

3rd Grade – Thematic Model – Bundle 3 Survival of Organisms

This is the third bundle of the 3rd Grade Thematic Model. Each bundle has connections to the other bundles in the course, as shown in the [Course Flowchart](#).

Bundle 3 Question: This bundle is assembled to address the question “what affects organisms’ survival?”

Summary

The bundle organizes performance with a focus on helping students build understanding of the various factors that affect the survival of organisms and groups of organisms. Instruction developed from this bundle should always maintain the three-dimensional nature of the standards, and recognize that instruction is not limited to the practices and concepts directly linked with any of the bundle performance expectations.

Connections between bundle DCIs

The idea that being part of a group helps animals obtain food, defend themselves, and cope with changes (LS2.D as in 3-LS2-1) connects to the idea that for any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all (LS4.C as in 3-LS4-3) in that both ideas are about the survival of kinds of organisms. These ideas can also connect to survival of individuals within a group and that sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing (LS4.B as in 3-LS4-2).

In order to identify the differences in characteristics between individuals that may provide an advantage, it is helpful to look at the patterns of variation of a given characteristic among individuals in a species (e.g., longer or shorter thorns on individual plants, dark or light coloration of animals). And through the concept of patterns, this bundle also gives an opportunity to continue the study of the idea that scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next (ESS2.D as in 3-ESS2-1).

Bundle Science and Engineering Practices

Instruction leading to this bundle of PEs will help students build toward proficiency in elements of the practices of analyzing and interpreting data (3-ESS2-1), constructing explanations and designing solutions (3-LS4-2), and engaging in argument from evidence (3-LS2-1 and 3-LS4-3). Many other practice elements can be used in instruction.

Bundle Crosscutting Concepts

Instruction leading to this bundle of PEs will help students build toward proficiency in elements of the crosscutting concepts of Patterns (3-ESS2-1) and Cause and Effect (3-LS2-1, 3-LS4-2, and 3-LS4-3). Many other crosscutting concepts elements can be used in instruction.

All instruction should be three-dimensional.

Performance Expectations

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

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 be 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.]

<p>Performance Expectations (Continued)</p>	<p>3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]</p> <p>3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]</p>
<p>Example Phenomena</p>	<p>Most people don't like to live completely on their own.</p> <p>Deer with larger antlers usually have more children.</p>
<p>Additional Practices Building to the PEs</p>	<p>Asking Questions and Defining Problems</p> <ul style="list-style-type: none"> ● Use prior knowledge to describe problems that can be solved. <p>Students could use prior knowledge [about] <i>patterns of the weather across different times and areas</i> to describe problems that can be solved. 3-ESS2-1</p> <p>Developing and Using Models</p> <ul style="list-style-type: none"> ● Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution. <p>Students could <i>develop a model using an example to describe</i> [that in a] <i>particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.</i> 3-LS4-3</p> <p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> ● Evaluate appropriate methods and/or tools for collecting data. <p>Students could <i>evaluate appropriate methods for collecting data</i> [on how well] <i>some kinds of organisms survive in a particular environment.</i> 3-LS4-3</p> <p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> ● Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation. <p>Students could <i>analyze and interpret data using logical reasoning to make sense</i> [of] <i>the differences in characteristics between individuals of the same species.</i> 3-LS4-2</p> <p>Using Mathematical and Computational Thinking</p> <ul style="list-style-type: none"> ● Describe, measure, estimate, and/or graph quantities such as area, volume, weight, and time to address scientific and engineering questions and problems. <p>Students could <i>describe, estimate, and graph quantities to address scientific questions</i> [about the] <i>dramatic variation in group sizes.</i> 3-LS2-1</p> <p>Constructing Explanations and Designing Solutions</p> <ul style="list-style-type: none"> ● Construct an explanation of observed relationships (e.g., the distribution of plants in the backyard). <p>Students could <i>construct an explanation of observed relationships</i> [between] <i>patterns of the weather</i> [and] <i>different times and areas.</i> 3-ESS2-1</p>

<p>Additional Practices Building to the PEs (Continued)</p>	<p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> ● Construct and/or support an argument with evidence, data, and/or a model. <p>Students could <i>construct and support an argument with evidence</i> [that] <i>the differences in characteristics between individuals of the same species sometimes provide advantages in surviving, finding mates, and reproducing.</i> 3-LS4-2</p> <p>Obtaining, Evaluating, and Communicating Information</p> <ul style="list-style-type: none"> ● Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. <p>Students could <i>combine information from books and/or other reliable media to explain</i> [why animals often live in] <i>groups.</i> 3-LS2-1</p>
<p>Additional Crosscutting Concepts Building to the PEs</p>	<p>Patterns</p> <ul style="list-style-type: none"> ● Patterns can be used as evidence to support an explanation. <p>Students could use <i>patterns</i> [of] <i>the differences in characteristics between individuals of the same species as evidence to support an explanation that the different characteristics may provide advantages in surviving, finding mates, and reproducing.</i> 3-LS4-2</p> <p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none"> ● Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. <p>Students could describe why it is important to <i>use standard units to measure and</i> [compare] <i>physical quantities</i> [of] <i>characteristics</i> [of] <i>individuals</i> [when identifying] <i>differences in characteristics between individuals of the same species.</i> 3-LS4-2</p> <p>Systems and system models</p> <ul style="list-style-type: none"> ● A system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. <p>Students could describe a <i>group of animals</i> [that work together to] <i>obtain food, defend themselves, and cope with changes</i> [as a] <i>system</i> [composed] <i>of related parts that make up a whole and can carry out functions its individual parts cannot.</i> 3-LS2-1</p>
<p>Additional Connections to Nature of Science</p>	<p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> ● Science findings are based on recognizing patterns. <p>Students can describe how <i>science findings</i>—[such as that] <i>differences in characteristics between individuals of the same species</i> [can] <i>provide advantages in surviving, finding mates, and reproducing</i>—<i>are based on recognizing patterns.</i> 3-LS4-2</p> <p>Science is a Way of Knowing</p> <ul style="list-style-type: none"> ● Science is a way of knowing that is used by many people. <p>Students could construct an argument that <i>science is a way of knowing that is used by many people</i> [using as evidence the example of identifying] <i>patterns of the weather across different times and areas so that predictions</i> [can be made] <i>about what kind of weather might happen next.</i> 3-ESS2-1</p>

3-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Students who demonstrate understanding can:

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

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Engaging in Argument from Evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Construct an argument with evidence, data, and/or a model.

Disciplinary Core Ideas

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*).

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change.

Observable features of the student performance by the end of the grade:

1	Supported claims	
	a	Students make a claim to be supported about a phenomenon. In their claim, students include the idea that some animals form groups and that being a member of that group helps each member survive.
2	Identifying scientific evidence	
	a	Students describe* the given evidence, data, and/or models necessary to support the claim, including:
		i. Identifying types of animals that form or live in groups of varying sizes.
		ii. Multiple examples of animals in groups of various sizes:
		1. Obtaining more food for each individual animal compared to the same type of animal looking for food individually.
	2. Displaying more success in defending themselves than those same animals acting alone.	
	3. Making faster or better adjustments to harmful changes in their ecosystem than would those same animals acting alone.	
3	Evaluating and critiquing evidence	
	a	Students evaluate the evidence to determine its relevance, and whether it supports the claim that being a member of a group has a survival advantage.
	b	Students describe* whether the given evidence is sufficient to support the claim and whether additional evidence is needed.
4	Reasoning and synthesis	
	a	Students use reasoning to construct an argument connecting the evidence, data and/or models to the claim. Students describe* the following reasoning in their argument:
		i. The causal evidence that being part of a group can have the effect of animals being more successful in obtaining food, defending themselves, and coping with change supports the claim that being a member of a group helps animals survive.
	ii. The causal evidence that an animal losing its group status can have the effect of the animal obtaining less food, not being able to defend itself, and not being able to cope with change supports the claim that being a member of a group helps animals survive.	

3-LS4-2 Biological Evolution: Unity and Diversity

Students who demonstrate understanding can:

- 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 be 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.]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

<p>Science and Engineering Practices</p> <p>Constructing Explanations and Designing Solutions</p> <p>Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.</p> <ul style="list-style-type: none"> Use evidence (e.g., observations, patterns) to construct an explanation. 	<p>Disciplinary Core Ideas</p> <p>LS4.B: Natural Selection</p> <ul style="list-style-type: none"> Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. 	<p>Crosscutting Concepts</p> <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified and used to explain change.
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Observable features of the student performance by the end of the grade:

1	Articulating the explanation of phenomena						
	a Students articulate a statement that relates the given phenomenon to a scientific idea, including that variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.						
	b Students use evidence and reasoning to construct an explanation for the phenomenon.						
2	Evidence						
	a Students describe* the given evidence necessary for the explanation, including: <table border="1" style="margin-left: 20px;"> <tr> <td>i.</td> <td>A given characteristic of a species (e.g., thorns on a plant, camouflage of an animal, the coloration of moths).</td> </tr> <tr> <td>ii.</td> <td>The patterns of variation of a given characteristic among individuals in a species (e.g., longer or shorter thorns on individual plants, dark or light coloration of animals).</td> </tr> <tr> <td>iii.</td> <td>Potential benefits of a given variation of the characteristic (e.g., the light coloration of some moths makes them difficult to see on the bark of a tree).</td> </tr> </table>	i.	A given characteristic of a species (e.g., thorns on a plant, camouflage of an animal, the coloration of moths).	ii.	The patterns of variation of a given characteristic among individuals in a species (e.g., longer or shorter thorns on individual plants, dark or light coloration of animals).	iii.	Potential benefits of a given variation of the characteristic (e.g., the light coloration of some moths makes them difficult to see on the bark of a tree).
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ii.	The patterns of variation of a given characteristic among individuals in a species (e.g., longer or shorter thorns on individual plants, dark or light coloration of animals).						
iii.	Potential benefits of a given variation of the characteristic (e.g., the light coloration of some moths makes them difficult to see on the bark of a tree).						
3	Reasoning						
	a Students use reasoning to logically connect the evidence to support the explanation for the phenomenon. Students describe* a chain of reasoning that includes: <table border="1" style="margin-left: 20px;"> <tr> <td>i.</td> <td>That certain variations in characteristics make it harder or easier for an animal to survive, find mates, and reproduce (e.g., longer thorns prevent predators more effectively and increase the likelihood of survival; light coloration of some moths provides camouflage in certain environments, making it more likely that they will live long enough to be able to mate and reproduce).</td> </tr> <tr> <td>ii.</td> <td>That the characteristics that make it easier for some organisms to survive, find mates, and reproduce give those organisms an advantage over other organisms of the same species that don't have those traits.</td> </tr> <tr> <td>iii.</td> <td>That there can be a cause-and-effect relationship between a specific variation in a characteristic (e.g., longer thorns, coloration of moths) and its effect on the ability of the individual organism to survive and reproduce (e.g., plants with longer thorns are less likely to be eaten, darker moths are less likely to be seen and eaten on dark trees).</td> </tr> </table>	i.	That certain variations in characteristics make it harder or easier for an animal to survive, find mates, and reproduce (e.g., longer thorns prevent predators more effectively and increase the likelihood of survival; light coloration of some moths provides camouflage in certain environments, making it more likely that they will live long enough to be able to mate and reproduce).	ii.	That the characteristics that make it easier for some organisms to survive, find mates, and reproduce give those organisms an advantage over other organisms of the same species that don't have those traits.	iii.	That there can be a cause-and-effect relationship between a specific variation in a characteristic (e.g., longer thorns, coloration of moths) and its effect on the ability of the individual organism to survive and reproduce (e.g., plants with longer thorns are less likely to be eaten, darker moths are less likely to be seen and eaten on dark trees).
i.	That certain variations in characteristics make it harder or easier for an animal to survive, find mates, and reproduce (e.g., longer thorns prevent predators more effectively and increase the likelihood of survival; light coloration of some moths provides camouflage in certain environments, making it more likely that they will live long enough to be able to mate and reproduce).						
ii.	That the characteristics that make it easier for some organisms to survive, find mates, and reproduce give those organisms an advantage over other organisms of the same species that don't have those traits.						
iii.	That there can be a cause-and-effect relationship between a specific variation in a characteristic (e.g., longer thorns, coloration of moths) and its effect on the ability of the individual organism to survive and reproduce (e.g., plants with longer thorns are less likely to be eaten, darker moths are less likely to be seen and eaten on dark trees).						

3-LS4-3 Biological Evolution: Unity and Diversity

Students who demonstrate understanding can:

- 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.** [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Engaging in Argument from Evidence Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).</p> <ul style="list-style-type: none"> Construct an argument with evidence. 	<p>LS4.C: Adaptation</p> <ul style="list-style-type: none"> For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified and used to explain change.

Observable features of the student performance by the end of the grade:									
1	Supported claims								
	a Students make a claim to be supported about a phenomenon. In their claim, students include the idea that in a particular habitat, some organisms can survive well, some can survive less well, and some cannot survive at all.								
2	Identifying scientific evidence								
	a Students describe* the given evidence necessary for supporting the claim, including: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px;">i.</td> <td>Characteristics of a given particular environment (e.g., soft earth, trees and shrubs, seasonal flowering plants).</td> </tr> <tr> <td>ii.</td> <td>Characteristics of a particular organism (e.g., plants with long, sharp leaves; rabbit coloration).</td> </tr> <tr> <td>iii.</td> <td>Needs of a particular organism (e.g., shelter from predators, food, water).</td> </tr> </table>	i.	Characteristics of a given particular environment (e.g., soft earth, trees and shrubs, seasonal flowering plants).	ii.	Characteristics of a particular organism (e.g., plants with long, sharp leaves; rabbit coloration).	iii.	Needs of a particular organism (e.g., shelter from predators, food, water).		
i.	Characteristics of a given particular environment (e.g., soft earth, trees and shrubs, seasonal flowering plants).								
ii.	Characteristics of a particular organism (e.g., plants with long, sharp leaves; rabbit coloration).								
iii.	Needs of a particular organism (e.g., shelter from predators, food, water).								
3	Evaluating and critiquing evidence								
	a Students evaluate the evidence to determine: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px;">i.</td> <td>The characteristics of organisms that might affect survival.</td> </tr> <tr> <td>ii.</td> <td>The similarities and differences in needs among at least three types of organisms.</td> </tr> <tr> <td>iii.</td> <td>How and what features of the habitat meet the needs of each of the organisms (i.e., the degree to which a habitat meets the needs of an organism).</td> </tr> <tr> <td>iv.</td> <td>How and what features of the habitat do not meet the needs of each of the organisms (i.e., the degree to which a habitat does not meet the needs of an organism).</td> </tr> </table>	i.	The characteristics of organisms that might affect survival.	ii.	The similarities and differences in needs among at least three types of organisms.	iii.	How and what features of the habitat meet the needs of each of the organisms (i.e., the degree to which a habitat meets the needs of an organism).	iv.	How and what features of the habitat do not meet the needs of each of the organisms (i.e., the degree to which a habitat does not meet the needs of an organism).
i.	The characteristics of organisms that might affect survival.								
ii.	The similarities and differences in needs among at least three types of organisms.								
iii.	How and what features of the habitat meet the needs of each of the organisms (i.e., the degree to which a habitat meets the needs of an organism).								
iv.	How and what features of the habitat do not meet the needs of each of the organisms (i.e., the degree to which a habitat does not meet the needs of an organism).								
	b Students evaluate the evidence to determine whether it is relevant to and supports the claim.								
	c Students describe* whether the given evidence is sufficient to support the claim, and whether additional evidence is needed.								
4	Reasoning and synthesis								
	a Students use reasoning to construct an argument, connecting the relevant and appropriate evidence to the claim, including describing* that any particular environment meets different organisms' needs to different degrees due to the characteristics of that environment and the needs of the organisms. Students describe* a chain of reasoning in their argument, including the following cause-and-effect relationships: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px;">i.</td> <td>If an environment fully meets the needs of an organism, that organism can survive well within that environment.</td> </tr> <tr> <td>ii.</td> <td>If an environment partially meets the needs of an organism, that organism can survive less well (e.g., lower survival rate, increased sickness, shorter lifespan) than organisms whose needs are met within that environment.</td> </tr> </table>	i.	If an environment fully meets the needs of an organism, that organism can survive well within that environment.	ii.	If an environment partially meets the needs of an organism, that organism can survive less well (e.g., lower survival rate, increased sickness, shorter lifespan) than organisms whose needs are met within that environment.				
i.	If an environment fully meets the needs of an organism, that organism can survive well within that environment.								
ii.	If an environment partially meets the needs of an organism, that organism can survive less well (e.g., lower survival rate, increased sickness, shorter lifespan) than organisms whose needs are met within that environment.								

	iii. If an environment does not meet the needs of the organism, that organism cannot survive within that environment.
	iv. Together, the evidence suggests a causal relationship within the system between the characteristics of a habitat and the survival of organisms within it.

3-ESS2-1 Earth's Systems

Students who demonstrate understanding can:

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.</p> <ul style="list-style-type: none"> Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. 	<p>ESS2.D: Weather and Climate</p> <ul style="list-style-type: none"> Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns of change can be used to make predictions.

Observable features of the student performance by the end of the grade:	
1	Organizing data
a	Students use graphical displays (e.g., table, chart, graph) to organize the given data by season using tables, pictographs, and/or bar charts, including: <ul style="list-style-type: none"> i. Weather condition data from the same area across multiple seasons (e.g., average temperature, precipitation, wind direction). ii. Weather condition data from different areas (e.g., hometown and nonlocal areas, such as a town in another state).
2	Identifying relationships
a	Students identify and describe* patterns of weather conditions across: <ul style="list-style-type: none"> i. Different seasons (e.g., cold and dry in the winter, hot and wet in the summer; more or less wind in a particular season). ii. Different areas (e.g., certain areas (defined by location, such as a town in the Pacific Northwest), have high precipitation, while a different area (based on location or type, such as a town in the Southwest) have very little precipitation).
3	Interpreting data
a	Students use patterns of weather conditions in different seasons and different areas to predict: <ul style="list-style-type: none"> i. The typical weather conditions expected during a particular season (e.g., “In our town in the summer it is typically hot, as indicated on a bar graph over time, while in the winter it is typically cold; therefore, the prediction is that next summer it will be hot and next winter it will be cold.”). ii. The typical weather conditions expected during a particular season in different areas.