took, and what the effect has been on the bird population. **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. ● Students read about and research bird heroes who help conserve habitat systems. Conservation often involves altering one part of a system (e.g., removing debris, planting marsh grass) to impact another part of the system (e.g., presence of birds). **Stability and Change** Stability might be disturbed either by sudden events or gradual changes that accumulate over time. ● Students research and interview bird heroes, learning about negative and positive changes that have impacted an ecosystem over time.

Performance Expectation(s):

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

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Additional PEs, SEPs, DCIs, and CCCs

This activity also correlates with the SEP Obtaining, Evaluating, and Communicating Information at the high school level.

Depending on the conservation issues and heroes researched, the following DCI may apply:

LS2.D: Social Interactions and Group Behavior 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)

Birds on Display

Create a scrapbook describing and depicting ways birds affect people's lives.

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Grade Level: Middle School

Guiding Question/Phenomenon: *How do humans rely on birds as a resource?*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
	LS2.D: Social Interactions and Group Behavior 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. ● Students consider the value of birds to humans, including as a food source.	
Performance Expectation(s):		
Additional PEs, SEPs, DCIs, and CCCs		

The Birding Beat

Challenge yourself to see how many birds you can identify on Birding Lane.

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Grade Level: Middle School

Guiding Question/Phenomenon: *How many kinds of birds that live near you can you identify?*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information. ● Students ask questions as they consult field guides to identify birds based on observed characteristics. **Developing and Using Models** Develop and/or use a model to predict and/or describe phenomena. ● Students use The (virtual) Birding Lane as a model to describe phenomena—i.e., identifying birds based on their characteristics, including habitat preferences. Students who conduct the activity in person will create their own version of The Birding Lane, with birds common to their area.	**LS2.C: Ecosystem Dynamics, Functioning, and Resilience** 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. ● Students learn about a variety of bird species that live in their community.	
Performance Expectation(s):		
Additional PEs, SEPs, DCIs, and CCCs		

Food Chain Tag

Investigate the importance of birds in nature by creating bird-based food chains.

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Grade Level: Middle School

Guiding Question/Phenomenon: *What would happen if all birds suddenly disappeared?*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Use models to describe and/or predict phenomena. ● Students simulate the transfer of matter, including toxic chemicals, throughout a food chain. **Constructing Explanations and Designing Solutions** Construct an explanation using models or representations. Apply scientific ideas, principles, and/or evidence to construct, revise and/or use an explanation for real-world phenomena, examples, or events. ● Students refer to the simulation to explain how matter is transferred throughout a food chain, including toxic chemicals. Students connect this example with the biomagnification of DDT and its historical impacts on bird populations.	**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. ● Students model the transfer of toxic chemicals as consumers interact within a food chain. **LS2.B: Cycles 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. ● Students review and discuss a food chain diagram, and simulate the transfer of matter in a food chain by acting as predator and prey. **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. ● Students discuss the effects of biomagnification of toxic chemicals on populations of organisms throughout the food web. **LS2.D: Social Interactions and Group Behavior** 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. ● In the extensions, students discuss	**Patterns** Patterns can be used to identify cause and effect relationships. ● Students simulate what happens when toxic chemicals are present in a food chain. **Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. ● Students simulate what happens when toxic chemicals are present in a food chain. **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. Models can be used to represent systems and their interactions—such as inputs, processes, and outputs—and energy, matter, and information flows within systems. Models are limited in that they only represent certain aspects of the system under study. ● Students simulate the transfer of matter, including toxic chemicals, in a food chain. Students reflect on how well the simulation accurately models what actually happens in an ecosystem. Students discuss impacts to ecosystems if birds—and the ecosystem services they provide—were to disappear. **Energy and Matter** The transfer of energy can be tracked as energy flows through a designed or natural system. ● Students model the transfer of matter throughout populations of consumers in a food chain. **Stability and Change** Small changes in one part of a system might cause large changes in another part. ● Students discuss how changes in the diet of prey animals can alter the health of animals throughout the food chain.

	ecosystem services provided by birds and how those are impacted when bird populations decline. **ESS3.C: Human Impacts on Earth Systems** Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. ● Students discuss how DDT impacted bird populations, and how the ecosystem services provided by birds would be impacted by the birds' disappearance.	

Performance Expectation(s):

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

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

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

Additional PEs, SEPs, DCIs, and CCCs

In Module 2, Forum A, of the Flying WILD online course, the SEP Developing and Using Models is reinforced as participants discuss what is realistic and unrealistic about the simulation. Educators asking students the same question would further address this SEP.

Teaming Up for Birds

Research wild bird conservation organizations and create a plan to form one of your own.

Page: 151
Grade Level: Middle School

Guiding Question/Phenomenon: *What are bird conservation organizations in your area doing to make a difference?*

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concepts
	ESS3.C: Human Impacts on Earth Systems Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (MSESS3-3) ● Students read about and research conservation organizations that have contributed to bird conservation, oftentimes reversing damage previously done by humans.	**Patterns** Patterns can be used to identify cause and effect relationships. ● Students discuss similarities and differences among bird conservation organizations, including why they were founded. **Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. ● Students research conservation organizations to understand the issue which prompted their founding, how the organization works to address the issue, and what success stories the organization has had. **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. ● Students read about and research conservation organizations and how they work in similar and different ways to support birds and their habitat. **Stability and Change** Stability might be disturbed either by sudden events or gradual changes that accumulate over time. ● Students research conservation organizations, learning about negative and positive changes that have impacted an ecosystem over time.
Performance Expectation(s): **5-ESS3-1.** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.		
Additional PEs, SEPs, DCIs, and CCCs		