CEREAL CITY SCIENCE by BCAMSC

Teacher Guide and Student Journal
Sample Activity and Planning Pages

Life Cycles and Survival in an Ecosystem 3LNG

SECOND EDITION

A third grade unit supporting Next Generation Science Standards
and Michigan Science Standards

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Life Cycles and Survival in an Ecosystem 3LNG

A third-grade unit supporting **Next Generation Science Standards** and the **Michigan Science Standards** developed and written by the Battle Creek Area Mathematics and Science Center for

CEREAL CITY SCIENCE™
by BCAMSC

Life Cycles and Survival in an Ecosystem

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NEXT GENERATION SCIENCE STANDARDS

Disciplinary Core Ideas	Activities
LS2.C: Ecosystem Dynamics, Functioning, and Resilience • When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.	5,6
3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.	5,6
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.	1,2
3-LS2-1. Construct an argument that some animals form groups that help members survive.	1,2
LS4.A: Evidence of Common Ancestry and Diversity • Some kinds of plants and animals that once lived on Earth are no longer found anywhere. • Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments.	6
3-LS4-1. Analyze and interpret data from fossils to provide evidence of organisms and the environments in which they lived long ago.	6
LS4.C: Adaptation • For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.	2,3,4
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.	2,3,4
LS4.D: Biodiversity and Humans • Populations live in a variety of habitats, and change in those habitats affects the organisms living there.	2,5,6
3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.	2,5,6

NEXT GENERATION SCIENCE STANDARDS

Disciplinary Core Ideas	Activities
LS1.B: Growth and Development of Organisms • Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.	1,3
3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	1,3,4
LS3.A: Inheritance of Traits • Many characteristics of organisms are inherited from their parents. • Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment.	4
3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	1,3,4
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.	4
LS3.B: Variation 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.	2,4,5
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.	2,4,5
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.	2,4,5
LS4.B: Natural Selection • Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.	2,4,5,6
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.	2,4,5,6

NEXT GENERATION SCIENCE STANDARDS

Science and Engineering Practices	Activities
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. • Analyze and interpret data to make sense of phenomena using logical reasoning.	1,2,3,4
3-LS4-1. Analyze and interpret data from fossils to provide evidence of organisms and the environments in which they lived long ago.	6
3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	1,3
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. • Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.	
3-LS2-1. Construct an argument that some animals form groups that help members survive.	1,2
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.	2,3,4
3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.	2,5,6
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop and/or use models to describe and/or predict phenomena.	1,2,3,5
3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	1,3

NEXT GENERATION SCIENCE STANDARDS

Science and Engineering Practices	Activities
Constructing Explanations and Designing Solutions 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 the variables that describe and predict phenomena and in designing multiple solutions to solve problems. • Use evidence (e.g., observations, patterns) to support an explanation. • Use evidence (e.g., observations, patterns) to construct an explanation.	1,2,3,5,6
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.	4
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.	2,4,5,6

NEXT GENERATION SCIENCE STANDARDS

Crosscutting Concepts	Activities
Cause and Effect • Cause-and-effect relationships are routinely identified, tested, and used to explain change.	1,5,6
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.	4
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.	2,4,5,6
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.	2,3,4
3-LS2-1. Construct an argument that some animals form groups that help members survive.	
Scale, Proportion, and Quantity • Observable phenomena exist from very short to very long time periods.	6
3-LS4-1. Analyze and interpret data from fossils to provide evidence of organisms and the environments in which they lived long ago.	6
Systems and System Models • A system can be described in terms of its components and their interactions.	2,3,5
3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.	2,5,6
Patterns • Similarities and differences in patterns can be used to sort and classify natural phenomena. • Patterns of change can be used to make predictions	4
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.	2,4,5
3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	1,3

*Allow for local, regional, Michigan specific contents or examples in teaching and assessment.

COMMON CORE STATE STANDARDS - READING

Reading Standards for Informational Text—Grade 3	Activity
Key Ideas and Details	
RI.3.1: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for answers.	1,2,3,4,5,6
RI.3.2: Determine the main idea of a text; recount the key details and explain how they support the main idea.	1,2,3,4,5,6
RI.3.3: Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.	1,2,3,4,5,6
Craft and Structure	
RI.3.4: Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade-3 topic or subject area.	1,2,3,4,5,6
RI.3.5: Use text features and search tools (e.g., keywords, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	1,3,4,5,6
RI.3.6: Distinguish their own point of view from that of the author of the text.	1
Integration of Knowledge and Ideas	
RI.3.7: Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).	1,2,3,4,5,6
RI.3.8: Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence).	1,2,3,4,5,6
RI.3.9: Compare and contrast the most important points and key details presented in two texts on the same topic.	1,3,5
Range of Reading and Level of Text Complexity	
RI.3.10: By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 2–3 text complexity band independently and proficiently.	1,2,3,4,5,6

COMMON CORE STATE STANDARDS - WRITING

Writing Standards—Grade 3	Activity
Text Types and Purposes	
W.3.1: Write opinion pieces on topics or texts, supporting a point of view with reasons. a. Introduce the topic or text they are writing about, state an opinion, and create an organizational structure that lists reasons. b. Provide reasons that support the opinion. c. Use linking words and phrases (e.g., *because, therefore, since, for example*) to connect opinion and reasons. d. Provide a concluding statement or section.	1,2,3,6
W.3.2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic and group related information together; include illustrations when useful to aid comprehension. b. Develop the topic with facts, definitions, and details. c. Use linking words and phrases (e.g., *also, another, and, more, but*) to connect ideas within categories of information. d. Provide a concluding statement or section.	1,2,3,4,6
W.3.3: Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. a. Establish a situation and introduce a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use dialogue and descriptions of actions, thoughts, and feelings to develop experiences and events or show the response of characters to situations. c. Use temporal words and phrases to signal event order. d. Provide a sense of closure.	5
Production and Distribution of Writing	
W.3.4: With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	1,2,3,4,5,6
W.3.5: With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of language standards 1–3, up to and including grade 3.)	1,2,3,4,5,6
W.3.6: With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.	2,3,6

COMMON CORE STATE STANDARDS - WRITING

Writing Standards—Grade 3	Activity
Research to Build and Present Knowledge	
W.3.7: Conduct short research projects that build knowledge about a topic.	2,3,5,6
W.3.8: Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence to provide categories.	1,2,3,4,5,6
W.3.9: (Begins in grade 4)	
W.3.10: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	1,2,3,4,5,6

COMMON CORE STATE STANDARDS - LANGUAGE

Language Standards—Grade 3	Activity
Conventions of Standard English	
L.3.1: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Explain the function of nouns, pronouns, verbs, adjectives, and adverbs in general and their functions in particular sentences. b. Form and use regular and irregular plural nouns. c. Use abstract nouns (e.g., *childhood*). d. Form and use regular and irregular verbs. e. Form and use the simple (e.g., I walked; I walk; I will walk) verb tenses. f. Ensure subject–verb and pronoun–antecedent agreement. g. Form and use comparative and superlative adjectives and adverbs, and choose between them depending on what is modified. h. Use coordinating and subordinating conjunctions. i. Produce simple, compound, and complex sentences.	1,2,3,4,5,6
L.3.2: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling in writing. a. Capitalize appropriate words in titles. b. Use commas in addresses. c. Use commas and quotation marks in dialogue. d. Form and use possessives. e. Use conventional spelling for high-frequency and other studied words and for adding suffixes to base words (e.g., *sitting, smiled, cries, happiness*). f. Use spelling patterns and generalizations (e.g., word families, position-based spellings, syllable patterns, ending rules, meaningful word parts) in writing words. g. Consult reference materials, including beginning dictionaries, as needed to check and correct spelling.	1,2,3,4,5,6
Knowledge of Language	
L.3.3: Use knowledge of language and its conventions when writing, speaking, reading, or listening. a. Choose words and phrases for effect. b. Recognize and observe differences between the conventions of spoken and written standard English.	1,2,3,4,5,6

COMMON CORE STATE STANDARDS - LANGUAGE

Language Standards—Grade 3	Activity
Vocabulary Acquisition Use	
L.3.4: Determine or clarify the meaning of unknown and multiple-meaning word and phrases based on grade-3 reading and content, choosing flexibly from a range of strategies. a. Use sentence-level context as a clue to the meaning of a word or phrase. b. Determine the meaning of the new word formed when a known affix is added to a known word. c. Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., *company, companion*). d. Use glossaries or beginning dictionaries, both print and digital, to determine or clarify the precise meaning of key words and phrases.	1,2,3,4,5,6
L.3.5: Demonstrate understanding of word relationships and nuances in word meanings. a. Distinguish the literal and nonliteral meanings of words and phrases in context (e.g., *take steps*). b. Identify real-life connections between words and their use (e.g., describe people who are *friendly* or *helpful*). c. Distinguish shades of meaning among related words that describe states of mind or degrees of certainty (e.g., *knew, believed, suspected, heard, wondered*).	1,2,3,4,5,6
L.3.6: Acquire and use accurately grade-appropriate conversational, general academic, and domain-specific words and phrases, including those that signal spatial and temporal relationships (e.g., *After dinner that night we went looking for them*).	1,2,3,4,5,6

COMMON CORE STATE STANDARDS - MATHEMATICS

Mathematics—Grade 3	Activity
Mathematical Practices	
1. Make sense of problems and persevere in solving them.	
2. Reason abstractly and quantitatively.	
3. Construct viable arguments and critique the reasoning of others.	
4. Model with mathematics	
5. Use appropriate tools strategically.	
6. Attend to precision.	
7. Look for and make use of structure.	
8. Look for and express regularity in repeated reasoning.	
3.OA Operations and Algebraic Thinking	
Represent and solve problems involving multiplication and division. 1. Interpret products of whole numbers (e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each). 2. Interpret whole-number quotients of whole numbers (e.g., interpret 56÷8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each). 3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem). 4. Determine the unknown whole number in multiplication or division equations relating three whole numbers.	
Understand and apply properties of operations and the relationship between multiplication and division. 5. Apply properties of operations as strategies to multiply and divide. 6. Understand division as an unknown-factor problem.	
Multiply and divide within 100. 7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division, or properties of operations. By the end of grade 3, know from memory all products of two one-digit numbers.	
Solve problems involving the four operations, and identify and explain patterns in arithmetic. 8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. 9. Identify arithmetic patterns (including patterns in the addition table or multiplication table) and explain them using properties of operations.	

COMMON CORE STATE STANDARDS - MATHEMATICS

Mathematics—Grade 3	Activity
3.NBT Number and Operations in Base Ten	
1. Use place value understanding and properties of operations to perform multi-digit arithmetic.	
2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	
3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80, 5×60) using strategies based on place value and properties of operations.	
3.NF Number and Operations—Fractions	
Develop understanding of fractions as numbers.	
1. Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioning into b equal parts; understand a fraction a/b as the quantity formed by parts of size 1/b.	
2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.	
3. Explain equivalence of fractions in special cases and compare fractions by reasoning about their size.	
3.MD Measurement and Data	
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	
1. Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes (e.g., by representing the problem on a number line diagram).	
2. Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters. Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units (e.g., by using drawings to represent the problem).	
Represent and Interpret Data	
3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs.	
4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot where the horizontal scale is marked off in appropriate units: whole numbers, halves, or quarters.	

COMMON CORE STATE STANDARDS - MATHEMATICS

Mathematics—Grade 3	Activity
Geometric measurement: understand concepts of area and relate area to multiplication and to addition.	
5. Recognize area as an attribute of plane figures and understand concepts of area measurement.	
6. Measure areas by counting unit squares (square cm, square m, square in., square ft., and improvised units).	
7. Relate area to the operations of multiplication and division.	
Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	
8. Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	
3.G Geometry	
Reason with shapes and their attributes.	
1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., four sides) and the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of the subcategories.	
2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.	

UNIT AT A GLANCE

Activity	Time to Complete	Lesson Level Learning Goals	Phenomena	Summary: Students Will…
1 **Life Sounds**	Preparation: 35 min. Activity 1: 6 classes Lesson 1A: 45–50 min. Lesson 1B: 45–50 min., 2 classes Lesson 1C: 45–50 min. Lesson 1D: 45–50 min., 2 classes Lesson 1E: 45–50 min.	Develop an initial model that explains why and how frogs make frog calls that help them to survive.	Frogs of different kinds make different frog calls or croaking sounds.	• make observations of different frog calls. • develop a chart that reflects what they think about frogs and frog calls. • use a variety of materials to make a device that makes three different sounds as three different frog calls. • demonstrate their frog sound devices. • role play male and female frogs on a pond. • read informational text about frogs.
2 **More About Frogs**	Preparation: 40 min. Activity 2: 8 classes Lesson 2A: 45–50 min., 2 classes Lesson 2B: 45–50 min. Lesson 2C: 45–50 min. Lesson 2D: 45–50 min., 2 classes Lesson 2E: 45–50 min., 2 classes	Revise and build on model from Activity 1 to reflect a variety of habitats.	Frogs of different kinds make different frog calls or croaking sounds. Observations of frog eggs.	• make observations of a container to determine what is in the container. • collaborate to build a suitable habitat for the tadpoles and frogs as they hatch and grow. • make observations of different kinds of habitats to determine where frogs would survive. • use multiple sources to research habitats and what lives there.
3 **Animal Life Cycles**	Preparation: 40 min. Activity 3: 8 classes Lesson 3A: 45–50 min., 2 classes Lesson 3B: 45–50 min., 2 classes Lesson 3C: 45–50 min., 2 classes Lesson 3D: 45–50 min., 2 classes	Develop a model of a life cycle of a frog based on text and observations.	Observations of frog eggs hatching. Observations of chicken and turtle eggs hatching.	• brainstorm ideas about eggs, animals that produce eggs, and why eggs are important to the survival of animals. • watch videos of frogs, chickens, and turtles hatching from eggs. • present information from research.

UNIT AT A GLANCE

Students Figure Out How to:	Practices and Crosscutting Concepts	Assessment
• develop a model that demonstrates how and why frogs make frog calls. • work as an engineering team to design a sound maker that will make three different sounds to mimic frog calls. • explain how vibrations make sounds and relate vibrations to how frogs make frog calls. • use their sound devices in a role play to determine how frogs work in groups to call a mate. • explain the importance of mating in the survival of different frog species. • obtain information about frog calls from text.	**Constructing Explanation and Designing Solutions** **Developing and Using Models** **Analyzing and Interpreting Data** **Obtaining, Evaluating, and Communicating Information** **Cause and Effect**	**Formative Assessment** What We Think chart Journal Entry (frog call initial models) Activity Page main idea charts **Summative Assessment** presentations revised models Science Talk Journal Entry Activity Page
• determine what frogs need to survive in their habitat. • obtain and analyze information from text to determine the suitable components of a frog habitat. • collaborate on a habitat research project to find out what habitats are suitable for frogs and other organisms.	**Developing and Using Models** **Obtaining, Evaluating, and Communicating Information** **Analyzing and Interpreting Data** **Constructing Explanation and Designing Solutions** **Systems and System Models**	**Formative Assessment** Activity Pages models Post-It notes Science Talks Journal Entry **Summative Assessment** Activity Pages Science Talks Journal Entry/Respond to Text research presentations
• develop and revise models of the life cycles of different organisms. • obtain information from videos of frogs, chickens, and turtles hatching from eggs. • find patterns in life cycles to determine the common features (birth, growth, reproduction, death). • obtain and analyze information from text and reliable media about the life cycle of the frog and compare it to another research plant or animal.	**Constructing Explanation and Designing Solutions** **Analyzing and Interpreting Data** **Developing and Using Models** **Obtaining, Evaluating, and Communicating Information** **Systems and System Models**	**Formative Assessment** Activity Pages What We Think chart Science Talk **Summative Assessment** Respond to Text models presentations

UNIT AT A GLANCE

Activity	Time to Complete	Lesson Level Learning Goals	Phenomena	Summary: Students Will…
4 **Inherited Traits**	Preparation: 25 min. Activity 4: 3 classes Lesson 4A: 45–50 min. Lesson 4B: 45–50 min. Lesson 4C: 45–50 min.	Make observations and collect data on observable inherited traits.	Some students can do the tongue roll and some cannot.	• collect data to determine the percent of students in the class who are able to do the tongue roll and those who are not. • collect data on multiple observable inherited traits. • view a "What Are Traits?" video • read *The One and Only Me.*
5 **Frogs Are In Trouble**	Preparation: 15 min. Activity 5: 3 classes Lesson 5A: 45–50 min. Lesson 5B: 45–50 min. Lesson 5C:45–50 min.	Obtain information about the effect of human activity on the declining frog population.	Frogs face problems with a fungus that threatens their survival.	• read about a fungus that is killing frogs. • participate in role play of different components of an ecosystem.
6 **Evidence of Organisms From Long Ago**	Preparation: 25 min. Activity 6: 4 classes Lesson 6A: 55–60 min., 2 classes Lesson 6B: 50–55 min. Lesson 6C: 50–55 min.	Obtain information about the effect of catastrophic events, environmental change, human activity, and natural hazards that cause extinction in an ecosystem.	Scientists uncover a fossil of an extinct animal.	• make observations and draw a fossil specimen. • share and compare fossil observations. • compare fossils to familiar organisms that are still living. • read a book about fossils. • read a selection about the extinction of animals. • write an article for publication in a class magazine.

UNIT AT A GLANCE

Students Figure Out How to:	Practices and Crosscutting Concepts	Assessment
• obtain, analyze, and present information from media and text. • analyze data to determine traits that are passed from parent to offspring. • distinguish between an inherited trait and an environmental or learned trait.	**Analyzing and Interpreting Data** **Obtaining, Evaluating, and Communicating Information** **Patterns**	**Formative Assessment** Science Talk What We Think chart **Summative Assessment** Science Talk Journal Entry
• develop a model to explain the role a frog plays in an ecosystem. • obtain information from text about the declining population of frogs. • use role play as a model to demonstrate the effect of catastrophic and natural hazards on the population in an ecosystem.	**Constructing Explanations and Designing Solutions** **Cause and Effect** **Systems and System Models**	**Formative Assessment** Activity Pages **Summative Assessment** Activity Pages models Science Talk Respond to Text group presentations Journal Entry
• compare fossils of ancient life-forms to modern life-forms. • determine how changes in the environment can lead to the extinction of a species. • determine the effect of natural hazards, human activity, environmental change, and catastrophic events on the survival of species in the area. • obtain useful information in writing a magazine article to inform the reader of how environmental changes can affect the plants and animals that live there.	**Obtaining, Evaluating, and Communicating Information** **Constructing Explanations and Designing Solutions** **Cause and Effect**	**Formative Assessment** Driving Questions/What We Think chart Activity Page reading integration **Summative Assessment** Journal Articles Science Talk What We Think chart

Dear Parent:

Your child is beginning a unit developed by the Battle Creek Area Mathematics and Science Center. This unit was designed to promote science and engineering literacy and integrate reading and writing skills into high-interest science content. During the next twelve weeks, your child will be actively involved with the unit *Life Cycles and Survival in an Ecosystem*. This unit is designed for third-grade students and focuses on three main themes that dominate the unit: the life cycles of different organisms, adaptations and survival in an ecosystem, and the cause and effect of change in an ecosystem.

- All living things have a life cycle that is unique to the organism, yet all life cycles have birth, growth, development, reproduction, and death in common.
- Organisms have specific behavioral and physical characteristics (traits) that allow them to survive in a given environment.
- Physical and behavioral characteristics (traits) are either inherited (genetic) or acquired (from the environment).
- As environments change over time, these characteristics may change (adaptations) to allow organisms to continue to survive.
- Paleontologists piece together information about changes in Earth and its environments through fossils and layers of sediments.

During this unit of study, your child will begin to explore how frogs communicate, the life cycle of the frog, behavioral and physical traits of the frog, and frog habitats. Your child will be given the opportunity to observe, compare, and contrast frogs with other animals. The class will research a variety of habitats, change in habitats, and related topics to create an ecology magazine.

We hope you enjoy discussing the concepts involved in *Life Cycles and Survival in an Ecosystem* with your child. Suggestions for activities to do at home are included with this letter. These activities will reinforce the concepts taught during this unit instruction. Let us know if we may be of assistance.

The Outreach Staff
Battle Creek Area Mathematics and Science Center
(269) 213-3907 or (269) 213-3908

ACTIVITIES TO DO AT HOME

1. Take this opportunity to explore ecosystems within your backyard, neighborhood, and local parks. Turn over a rock or log and see how many organisms make it their home. Discuss the different physical traits of the organisms.
2. Visit a local park with a pond or slow-moving water. In the springtime, listen for the frogs calling in the early morning and evening. Look for frog eggs and tadpoles from the edge of a pond or slow-moving stream. Some large puddles may also have frog eggs or tadpoles.
3. Do some research with your child to see what might attract frogs and toads to your backyard. Plant a small garden to see what animals are attracted to the area. Include an area that has a rock garden to provide cover for different animals to make their homes.
4. Take a close look at the plants in your home and garden. Help your child to identify the different plant parts: roots, stems, leaves, flowers, seeds. Discuss how the characteristics of new plants are passed on from the parent plant.
5. Research the different physical traits of your child that are inherited (genetic) and the traits that he or she acquires through the environment. Review how your child learned to talk, crawl, walk, eat with a spoon, read, write, and ride a bike. Make a list of learned behaviors.

ACTIVITY 1

LIFE SOUNDS

Teacher Background Information
Frogs use sounds to communicate with one another. Frogs "croak," or call out, to find a mate, warn of danger, and to locate frogs of their species. The following lessons are intended to pique the curiosity of the third-grade student in raising questions about frog sounds and different species of frogs, where they live, and how they survive. The anchoring phenomenon introduces a chorus of frog calls from a noisy pond. Students will focus on related phenomenon as the unit progresses.

Engage the Learner
The initial phase of the Learning Cycle encourages students to apply what they think about animals and different habitats to a recording of a chorus of animals in nature. They attempt to make connections between what they have experienced and what they hear. Students are asked to make their initial thinking visible through the development of a model. They raise questions that drive the following lessons.

Considerations for Students with Special Needs
All prompts and passages in the Student Journal should be read aloud, with repeated directions and checking for understanding prior to writing.

Students are asked to draw and write in their Student Journals. Students may benefit by working with a partner in the longer writing pieces. Students with an IEP should be allowed to dictate their ideas and answers.

Advance Preparation
Your frog eggs may take the entire twelve weeks of the unit to go from egg to tadpole to adult frog. **Be sure to order your frog eggs to arrive early in the unit.** Begin observations of the eggs as soon as they arrive. This may be prior to their introduction in the Teacher Guide.

Read through the Advance Preparation section of Lesson 2A to familiarize yourself with the care instructions for your eggs and tadpoles.

Preview videos of sounds of frogs on a pond. A Google search with the keywords *frog chorus* or *nature scapes frog chorus* will generate a list of recordings of frogs on the pond.

https://www.youtube.com/watch?v=MhtN4sFOJZw

https://www.youtube.com/watch?v=qumHHNJ3JMM

ESTIMATED TIME:
Lesson 1A: 45–50 minutes
Lesson 1B: 45–50 minutes, 2 classes
Lesson 1C: 45–50 minutes
Lesson 1D: 45–50 minutes, 2 classes
Lesson 1E: 45–50 minutes

LESSON LEVEL LEARNING GOAL
Develop an initial model that explains why and how frogs make frog calls that help them to survive.

MATERIALS NEEDED
For each student:
student page
Teacher provides:
Post-It notes
chart paper

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.

TEACHING TIP
Many students will guess the frog calls as sounds of different insects, birds, or even mice. Do not tell them they are wrong. Allow all ideas to flow freely.

Students may not recognize the sounds are coming from a pond and may choose a forest, meadow, or their backyard.

TEACHING TIP
Some students may have considerable knowledge about frogs and ask for additional Post-It notes. Be prepared to distribute extra notes.

Preview the following videos that show the different frog calls:

Bull Frog Call

https://www.youtube.com/watch?v=M02_dnl9zCA

Cricket Frog Call

https://youtu.be/k35o_DmTL9o

Green Tree Frog Call

https://youtu.be/OYm2Mm6z850

Leopard Frog Call

https://youtu.be/yswmmRZFItk

Pickerel Frog Call

www.youtube.com/watch?v=RvamqQXtzO8

Make a What We Think About Frogs and Frog Calls chart.

What We Think	Questions We Have	What We Did	What We Figured Out	How Does That Help Us to Figure Out the Phenomenon?

LESSON 1A: WHAT IS THAT SOUND?

Procedure

Engage the learner.

Begin the lesson by asking the students to sit quietly and listen as you play an audio recording of sounds they might hear in nature. Ask students to try to identify the animals that are producing the sounds. Encourage students to close their eyes and imagine that they are outside in the wilderness and listening to the sounds of nature. Ask them to visualize where they would hear the sounds and who is making the sounds.

Allow sufficient time for students to listen to the sounds. Repeat the video so students can hear the sounds at least two times before guessing the origin of the sounds. Encourage lively conversation that helps students link their previous experiences with animal sounds to the recorded sounds. Make a note of students' early questions to revisit when developing the question chart.

Make a list and post it on the board or chart paper of the animals students think they were hearing in the audio recording (frogs, owls, crickets, birds, insects, etc.)

Discuss with the class where they might hear these sounds. Add their location ideas to the list of animals on the board or chart paper. After the students have shared their ideas, ask them to draw a model that explains what animals they are hearing, why the animals are making noise, and where the animals are making all that noise. Have them draw and write their brainstorming ideas in the Student Journal.

Your class has listened to a recording of the sounds of animals in nature. Develop a model that explains who is making the sounds and where the sounds are being made. Include why you think the animals are making the sounds.

After students have had the opportunity to develop their models on their own, divide the class into groups of four and allow students to exchange ideas and come to a consensus and develop a group model. Distribute chart paper and markers to each group so they can display their models in the room. Facilitate the group model development by circulating among the students and observing their models and listening to their exchange of ideas. To help the students elaborate on their ideas, ask:

- Can someone tell me more about what this represents in your model?
- How does that relate to the sounds we heard?
- Would it help to make a key or list of the animals you want to represent?
- Has the group reached an agreement on what animals will be in their model?
- What about the location? Has the group decided where you might hear all these sounds? What makes you think that? Do the rest of you agree? Why or why not?

When groups have completed their models have them post them around the room for the class to see. Allow time for the whole class to come together and share their models. Encourage groups to look for common ideas among the models. Look for models that include a pond and frogs.

To help the groups elaborate on their explanations of their models, ask:

- Do we have a common theme in the majority of our models?
- Is there an animal(s) that is present on all the models?
- What location did the majority of models represent?
- Did any of the models help us to explain why we were hearing such loud noises from nature?

DEVELOPING AND USING MODELS

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Identify limitations of models.
- **Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events.**
- Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.
- **Develop and/or use models to describe and/or predict phenomena.**
- ~~Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.~~
- ~~Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.~~

TEACHING TIP
Use a chart to categorize student generated questions:

Questions About Frogs

Who	Why	Where	How
			

TEACHING TIP
Save the initial models to be revised as the unit progresses.

ASKING QUESTIONS AND DEFINING PROBLEMS
Asking questions and defining problems in grades 3–5 builds from K–2 experiences and progresses to specifying qualitative relationships.

- Ask questions about what would happen if a variable is changed.
- **Identify scientific (testable) and non-scientific (non-testable) questions.**
- **Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause-and-effect relationships.**
- Use prior knowledge to describe problems that can be solved.
- ~~Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.~~

After groups have shared their initial models and exchange of ideas, play the video that shows the frogs that make the different sounds. Listen for students to begin to question the frog calls, how they are made, and why the different frogs have different calls. To elicit questions, play the deep, low call of the bullfrog and have students compare it to the high, sharp peeps of the spring peepers. Record questions that are generated during the discovery. Listen for questions that relate to:

- How do frogs make sounds?
- Why do different kinds of frogs make different sounds?

Display the *What We Think About Frogs and Frog Calls* chart and explain to the class that the chart will be used as a record of their current ideas, questions, and new ideas about frogs, their calls, where they live, and their habits.

Divide the class into groups of four students and distribute five or six Post-It notes to each student. Ask the students to begin by individually writing down one idea or question about frogs per Post-It note. Tell the students that it can be ideas and questions about frogs' physical characteristics, what they do all day, where they live, how they live and grow, what they eat, and how they make their sounds. Encourage all students to come up with at least four or five ideas and/or questions they have about frogs and frog sounds. After students have individually written their ideas on Post-It notes, have them share their ideas within their groups and discuss each note.

After the groups have discussed and categorized their notes on frogs, conduct a whole-class sharing of ideas. Ask students to share the different categories of ideas and questions they had about frogs and write the categories on the chart. Take time to share some of the ideas common among students and new or extraordinary ideas that came out in their conversations.

Focus the class's attention on their ideas about frog calls and, as a class, make a list of questions they have about the frog calls. Choose one question to be the focus question for following lessons and that the class can investigate in the following lessons. Example questions:

- How are frogs making the calls?
- Why do frogs make the calls?
- Why do the frog calls sound different between the different kinds of frogs?
- What are the frogs saying to each other?

- Can different kinds of frogs understand and communicate with each other?
- Why are the frogs calling from the pond? Why do I see frogs in my backyard without a pond?

The focus question should relate to why frogs are making the calls and what they are communicating to each other. Ask students how they can find the answers to their questions and learn more about their ideas on the What We Think column. Accept all reasonable ideas at this time.

Check to see if students have ideas for investigations into sound and frog habitats that may help them gain information. Record their ideas in the What We Think column and their questions about the animal sounds in the Question We Have column.

Assessment: Formative
Use the What We Think chart, Activity Page and initial models to assess the students' initial ideas of why frogs make the croaking sounds that they make.

LESSON 1B: DEVELOPING OUR OWN FROG CALLS

Teacher Background Information

This lesson is intended to apply what the students have retained from the first-grade unit *Waves: Light and Sound* about how sounds are produced and how sound travels to their ideas of how frogs make sounds. The Disciplinary Core Ideas and Performance Expectations integrated here are:

PS4.A Wave Properties

- Sound can make matter vibrate, and vibrating matter can make sound.

Performance Expectation: 1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

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.

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

For this and following lessons, divide the class into larger groups of five or six students. The larger number of students in each frog species group will be helpful in facilitating the role-play activity in Lesson 1D.

Explore the Concept

This phase of learning provides students with the opportunity to explore their questions and understandings about the interaction between and among species of organisms. The exploration includes reviewing the properties of sounds and how the frogs' ability to make frog calls helps them in survival.

Advance Preparation

Prepare a materials table with a variety of items for students to use to make their own frog calls.

Collect different sizes of plastic tubs, containers, and beans, rice, or beads for students to use in their frog sound makers.

Prepare a *Word Sort Card Set* for each group (See Materials Needed).

MATERIALS NEEDED

For each student:
- student pages

For each group of 5–6:
- variety of materials from table
- *Word Sort Card Set* (sound, vibrations, pitch, volume, high, low, quiet, loud, soft)
- *Frog Picture* (1 picture from set of 8 different frogs)

For the class:
- balloons
- craft sticks
- rubber bands, different sizes
- wooden dowels
- deli containers, 8 oz.
- deli containers, 16 oz.
- cups, 9 oz. with lids
- paper clips
- plastic combs
- *Frog Picture Card Set*

Teacher provides:
- miscellaneous plastic tubs (optional)
- beans (optional)
- rice or beads

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.

DEVELOPING AND USING MODELS

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Identify limitations of models.
- Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events.
- **Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.**
- **Develop and/or use models to describe and/or predict phenomena.**
- **Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.**
- Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.

TEACHING TIP

Students explored sounds and vibrations in the first grade unit *Waves: Light and Sound.* Take this opportunity to have students discuss their ideas about sound, how vibrations produce sound, and how sound can also make things vibrate.

Procedure

Explore the concept.

Review the What We Think chart and the focus question the class is asking. Ask students to share their models of why frogs call from the previous lesson. Have the class look for patterns in the different models developed by the students. Check for models that include ideas as to why the frogs are calling and choose the three or four most common ideas.

Write the common ideas on the board. Example:

- Greeting
- Danger
- Lonely

Have the students write the three categories on the chart in their Student Journals.

Divide the class into groups of five or six students. Distribute one picture of a different species of frog to each group. Ask the students to imagine that they are frogs of the same species and need to communicate with one another. Inform the groups that it is their challenge to make a device with three distinct sounds for their kind of frog.

Explain to the class that they are going to become frog call engineers and design three devices that demonstrate how frogs make three different sounds. Explain the use of the Engineering Design Process to develop their frog sound devices. Discuss how engineers brainstorm, plan, and draw their plans, then begin to build and assemble their devices, test, and revise based on test results.

Review the Activity Page students will use to plan their device. Explain the use of a model to plan, build, and explain. Inform the class that these models may be used to find out how frogs make sounds and to revise their models from the previous lesson.

Use the chart below to organize your ideas of why the frogs make calls.

Example:

Why frogs make sounds	*Draw and label a model of how each device will make each sound.*
1. danger	
2. lost or lonely	
3. hello	

Display the materials table and show the class the different materials available to make their frog sound makers. Allow time for the groups to preview the materials prior to planning to help inspire ideas for their frog sound makers.

Facilitate the group planning and building by circulating among the students, listening to their brainstorming and observing their ability to begin to build their sound makers. To help groups that are stuck, ask:

- Can someone explain the engineering challenge in your own words?
- Would it help to create a diagram of a sound maker? How will it show what causes the sound?
- What would happen if you started with describing the sound you would like your device to make?
- What material might make that sound?
- What do you already know about how sounds are made and what causes sounds?
- Can someone imitate the sound you are trying to make? How do humans make sounds?
- Would it help to make a list of the different kinds of sounds we heard from the frogs?
- We heard some chirps, peeps, clicks, and screeching sounds from the different frogs. What sounds do you want your frog to make? How can you use some of the materials from the table to make that sound?

As you circulate among the groups, take this opportunity to direct conversations to explaining how sounds are made and what material will accomplish that sound. As the sound makers begin to get assembled, ask students to demonstrate the sound and explain how it is made. Listen for responses that include vibrations of matter producing sounds.

Allow sufficient time for students to create three sounds with their sound makers and complete the chart in their Student Journals within their groups.

Pre-Writing Strategy
Distribute the *Word Sort Card Set* and have students discuss the meanings of the words. Encourage students to use the words to help them explain their sound-making devices and develop their models to explain how they work.

CAUSE AND EFFECT
- Cause-and-effect relationships may be used to predict phenomena in natural or designed systems.
- Cause-and-effect relationships are routinely identified, tested, and used to explain change.

ASKING QUESTIONS AND DEFINING PROBLEMS
Asking questions and defining problems in grades 3–5 builds from K–2 experiences and progresses to specifying qualitative relationships.
- ~~Ask questions about what would happen if a variable is changed.~~
- Identify scientific (testable) and non-scientific (non-testable) questions.
- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause-and-effect relationships.
- **Use prior knowledge to describe problems that can be solved.**
- **Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.**

WRITING

Text Types and Purposes

W.3.2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension.
b. Develop the topic with facts, definitions, and details.
c. Use linking words and phrases (e.g., *also, another, and, more, but*) to connect ideas within categories of information.
d. Provide a concluding statement or section.

Research to Build and Present Knowledge

W.3.8: Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence to provide categories.

Range of Writing

W.3.10: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Journal Entry

1. *Draw and label how each device makes the sound.*
   Sound 1:
   Sound 2:
   Sound 3:
2. *Write what all three sounds have in common. Describe what causes the sound in your devices.*

Assessment: Formative

Use the Activity Page to assess the students' ability to represent how sounds are made in a model.

LESSON 1C: COMMUNICATING LIKE FROGS

Teacher Background Information

This lesson allows students to demonstrate their frog calls for three different signals and explain how each sound is made. Students are not expected to create sounds that mimic the frog on the card, but rather to create three different sounds using a variety of materials. In the previous lesson, students drew models of how each sound was made. In this lesson, they share their sounds and models for others to analyze. Students are given the opportunity to modify their models based on the feedback of others.

Advance Preparation

Write the following headings at the top of four pieces of chart paper:

Asking Clarifying Questions

Asking a Probing Question

Adding to an Idea

Respectfully Disagreeing with an Idea

Prepare a *Word Sort Card Set* for each group (See Materials Needed).

Procedure

Explain the concept and define the terms.

Revisit the What We Think About Frogs and Frog Calls chart from the previous lessons. Review the information that relates to why frogs make their calls. Ask students if they have any new information for the chart or adjustments they would like to make.

Explain that each group will be given the opportunity to share their frog call makers and models with the rest of the class and that they will be analyzing and critiquing each other's engineering solutions. In order to conduct a friendly, nonthreatening critique, as a class, establish some guidelines and rules in their critiquing methods. Ask students to create four anchor posters that will guide the class throughout the unit when sharing ideas. Display the four charts with the questioning and critiquing categories. As a class, have students suggest how they might start a question that asks a group to clarify, probe or dig deeper, disagree, and add to an idea. It is important for success in student-to-student interactions for the anchor charts to be developed by the students.

MATERIALS NEEDED

For each student:
- student page

For each group:
- variety of materials from table
- *Word Sort Card Set* (sound, vibrations, pitch, volume, high, low, quiet, loud, soft, frog calls, croaking sounds)
- *Frog Pictures Card Set* (1 picture from set of 8 different frogs)

For the class:
- balloons
- craft sticks
- rubber bands, different sizes
- wooden dowels
- deli containers, 8 oz.
- deli containers, 16 oz.
- 9 oz. cups with lids
- paper clips
- plastic combs

Teacher provides:
- miscellaneous plastic tubs (optional)
- beans (optional)
- chart paper
- markers

TEACHING TIP

As the groups present their frog calls and models, take notes on their presentations to record common ideas and concepts that are present in most of the models. Record when students use the terms *vibrations*, *moving air*, etc., to use as prompts in the Science Talk at the end of the lesson.

CAUSE AND EFFECT

- Cause-and-effect relationships may be used to predict phenomena in natural or designed systems.
- Cause-and-effect relationships are routinely identified, tested, and used to explain change.

Example Charts:

Respectfully Disagreeing with an Idea

I agree with… but…

I disagree with… because…

I agree with part of your model but disagree with this part…

I respectfully disagree because…

I understand where you are coming from but have a different idea.

I agree with you but also think…

I see your reasoning, but I disagree with some of the ideas because…

Asking a Clarifying Question

What do you mean by…?

Can you be more specific about…?

What makes you think that?

What evidence do you have that supports that?

How do you know?

Can you tell us more about…?

What do you mean by…?

Asking a Probing Question

What do you mean by…?

What makes you think that?

If that were true, then wouldn't _____ be true?

Where did you get this idea?

How did you come up with…?

Adding to an Idea

I agree with you, but also…

I would like to add …

I agree but also think…

I agree with this part, but could you add…?

Do you think adding _____ would make it more clear?

I agree but have an idea that might add more clarity or information.

Would it make it more clear if you added…?

Allow time for each group to share their frog sound making devices that communicate three different messages. Ask each group to share their calls and explain how they work. Listen for students to use the terms *vibrations, moving air, pitch (high and low),* and *volume (soft and loud).* As students present their models and sounds, ask them to identify what is moving and if they can explain how the sound travels to their ears. At the end of each presentation, encourage the class to ask questions and comment on their sound devices and models. Remind students that scientists and engineers share their ideas with others to add new ideas and improve their models. Encourage students to use the suggestions on the anchor charts to communicate with one another.

Science Talk

After all groups have shared their sound makers and explained their models, have students gather in a circle to make meaning and connections to the focus question. Begin the Science Talk by choosing a comment or idea that was conveyed in one of the group presentations. To start the conversation and help students make connections among ideas and applications, ask:

- _____, I heard you say _____. What did you mean by that?
- Did anyone else have a similar finding? Do you think that is true for all cases? Why or why not?
- I heard many groups use the term *vibrations* when describing how sounds were made. What evidence do you have that makes you think sounds are caused by vibrations? Do the rest of you agree? Why or why not?
- I heard many groups refer to moving air when they explained their frog sound makers. What evidence do you have that air was moving? Do the rest of you agree? Why or why not?
- How does this information relate to our question, *How and why do frogs make frog calls?*
- What do you think is vibrating when a frog makes its croaking sound? What makes you think that?
- What do you think would happen to the frogs if they didn't make calls? What makes you think that? How can we find out?

At the conclusion of the Science Talk, revisit the What We Think About Frogs and Frog Calls chart and make additions and revisions as directed by the students. Include on the chart their ideas of how sounds are produced through vibrating material. Example: Vibrating objects produce sound, different vibrating materials produce different sounds, sounds can be high or low and soft or loud.

TEACHING TIP

Science Talk is a conversation among students that allows them to have the opportunity to orally express their ideas and listen to the ideas of others. Allow sufficient time for each student to express ideas and opinions. Encourage student-led conversation in the classroom.

CONSTRUCTING EXPLANATIONS AND DESIGNING SOLUTIONS

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.

- **Construct an explanation of observed relationships.**
- Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.
- Identify the evidence that supports particular points in an explanation.
- **Apply scientific ideas to solve design problems.**
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.

DEVELOPING AND USING MODELS

Modeling in 3–5 builds on K–2 experiences and progresses to building and **revising simple models** and using models to represent events and design solutions.

- Identify limitations of models.
- Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events.
- **Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.**
- **Develop and/or use models to describe and/or predict phenomena.**
- **Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.**
- Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.

After students have concluded that vibrations produce sounds, view a video of a frog making its sound. Ask students to look carefully for what is vibrating in the frog to make its sound.

After students have had a chance to view the video, ask for their ideas of what is vibrating and where air is moving. Students may notice that the frogs move air in and out of a sac that looks much like a balloon. Ask students to close their mouths and nostrils and try to move air in and out of their cheeks. Explain that in order for the frog to make a sound, the air must be moving back and forth between the lungs and the air sac or balloon and pass over its vocal cords. Challenge the students to make a sound without moving air from their lungs to their mouths.

Ask the class if they have further information to add to their class chart that helps to answer the question of how frogs make sounds. Make additions and adjustments to the chart as dictated by the students.

Have the groups revisit their models of their frog call devices and make additions and adjustments to their models. Encourage groups to share their new models with one another.

Journal Entry

Your class has been exploring how sounds are made and how the frog makes its sound. Revise your models from Lesson 1A of what and where sounds are coming from.

Assessment

Use the presentations, Science Talk, and revised models to assess the students' understanding of how sounds are made.

LESSON 1D: WHY DOES OUR FROG MAKE CALLS?

Teacher Background Information

This activity uses role playing with the student frog-call devices from the previous activity to answer the questions: In spring, when frogs mate, how do the male and female frogs of the same species find each other? Would it be easier if it was one frog doing the calling or a group of male frogs calling?

The out-of-the-lab investigation provides an opportunity for students to collect and analyze data by mimicking frog calls around a pond.

Advance Preparation

A large, open area is needed to facilitate the frog pond role playing. Look for an outside field or the gym to carry out the activity.

Make a data collection chart on the board or chart paper. Example:

How Do Frogs Find a Mate?

	Individual Trials		Group Trials		Results
Frog Group	Trial 1	Trial 2	Trial 1	Trial 2	
Frog Group 1					

Preview pages 5 through 7 in the book *Frogs* by Seymour Simon. The focus of using the informational text is to confirm the class's conclusion and data. Depending on the time of year when the unit is being taught, determine if your students are prepared to read the pages on their own in a small-group reading or if the text is more suitable for your class as a read aloud with whole-class discussion.

Procedure

Explain the concept and define the terms.

Introduce the book *Frogs*. Inform the class that they will be using the text in the book as a source to obtain information about frogs. Review the What We Think About Frogs and Frog Calls chart from the beginning of the unit. Focus on any ideas that refer to frog calls and why frogs are calling. Add any new ideas students have about the reason for the calling. Ask students what they have figured out and record their ideas on the chart.

MATERIALS NEEDED

For each student:
student pages

For each frog group:
frog call device from previous lesson

For the class:
book: *Frogs*
bandana, 2

Teacher provides:
timing device
chart paper

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.

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.

- **Represent data in tables and/or various graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships.**
- **Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation.**
- Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings.
- ~~Analyze data to refine a problem statement or the design of a proposed object, tool, or process.~~
- ~~Use data to evaluate and refine design solutions.~~

LESSON 1D

READING
Key Ideas and Details
RI.3.1: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for answers.
RI.3.2: Determine the main idea of a text; recount the key details and explain how they support the main idea.
RI.3.3: Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
Craft and Structure
RI.3.4: Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade-3 topic or subject area.
Integration of Knowledge and Ideas
RI.3.7: Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
RI.3.8: Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence).

Read the solution on pages 5 to 7 about the reason why frogs are calling. As you read, be sure to have students discuss ideas from the book that are similar to or different from their ideas on the chart. Ask:

- The author states that frogs are amphibians. What does that tell us about where frogs live? What other animals do you think are amphibians?
- Ask students to retell how the author describes how spring peepers and other frogs make their sounds.
- Ask students to retell why the spring peepers are making their sounds.

At the conclusion of the reading, discuss why frogs make different calls and why the spring peeper has its own distinct sound while other frogs have their own different sounds. Discuss how students' initial ideas were similar to and different from the information in the book.

Ask students how finding a mate, marking territory, and alerting to danger or distress is helpful in survival. Ask the class if they have new information to add to the What We Think chart and their models from Lesson 1A. Allow sufficient time for students to make adjustments to their models and share their new models with the class.

Elaborate on the concept.
Play the audio of frogs on the pond. Review how and why the frogs are making their sounds. Ask: With all the different sounds in the pond in spring, how will the female frogs be able to locate the male? Would it be easier if it was one frog doing the calling or a group of male frogs calling? How can we find out?

Explain to the class that they are going to role-play frogs of different kinds on a pond and gather evidence to see if it is easier for male and female frogs to find each other when frogs call out in a group or individually.

Divide the class back into their groups from the previous lessons. Have the groups collaborate and decide on one sound from their frog sound devices that will be the mating call of their frog species. Allow time for the groups to practice the mating call before the role playing begins. Have each group select two members to play the female frogs and the remaining members (at least three or four students) to be male frogs. Within the group of male frogs, have students select one member to be the solo caller.

Assemble all frog species groups in a large area. Explain to the groups that this area is the pond. The pond is home to many species of frogs and other animals and many plants. Ask students what other kinds of animals you might find at the pond. What kinds of plants might grow there? Set the scene for the role play.

Explain the role-play activity to the class:

- The teacher plays the role of the scientist who is asking the questions: With all the different sounds in the pond in spring, how will the female frogs be able to locate the male? Would it be easier if it was one frog doing the calling or a group of male frogs calling?
- The scientist will time how long it takes for the females to find the males with one caller and then a group of callers. The faster time will indicate a greater chance for mating success.
- Each species group plays the role of the different species of frogs that have made the pond their home. When one species is calling, all other species can be making frog calls, too. They can make any of the three calls from the previous lesson on their devices.
- Two members of each group play female frogs and the remaining members of each group play the male frogs.
- Two female frogs from one species group will hang out somewhere in the pond and be blindfolded. Explain that the blindfold is to mimic the darkness of nighttime. Frogs must find their mate by sound/hearing alone.
- Our first test will have the scientist time how long it takes for the females to find one male calling out. Our second test will have the scientist time how long it takes for the females to find a group of males calling out.
- When one species is being tested, the other species will simply make their calls to add to the sounds of the pond.
- During the individual tests, all frog species separate around the pond to make their mating calls. During the group tests, only the tested frog species will make their calls standing together in a group.

Ask a frog species group to go first. Run a couple of trials for each group for each variable and record their time on the *How Do Frogs Find a Mate?* chart with each variable.

TEACHING TIP

Depending on your group size, you may have one or two female frogs and three or four male frogs. The number of male frogs should be greater than the number of female frogs.

TEACHING TIP

Before starting the trials, help the female frogs remember and identify the mating call of their species by having one male frog make the call that they are to identify and pick out among all other frogs.

DEVELOPING AND USING MODELS

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- **Identify limitations of models.**
- Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events.
- **Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.**
- **Develop and/or use models to describe and/or predict phenomena.**
- Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.
- Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.

WRITING

Text Types and Purposes

W.3.2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension.
b. Develop the topic with facts, definitions, and details.
c. Use linking words and phrases (e.g., *also, another, and, more, but*) to connect ideas within categories of information.
d. Provide a concluding statement or section.

Production and Distribution of Writing

W.3.4: With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose.

W.3.5: With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.

Science Talk

After all groups have been given the opportunity to role-play, reassemble in the classroom to analyze the data. Display the data for the class. Ask the groups to first look at their own group data and discuss what they can conclude from their group. Then ask the students to compare their findings to the data of the other groups. Explain that scientists look for patterns in data to make claims about their investigations.

Ask students if they can make a claim based on their data. Discuss the pattern that emerges among the group trials. Integrate some math and ask students to calculate the average time for each group to find the mate using the two trials. Return to the original question: Is it easier for the female frog to locate the male frog if one frog is doing the calling or a group of frogs? Discuss how the data provide evidence to answer the question.

Take this opportunity to write a scientific explanation in the Student Journal using Claim, Evidence, and Reasoning.

Write a conclusion or scientific explanation that explains if it is easier for the female frog to locate the male frog if the mating call is sounded by one frog or a group of frogs. Use claim, evidence, and reasoning in your response.

Ask the students to state a claim that answers the question, then cite their evidence, and tell how their claim and evidence make sense through reasoning and what they know about sound.

Remind the class that the claim is a clear, concise statement that answers the question. The evidence comes straight from the data on the chart, and the reasoning is why the claim and evidence make sense and applies scientific principles.

Example:

Claim: It is easier for the female frog to locate the male frog if the mating call is sounded in a group.

Evidence: Our evidence shows that it took _____ (amount of time) for the female frog to find the male frog with the individual male calling and it took _____ (amount of time) for the female to find the male with the group of males calling. The group calling was _____ faster.

Reasoning: Our claim and evidence make sense because the volume of the sound increases with multiple frog voices. Multiple frog voices means an increase in vibrations due to the vibration of multiple vocal cords and a louder sound traveling through the air. The volume of sound will increase with multiple sources vibrating and creating the same sound.

After students have completed their entries in the Student Journal, ask the class to form a circle and bring their Student Journals to the Science Talk.

Pose the following question to the class:

> How does making the mating call in a group help the frogs to survive?

Ask a student to share his or her scientific explanation and tell why the behavior of the frogs working in a group is helpful in their survival. Encourage all students to add to, agree with, or disagree with the response. To facilitate the exchange and help the students to elaborate on their ideas, ask:

- Why do you think that?
- How do you know?
- What do you mean when you say…?
- Tell me more about…
- Can you think of an example where it might be helpful for other animals to work in groups?

Allow sufficient time for all groups to express their ideas about frogs working in groups for survival.

As a class, return to the What We Think chart and add what students did and what they figured out. Allow time for revisions to their models.

Journal Entry
Refer to your original model from Lesson 1A.

Write how working in a group is helpful. Include what could happen to the frogs and the frog species if they did not work in a group to find a mate.

Assessment
Use the Science Talk, Activity Page (Claim, Evidence, and Reasoning), and Journal Entry to assess the students' understanding that some animals form groups that help in their survival.

Use the Activity Page and Journal Entry to assess the students' ability to analyze and interpret data.

CONSTRUCTING EXPLANATIONS AND DESIGNING SOLUTIONS
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.

- **Construct an explanation of observed relationships.**
- Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.
- Identify the evidence that supports particular points in an explanation.
- **Apply scientific ideas to solve design problems.**
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.

LS1.B: GROWTH AND DEVELOPMENT OF ORGANISMS

- Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.

LESSON 1E: *HOW DO ANIMALS COMMUNICATE?*

Teacher Background Information

Students use information in text to compare their findings about how frogs work in a group to communicate their frog calls. This lesson elaborates on the concept of how being part of a group helps some animals get food, provide protection, call a mate, and survive in their habitats.

Advance Preparation

Preview the book *How Do Animals Communicate?* Use Post-It notes to mark pages where it is helpful to stop for questions, discussion, and making connections to their exploration into frogs and frog calls. Preview the chapters to be distributed among pairs of students. Determine reading groups ahead of time based on reading abilities within the class. If multiple copies are available, divide the class into six reading groups. If only one copy is available, facilitate the activity as a teacher read.

Whole-class introduction:

- What is Communication?
- Do Animals Communicate?

Group 1:

- Roars, Growls, and Howls
- Humpback Whale Songs

Group 2:

- Bird Songs and Dances
- Nests and Other Gifts

Group 3:

- How to Look Bigger
- I'm Warning You

Group 4:

- Scent Messages
- Touch Is Communication

Group 5:

- Mothers and Babies
- Group Communication

Group 6:

- Animals and People
- Monkey Messages

MATERIALS NEEDED

For each student:
student pages

For the class:
book: *How Do Animals Communicate?*

Teacher Provides:
chart paper

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.

OBTAINING, EVALUATING, AND COMMUNICATING INFORMATION

Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

- Read and comprehend grade-appropriate complex texts and/or other reliable media to summarize and obtain scientific and technical ideas and describe how they are supported by evidence.
- Compare and/or combine across complex texts and/or other reliable media to support the engagement in other scientific and/or engineering practices.
- Combine information in written text with that contained in corresponding tables, diagrams, and/or charts to support the engagement in other scientific and/or engineering practices.
- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.

LESSON 1E

READING

Key Ideas and Details

RI.3.1: Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for answers.

RI.3.2: Determine the main idea of a text; recount the key details and explain how they support the main idea.

RI.3.3: Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

Craft and Structure

RI.3.4: Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade-3 topic or subject area.

Integration of Knowledge and Ideas

RI.3.7: Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

RI.3.8: Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence).

Procedure

Elaborate on the concept.

Review with the class their findings from their exploration into how and why frogs make frog calls. Ask students to explain how their data demonstrate how working in groups helps the frogs to survive. Review the What We Think About Frogs and Frog Calls chart and make additions and revisions as students recommend.

Introduce the book *How Do Animals Communicate?* Ask students to predict what the book is about by looking at the cover and the author's choice of title. As a class, read the first chapter or section of the book: "What is Communication?" on pages 4 to 7. Discuss the different forms of communication people use and have students discuss if other animals use the same form of communication.

If multiple copies of the book are available, divide the class into their reading groups and assign each group their chapters (see Advance Preparation). Review the Activity Page in the Student Journal as a class. If only one copy is available, facilitate the activity as a teacher read.

In your reading group, read the assigned pages together. Discuss the main idea and supporting details of each chapter. Complete the chart below to share with the rest of the class.

Main Idea:	
Supporting Details	*Supporting Details*

Facilitate the group reading and recording of ideas by circulating among the students and listening to their reading and discussion. To check progress, ask:

- Can someone summarize one of the chapters you read?
- What do you think is the main idea the author is trying to tell the reader? What makes you think that?
- Do the rest of you agree? Why or why not?
- Does anyone have the same answer but a different way to explain it?
- What information should you put on your chart that will help others who have not read the chapters to understand?

After reading groups have reached a consensus on their charts in the Student Journal, distribute two pieces of chart paper to each group and have them transfer their responses to the large paper to share with the rest of the class. Have each group display their charts around the room in the order the chapters are written in the book.

Science Talk
As a class, do a gallery walk of all of the charts and have a spokesperson from each group explain the reading and the information on the chart. Ask students to look for patterns in the main ideas from each chapter in the book. Check for understanding that in all types of communication among animals, the communication helps the animal to survive. Some communication is for/to:

- Warning
- Protection
- Attract mate
- Mark territory
- Say hello
- Find food
- Teaching

Compare the students' understanding of how frogs communicate to how other animals in the book communicate. Ask students to compare how the wolf howls with how the frog calls. Listen for responses that include air moving and creating vibrations in vocal cords.

Focus the class's attention on the Group Communication chapter and discuss how wolves, dolphins, and elephants use groups to help them to communicate, hunt, find a mate, and protect one another. Discuss how each activity helps the animals to survive.

Evaluate the students' understanding of the concept.
Revisit the What We Think chart and models from Lesson 1A of how and why frogs make calls and have students make adjustments and revisions to their models based on their information from the text and gallery walk.

Journal Entry
Write how you made changes to your model based on new information from the text and ideas of others.

Assessment
Use the main-idea charts and frog call models to assess the students' understanding of why frogs make calls and how the sounds are made.

WRITING
Text Types and Purposes
W.3.2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
Research to Build and Present Knowledge
W.3.8: Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence to provide categories.
Range of Writing
W.3.10: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

APPENDIX

ENGINEERING DESIGN PROCESS

The Engineering Design Process provides students with a series of steps to guide them as they solve problems and design and test products, models, and solutions. The process is cyclical, yet not necessarily in an order. Students are encouraged to evaluate as they progress through the process, revisit the mission often, and revise thinking and their plan multiple times as the process unfolds.

Engineers do not always follow the Engineering Design Process steps in order, one after another. It is very common to design something, test it, find a problem, and then go back to an earlier step to make a modification or change the design. Engineers must always keep in mind the mission or problem they are trying to solve and the limitations (cost, time, material, etc.) that are part of the solution to the problem. Two key elements in working as an engineer are teamwork and design-test-and-redesign.

Mission
- Defines the problem and what the engineers are trying to design or build.
- Describes the limitations within which the engineers must solve the problem.

Brainstorm Ideas
- Imagine, discuss, and sketch possible solutions.
- Conduct research into what has already been done.
- Discover what materials are available, time frame, and other limitations.

Plan and Design
- Draw and write a plan.
- Design your solution through drawing and manipulating materials.
- Develop a plan or steps and a schedule.

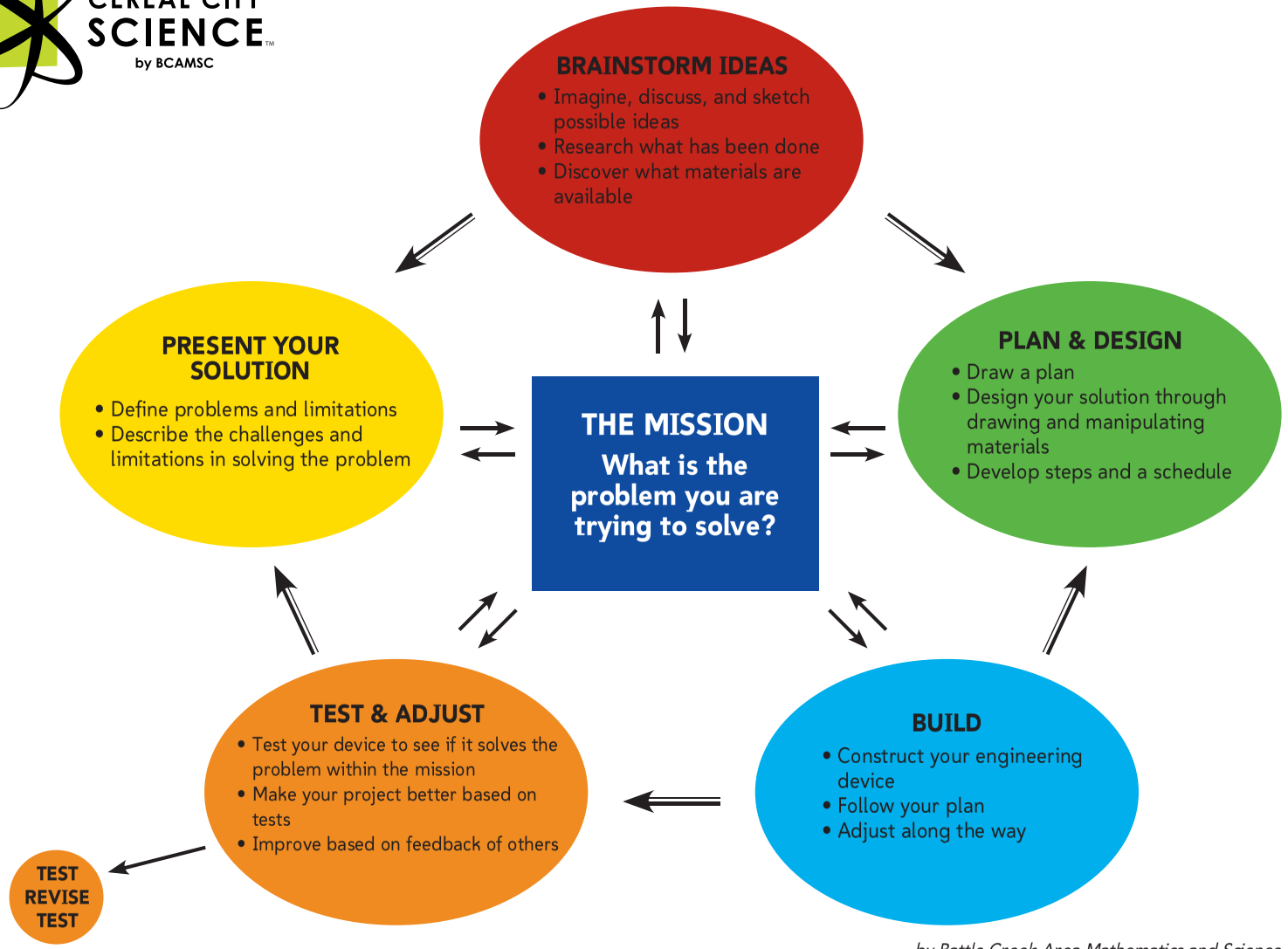
Build
- Construct your engineering device or project.
- Follow your plan.
- Adjust and test along the way.

Test and Adjust
- Test your device to see if it solves the problem within the mission and limitations.
- Make your project better based on tests: Test → Revise → Test.
- Improve based on feedback of others.

Present Your Solution
- Demonstrate how your solution solves the problem.
- Define problems and limitations.
- Describe the challenges and limitations in solving the problem.
- Describe additional revisions that could improve the device or project.

CEREAL CITY SCIENCE™ by BCAMSC

ENGINEERING DESIGN PROCESS



by Battle Creek Area Mathematics and Science Center
Cereal City Science
Adopted from the Carnegie Mellon Robotics Academy

APPENDIX

CEREAL CITY SCIENCE by BCAMSC

Student Journal
3.LS.NGSS

Life Cycles and Survival in an Ecosystem 3LNG

SECOND EDITION

A third grade unit supporting Next Generation Science Standards
and Michigan Science Standards

Name:_____

Name:_____

Date:_____

ACTIVITY **1A**

What is that Sound?

Your class has listened to a recording of the sounds of animals in nature. Develop a model that explains who is making the sounds and where the sounds are being made. Include why you think the animals are making the sound.

1B ACTIVITY
Developing Our Own Frog Calls

Name:_____

Date:_____

Use the chart below to organize your ideas of why the frogs make calls.

Example:

Why frogs make sounds	Draw and label a model of how the three devices will make each sound.
1.	
2.	
3.	

Name:_____

Date:_____

1. Draw and label a model of how each device makes the sounds.

Sound 1:

Sound 2:

Name:_____

Date:_____

Sound 3:

2. Write what all three sounds have in common. Describe what causes the sounds in your devices.

Name:_____

Date:_____

Your class has been exploring how sounds are made and how the frog makes its sound. Revise your model from Lesson 1A of what and where the sounds are coming from.

Name: _____

Date: _____

Write a conclusion or scientific explanation that explains if it is easier for the female frog to locate the male frog if the mating call is sounded by one frog or a group of frogs. Use claim, evidence, and reasoning in your response.

Claim: a claim is the answer to the question you investigated.

Evidence: evidence comes from the data you collected in your investigations.

Name:_____

Date:_____

ACTIVITY **1D**

Why Does Our Frog Make Calls?

Reasoning: reasoning explains why your claim and evidence make sense.

1D JOURNAL
Why Does Our Frog Make Calls?

Name: _____

Date: _____

Refer to your original model from Lesson 1A, make revisions as needed.

Write how working in a group is helpful. Include what could happen to the frogs and the frog species if they did not work in a group to find a mate.

Name:_____

Date:_____

RESPOND TO TEXT **1E**

How Do Animals Communicate?

Main Idea	
Supporting Details	Supporting Details

Name: _____

Date: _____

Write how you made changes to your model based on new information from the text and ideas of others.

Name:_____ **K E Y T E R M S**

Date:_____

K E Y T E R M S

Name: _____

Date: _____