Department of Agriculture Integrated Pest Management
Maine Curriculum Alignment: Grade 7 and Grade 8

Unit / Lesson	*Maine State Learning Results (Grades 6-8) Performance Indicators and Descriptors*	*New England Common Assessment Program Grade Level Expectations*	*National Science Education Content Standards*	*Grade-Level Expectations* *Students should be able to:*	*Assessment Standards*
Unit 1: Pest Identification What is a Pest: **Lesson 1: More Than Just Dust Bunnies** *To discover that dust contains living organisms. *To understand that some people are allergic to the fecal material of these organisms. *To recognize the need to prevent dust from accumulating. (SCI)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **Math/B1 – Data Analysis** Students use graphs and charts to represent, organize, interpret, and draw inferences from data. **SCI/A4 – Environment and Personal Health** Students determine how environment and other factors impact personal health.	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols;	**Unifying Concepts and Processes** • **Standard A:** As a result of activities in grades K-12, all students should develop understanding and abilities aligned with the following concepts and processes: o Systems, order, and organization o Evidence, models, and explanation o Constancy, change, and measurement o Evolution and equilibrium o Form and function **Life Science** • **Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments	1. Use a microscope correctly. 2. Collect and record data appropriately. 3. Make dry and wet slides, view contents, create drawings, and label them with locations in which the samples were found. 4. Create graphs to illustrate findings.	1. Demonstrate comprehension that small arachnids live in accumulated dust and can cause allergic reactions. 2. Compose a list of ways to control dust mites.

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Pest Identification **Lesson 2:** **A Weed By Any Other Name** *To determine the biodiversity of plants (weeds) in a given area. (SCI, SS)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **Math/B1 – Data Analysis** Students use graphs and charts to represent, organize, interpret, and draw inferences from data.	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols;	**Unifying Concepts and Processes** • **Standard:** As a result of activities in grades K-12, all students should develop understanding and abilities aligned with the following concepts and processes: o Systems, order, and organization o Evidence, models, and explanation o Constancy, change, and measurement o Evolution and equilibrium o Form and function **Science as Inquiry** • Content Standard A: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry	1. Determine the variety and survival adaptations of weeds in a designated area. 2. Observe and identify the plants in a given quadrant. 3. Create a map of the area illustrating where three to five samples of suspected weeds have been taken. 4. Create a scientific drawing of at least two of the samples complete with correct labeling. 5. Compute the answers to problems to determine the cost of weed control in corn, soybean, and wheat crops.	1. Explain the characteristics that are associated with weeds and allow their survival.

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Pest Identification **Lesson 3: Dormant Demons** *To identify the parts of a plant life cycle. *To recognize that different habitats harbor various seeds. *To recognize that mulching is an IPM method used to control weeds. *To apply knowledge gained to weed management. (SCI, Math)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part.	**R–8–8: Analyze and interpret informational text, citing evidence as appropriate by…** • R–8–8.1 Explaining connections about information *within* a text, *across* texts, or to related ideas. • R–8–8.2 Synthesizing and evaluating information within or across text(s) (e.g., constructing appropriate titles; or formulating assertions or controlling ideas)	**Unifying Concepts and Processes** • **Content Standard A:** As a result of activities in grades K-12, all students should develop understanding and abilities aligned with the following concepts and processes: o Systems, order, and organization o Evidence, models, and explanation o Constancy, change, and measurement **Life Science** • **Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments	1. Hypothesize, create experiment, record observations and data, and compare the original hypotheses to the actual results. 2. Draw conclusions based on data collected. 3. Complete a lab report based on the conclusions reached.	1. Understand how seeds can lie dormant until environmental conditions are optimum for germination. 2. Explain how mulching and removing weeds before they produce seeds can diminish the number of weeks that germinate in a given area.

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Pest Identification **Lesson 4: Johnny Appleseed Would Be Proud** *To diagnose and develop an action plan for control of an apple disease. (SCI, LA)	**LA/A2-A3 – Reading Literary Texts (Fiction and Nonfiction)** Students read to comprehend, interpret, analyze, evaluate, and appreciate literary and expository texts. **SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part.	**R–8–5: Analyze and interpret elements of literary texts, citing evidence where appropriate by…** R–8–5.3 Making inferences about cause/effect, internal or external conflicts (e.g., person versus self, person versus person, person versus nature/society/fate), or the relationship among elements within text (e.g., describing the interaction among plot/subplots)	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments	1. Use the Internet to access information. 2. Read and summarize expository information. 3. Complete an outline. 4. Create a visual aid. . 5. Diagnose a given plant disease and develop a plan to combat it.	1. Understand that the use of chemical controls to combat plant diseases can be reduced by applying IPM techniques. 2. Summarize the steps and tactics of IPM.

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Unit 2 **Pest Control Methods** **Section 1: Biological/Natural Control** **Lesson 1: Ant Antics** * To determine the effectiveness of three organic controls on ant behavior. (SCI,)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part.	**R–8–8: Analyze and interpret informational text, citing evidence as appropriate by…** • R–8–8.1 Explaining connections about information *within* a text, *across* texts, or to related ideas. • R–8–8.2 Synthesizing and evaluating information within or across text(s) (e.g., constructing appropriate titles; or formulating assertions or controlling ideas)	**Science as Inquiry** • **Content Standard A**: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry **Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments	1. Apply the Scientific Method to determine the effectiveness of three organic controls on ants. 2. Classify ants by phylum, class, order, and family. 3. Discuss the pros and cons of organic versus chemical control.	1. Understand that chemical controls are not the only way to manage pests. 2. Discover an organic substance that repels ants.

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Unit 2 **Pest Control Methods** **Section 1: Biological/Natural Control** **Lesson 2: There's No Such Thing As A Free Lunch** *To demonstrate through simulation the interactive relationship between predators and prey. *To demonstrate the impact of density-independent factors on predator and prey populations. (SCI)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part.	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols;	**Science as Inquiry** • **Content Standard A**: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry **Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments	1. Follow multi-step directions. 2. Record and interpret data. 3. Work together to play the predator/prey game. 4. Create a graph illustrating the results of each round.	1. Demonstrate an understanding of the fact that both density-dependent and density-independent factors impact pest populations. 2. Simulate the interaction of predators and prey in order to understand casual impact on populations.

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Unit 2 **Pest Control Methods** **Section 1: Biological/Natural Control** **Lesson 3: Friend or Foe?** * To understand the importance of carefully selecting natural enemies for use as introduced biological controls. (SCI, LA)	**SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part. **LA/A2-A3 – Reading Literary Texts (Fiction and Nonfiction)** Students read to comprehend, interpret, analyze, evaluate, and appreciate literary and expository texts. .	**R–8–5: Analyze and interpret elements of literary texts, citing evidence where appropriate by…** R–8–5.3 Making inferences about cause/effect, internal or external conflicts (e.g., person versus self, person versus person, person versus nature/society/fate), or the relationship among elements within text (e.g., describing the interaction among plot/subplots)	**Science as Inquiry** • **Content Standard A**: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry **Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments Living things have different structures and behaviors that allow them to meet their basic needs.	1. Participate in cooperative decision-making. 2. Analyze data. 3. Read expository material and determine the main idea of a scientific article. 4. Create an oral presentation. 5. Complete scientific evaluation. 6. Choose the best fit for a natural enemy to combat the Purpleface Waterleaf.	1. Understand the impact on native plants and animals must be considered prior to the introduction of non-native species into an ecosystem. 2. Review and evaluate the concept of biological control, emphasizing that natural enemies such as predators, parasites, and diseases are used to help control pests.

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Unit 2 **Pest Control Methods** **Section 2:** **Chemical Control** **Lesson 4:** **Weather vs. Whether** * To help group members discover which environmental factors must be considered when treating outside areas with pesticides. * To help group members determine what environmental conditions are optimum for pesticide application in an outside area. (SCI, Math)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **Math/B1 – Data Analysis** Students use graphs and charts to represent, organize, interpret, and draw inferences from data.	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols; **R–8–8: Analyze and interpret informational text, citing evidence as appropriate by…** • R–8–8.1 Explaining connections about information *within* a text, *across* texts, or to related ideas. • R–8–8.2 Synthesizing and evaluating information within or across text(s) (e.g., constructing appropriate titles; or formulating assertions or controlling ideas)	**Science as Inquiry** • **Content Standard A**: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry **Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments	1. Apply the Scientific Method. 2. Work Cooperatively. 3. Explain the steps/considerations for effective chemical pesticide application.	1. Recognize that the application of liquid pesticide formulation is affected by temperature, and to prevent to rapid evaporation, liquid pesticides should not be applied if temperature exceeds 78.F. 2. Realize that both liquid and powdered pesticides are affected by air currents, condensation, and precipitation.

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Unit 2 **Pest Control Methods** **Section 2:** **Chemical Control** **Lesson 5:** **Pesticide Wise** * To help students understand how to select, handle, use, store, and dispose of pesticides. (SCI, LA)	**LA/A2-A3 – Reading Literary Texts (Fiction and Nonfiction)** Students read to comprehend, interpret, analyze, evaluate, and appreciate literary and expository texts. **SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part.	**R–8–5: Analyze and interpret elements of literary texts, citing evidence where appropriate by…** R–8–5.3 Making inferences about cause/effect, internal or external conflicts (e.g., person versus self, person versus person, person versus nature/society/fate), or the relationship among elements within text (e.g., describing the interaction among plot/subplots)	**Science as Inquiry** • Content Standard A: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry **Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments Living things have different structures and behaviors that allow them to meet their basic needs.	1. Skim/Scan material read. 2. Summarize information. 3. Draw conclusions from information processed. 4. Differentiate between labels and labeling. 5. Comprehend the difference between active and inert ingredients.	1. Distinguish between safe and unsafe ways to dispose of pesticides. 2. Understand that pesticides, while useful in controlling unwanted pests, pose a risk to humans, other animals, and plants. They need to be used with caution, concern, and care.

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Unit 2 **Pest Control Methods** **Section 2:** **Chemical Control** **Lesson 6:** **Time Trials** * To understand that the movement of water through the upper levels of earth can carry surface contamination from pesticides to deeper levels. * To discover that percolation rate is influenced by the composition of earth's upper layers. (SCI, Math)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **Math/B1 – Data Analysis** Students use graphs and charts to represent, organize, interpret, and draw inferences from data.	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols; **R–8–8: Analyze and interpret informational text, citing evidence as appropriate by…** • R–8–8.1 Explaining connections about information *within* a text, *across* texts, or to related ideas. • R–8–8.2 Synthesizing and evaluating information within or across text(s) (e.g., constructing appropriate titles; or formulating assertions or controlling ideas)	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments Living things have different structures and behaviors that allow them to meet their basic needs. **Science as Inquiry** • Content Standard A: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry	1. Design an experiment. 2. Apply the Scientific Method. 3. Discuss the effect of percolation on groundwater. 4. Compare/contrast the sources of water contamination (i.e. pesticides, chemical dumping, garbage, and acid rain). 5. Design a leaching field that will slow percolation.	1. Describe how pesticides and other contaminates percolate through upper layers of the ground and contaminate groundwater. 2. Create a flow chart or diagram illustrating how ground level contamination affects groundwater.

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Unit 2 **Pest Control Methods** **Section 2:** **Chemical Control** **Lesson 7:** **Fact or Fiction?** * To examine literary forms as a source of public address. * To better understand the environmental impact of indiscriminate pesticide use. (SCI, LA)	**LA/A2-A3 – Reading Literary Texts (Fiction and Nonfiction)** Students read to comprehend, interpret, analyze, evaluate, and appreciate literary and expository texts. **SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part.	**R–8–5: Analyze and interpret elements of literary texts, citing evidence where appropriate by…** R–8–5.3 Making inferences about cause/effect, internal or external conflicts (e.g., person versus self, person versus person, person versus nature/society/fate), or the relationship among elements within text (e.g., describing the interaction among plot/subplots)	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments Living things have different structures and behaviors that allow them to meet their basic needs. – Plants need air, water and sunlight to survive. **Science as Inquiry** • Content Standard A: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry	1. Analyze literary forms. 2. Discuss the characteristics of a fable. 3. Recognize truth in fiction. 4. Design a poster to warn people of the continued indiscriminate use of pesticides on lawn and schoolyards.	1. Understand that fiction, particularly science fiction, often predicts future facts. 2. Recognize that indiscriminate use of pesticides can cause environmental chain reactions. 3. Develop a flow chart illustrating the causes and effects of pesticide use on an ecosystem.

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Unit 2 **Pest Control Methods** **Section 3: Cultural, Mechanical, Regulatory Control** **Lesson 8: "GM"… It's Not Just a Car** * To research a current scientific topic. * To formulate an opinion on a current scientific dilemma. *To defend that opinion using a debate format. (SCI, LA)	**LA/B3 – Writing** Students write academic essays that state a clear position, supporting the position with relevant evidence. **SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a	W-7-3 In response to literary or informational text, students make and support analytical judgments about text by . . . W–7–3.1 Stating and maintaining a focus (purpose), a firm judgment, or point of view when responding to a given question. W–7–3.3 Using specific details and references to text or relevant citations to support focus or judgment. W–7–8.2 Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing, use of visual images.	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments Living things have different structures and behaviors that allow them to meet their basic needs. – Plants need air, water and sunlight to survive.	1. Form a pro or con opinion about genetically modified agricultural products. 2. Present evidence to persuade. 3. Search websites and take notes to support a position: pro or con GM usage in agriculture. 4. Hold an informal debate and take turns presenting evidence and refuting opposing arguments. 5. Write a position paper.	1. Recognize that GM, genetic modification of agricultural products, is possible, but it is controversial.

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Unit 2 **Pest Control Methods** **Section 3: Cultural, Mechanical, Regulatory Control** **Lesson 9: Hopper Hunt** * To understand the migration and the life cycle patterns of a key alfalfa pest, the potato leafhopper (PLH) * To determine the economic threshold and the extent of economic injury levels. * To understand how the stage of crop development and other factors influence thresholds. * To determine a pest population by sampling technique. * To compare sampling results to the economic threshold and determine management action. (SCI, Math)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **Math/B2 – Data Analysis** Students use the mean, median, mode, range, and quartiles to solve problems involving raw data and information from data displays.	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols;	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments All organisms cause changes in the environment where they live. Some of these changes are detrimental to the organism or other organisms, whereas others are beneficial.	1. Conduct a scientific simulation. 2. Analyze and evaluate data. 3. Determine which fields of simulated alfalfa need pest control action taken. 4. Compute averages for both PLH samples and plant height samples.	1. Determine when to use pest control methods based upon mathematical calculations of pest populations and growth of crops.

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Unit 2 **Pest Control Methods** **Section 3: Cultural, Mechanical, Regulatory Control** **Lesson 10: Design a Landscape** * To determine appropriate plants for a Northeastern landscape. * To design a landscape plan for a typical home or pocket park. (SCI, Math)	**SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part. **Math/C3 – Geometry** Students understand and use the concept of scale drawings to enlarge or reduce two-dimensional plane figures.	**R–8–8: Analyze and interpret informational text, citing evidence as appropriate by…** • R–8–8.1 Explaining connections about information *within* a text, *across* texts, or to related ideas. • R–8–8.2 Synthesizing and evaluating information within or across text(s) (e.g., constructing appropriate titles; or formulating assertions or controlling ideas)	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments All organisms cause changes in the environment where they live. Some of these changes are detrimental to the organism or other organisms, whereas others are beneficial.	1. Generate a list of factors that must be considered when designing a landscape for a home or pocket park. 2. Create a landscape design for a Northeastern home or pocket park (a small urban space). 3. Display the final landscape plan including pictures of selected items and a scale drawing. 4. Present the plan, justifying the choices of materials and cost for completion.	1. Recognize that plants native to an area can provide the desired effect and have a better chance of surviving insect pests, diseases, and climatic changes than introduced plants. 2. Understand that the needs of a plant must be considered in the creation of a successful landscape design.

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Unit 2 **Pest Control Methods** **Section 3: Cultural, Mechanical, Regulatory Control** **Lesson 11: Environmental Entrepreneurs** * To recognize that alternate choices to chemical control for pest management exist. (SCI, LA)	**LA/A2-A3 – Reading Literary Texts (Fiction and Nonfiction)** Students read to comprehend, interpret, analyze, evaluate, and appreciate literary and expository texts. **SCI/A1 – Systems** Students describe and apply principles of systems in man-made things, natural things, and processes.	**R–8–5: Analyze and interpret elements of literary texts, citing evidence where appropriate by…** R–8–5.3 Making inferences about cause/effect, internal or external conflicts (e.g., person versus self, person versus person, person versus nature/society/fate), or the relationship among elements within text (e.g., describing the interaction among plot/subplots)	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments Many characteristics of an organism are inherited from the parents of the organism, but other characteristics result from an individual's interactions with the environment.	1. Read and analyze expository material. 2. Brainstorm a list of mechanical controls for pests. 3. Discuss the use of mechanical controls as a viable option in IPM. 4. Create an advertisement for an invention option. 5. Create a mechanical device to manage a selected pest.	1. Understand that the effectiveness and cost of mechanical pest control must be considered when selecting a method to control pests.

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Unit 2 **Pest Control Methods** **Section 3: Cultural, Mechanical, Regulatory Control** **Lesson 12: Who's Minding the Store?** * To determine the roles and responsibilities of citizen groups in influencing environmental policies and decision-making, * To increase participants interest in taking a more active pro-environmental role. (SCI, LA, SS)	**LA/A2-A3 – Reading Literary Texts (Fiction and Nonfiction)** Students read to comprehend, interpret, analyze, evaluate, and appreciate literary and expository texts. **LA/B3 – Writing** Students write academic essays that state a clear position, supporting the position with relevant evidence.	**R–8–5: Analyze and interpret elements of literary texts, citing evidence where appropriate by…** R–8–5.3 Making inferences about cause/effect, internal or external conflicts (e.g., person versus self, person versus person, person versus nature/society/fate), or the relationship among elements within text. W-7-3 In response to literary or informational text, students make and support analytical judgments about text by . . . W–7–3.1 Stating and maintaining a focus (purpose), a firm judgment, or point of view when responding to a given question. W–7–3.3 Using specific details and references to text or relevant citations to support focus or judgment. W–7–8.2 Including sufficient details or facts for appropriate depth of information	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments An n organism's patterns of behavior are related to the nature of that organism's environment,, including the kinds and numbers of other organisms present, the availability of food and resources, and the physical characteristics of the environment.	1. Research using primary sources. 2. Formulate a letter to an environmental agency of choice addressing a personal concern. 3. Summarize and evaluate information. 4. Hold a discussion on the value of civic action and what individual actions can be taken to protect the natural environment.	1. Realize that in a democracy, citizens have a voice in shaping environmental management policies. 2. Understand that effective civil participation requires that citizens carefully study all sides of an environmental issue and form an opinion based on facts.

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Unit 2 **Pest Control Methods** **Section 3: Cultural, Mechanical, Regulatory Control** **Lesson 13: Hygiene for Horror** * To recognize that social and cultural practices can contribute to the spread of infectious disease. * To recognize that IPM techniques contribute to the control of infectious disease. (SCI, SS)	**SCI/A4 – Environment and Personal Health** Students determine how environment and other factors impact personal health. **SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations.	W-7-3 In response to literary or informational text, students make and support analytical judgments about text by . . . W–7–3.1 Stating and maintaining a focus (purpose), a firm judgment, or point of view when responding to a given question. W–7–3.3 Using specific details and references to text or relevant citations to support focus or judgment. W–7–8.2 Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing, use of visual images.	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments **Science as Inquiry** • Content Standard A: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry Understanding about scientific inquiry	1. Compare pest facts to living conditions that encouraged the spread of plague. 2. Develop viable IPM plans that could have slowed the spread of the plague. 3. Evaluate current sanitary practices and problems to those of the Middle Ages. 4. Develop a plan to decrease the pest potential in a school or personal space.	1. Develop historical perspective through realizing the lack of technology and scientific knowledge, coupled with careless human health practices, resulted in living conditions that were prime for the spread of infectious diseases during the Middle Ages. 2. Recognize both fleas and rodents thrive in environments unhealthy for humans. 3. Understand poverty is often the partner of infectious disease. Therefore, in blighted areas infectious diseases can still be a threat.

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Unit 3 **Biodiversity** **Lesson 1:** **A Picture is Worth 1,000 Words** * To define biodiversity. * To aid understanding of biodiversity through the creation of a visual aid. (SCI, LA, Art)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **SCI/E1 – Biodiversity** Students differentiate among organisms based on biological characteristics and identify patterns of similarity. a. Compare physical characteristics that differentiate organisms into groups	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols. W-7-3 In response to literary or informational text, students make and support analytical judgments about text by . . . W–7–3.1 Stating and maintaining a focus (purpose), a firm judgment, or point of view when responding to a given question. W–7–3.3 Using specific details and references to text or relevant citations to support focus or judgment. W–7–8.2 Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing, use of visual images.	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments **Science as Inquiry** • Content Standard A: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry.	1. Gather, organize and analyze information. 2. Create a visual aid to illustrate biodiversity. 3. Graph statistical data. 4. Construct a “Quick Quiz” for other members of the group. 5. Create and keep a biodiversity journal for 24-hours recording each time a connection to biodiversity is experienced.	1. Understand that biodiversity is a term used to describe the variety of life forms on earth. 2. Recognize biodiversity is based on ecosystems, classification of species, and variations in genetic structure.

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Unit 3 Biodiversity **Lesson 2: More Than the Spice of Life** * To determine a myriad of ways humans benefit from biodiversity. (SCI, LA)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **SCI/E1 – Biodiversity** Students differentiate among organisms based on biological characteristics and identify patterns of similarity. a. Compare physical characteristics that differentiate organisms into groups	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols. W-7-3 In response to literary or informational text, students make and support analytical judgments about text by . . . W–7–3.1 Stating and maintaining a focus (purpose), a firm judgment, or point of view when responding to a given question. W–7–3.3 Using specific details and references to text or relevant citations to support focus or judgment. W–7–8.2 Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing, use of visual images.	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments Humans depend on their natural and constructed environments. Humans change environments in ways that can be either beneficial or detrimental for themselves and other organisms.	1. Understand multiple points of view. 2. Analyze data. 3. Form and defend an opinion. 4. Chart reasons that present the strongest case for preserving biodiversity. 5. Create a poster and/or write and or produce a jingle to convince the general public to support biodiversity.	1. Recognize that minus the vast variety of plants and animals, our lies would be far less interesting, and at some point, the lack of variety would have life threatening consequences to humans.

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Unit 3 Biodiversity **Lesson 3: E3 – Earth's Endangered Ecosystems** * To recognize and evaluate threats to world ecosystems. * To increase community awareness regarding the need for positive action preserve our ecosystems. * To investigate the Northeast's specific ecological problems. (SCI, LA, SS)	**SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part. **LA/B3 – Writing** Students write academic essays that state a clear position, supporting the position with relevant evidence.	W-7-3 In response to literary or informational text, students make and support analytical judgments about text by . . . W–7–3.1 Stating and maintaining a focus (purpose), a firm judgment, or point of view when responding to a given question. W–7–3.3 Using specific details and references to text or relevant citations to support focus or judgment. W–7–8.2 Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing, use of visual images.	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments	1. Investigate an endangered ecosystem and evaluate the threats. 2. Create an oral presentation. 3. Understand maps. 4. Read and summarize expository material defining an ecosystem and the problems facing the ecosystem. 5. Participate in cooperative learning to create a series of three public service ads to raise public awareness regarding the threats to an ecosystem.	1. Understand that every ecosystem worldwide is currently threatened to varying degrees by pollution, overpopulation, overconsumption, habitat loss and invading species.

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Unit 3 **Biodiversity** **Lesson 4:** **Alien Invaders** * To identify and describe examples of invasive species that threaten biodiversity. * To identify examples of alien species. * To describe the impact alien species have on the environment. * To understand how control methods can upset the balance of nature. (SCI, LA, SS)	**SCI/E1 – Biodiversity** Students differentiate among organisms based on biological characteristics and identify patterns of similarity. a. Compare physical characteristics that differentiate organisms into groups. **SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part.	Not applicable for this assignment.	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments **Earth and Space Science** • **Content Standard D:** As a result of their activities in grades K-4, all students should develop an understanding of o Properties of earth materials o Objects in the sky o Changes in earth and sky	1. Plot the location of origin of a plant or animal on a map and indicate the path the species traveled to its present location. 2. Research and design posters for a campaign to educate the public about the dangers of alien invaders.	1. Recognize invasive species can cause permanent disruption of habitats. 2. Explain how the balance of nature is upset by invasive species. 3. Understand how the methods of biological control can be disruptive to the environment.

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Unit 3 **Biodiversity** **Lesson 5:** **Acid Rain Ruin** * To identify the causes of acid rain. * To examine the effects of different acid solutions on the germination of seeds. * To correlate the results of this experiment to the effects of acid rain on terrestrial ecosystems. (SCI)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **Math/B1 – Data Analysis** Students use graphs and charts to represent, organize, interpret, and draw inferences from data.	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols;	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments **Science as Inquiry** • Content Standard A: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry.	1. Determine the effects of acid solutions on different types of seeds. 2. Create a graph illustrating observation data results. 3. Compare graphs and discuss the implications regarding the impact of acid rain on the natural environment. 4. Create a flow chart to illustrate the reason for the decrease in the United States frog population.	1. Remember most scientists agree that normal rain has a pH of 5.6, and acid rain is defined as any precipitation that has a pH of less than 5.6. 2. Realize that acid rain affects a lake and pond's ability to support plants and aquatic wildlife. 3. Understand that the upset in the balance of nature is causing widespread infestation of insect species that threaten to wipe out entire species of trees.

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Unit 3 Biodiversity **Lesson 6: Biosphere - Building a Balanced World** * To observe the connection between carbon dioxide depletion and photosynthetic activity. (SCI)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part.	Not applicable to this assignment.	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments **Science as Inquiry** • Content Standard A: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry.	1. Build a successful biosphere. 2. Create an experiment that illustrates how the depletion of carbon dioxide affects photosynthetic activity. 3. Discuss the types of gases that make up our atmosphere. 4. Set up a bulletin board to show the names and symbols of gases and the natural processes or human activities that form each gas.	1. Explain there is a relationship between carbon dioxide production and photosynthetic activity. 2. Realize that carbon dioxide levels can be dangerous to the balance of gases in the earth's atmosphere. 3. Recognize that carbon dioxide levels contribute to the condition known as the greenhouse effect which impacts biodiversity.

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Unit 3 **Biodiversity** **Lesson 7:** **Building Your Own Biosphere** ***** To design an enclosed environment that will support plant and animal life. * To determine the needs of an ecosystem (ie: size, amount of air, water type of soil and well as the flora and fauna). (SCI)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations.	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols. W-7-3 In response to literary or informational text, students make and support analytical judgments about text by . . . W–7–3.1 Stating and maintaining a focus (purpose), a firm judgment, or point of view when responding to a given question. W–7–3.3 Using specific details and references to text or relevant citations to support focus or judgment. W–7–8.2 Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing, use of visual images.	**Life Science** • **Content Standard C: As a result of activities in grades K-4, all students should develop understanding of:** ○ **The characteristics of organisms** ○ **Life cycles of organisms** ○ **Organisms and Environments** **Science as Inquiry** • **Content Standard A: As a result of activities in grades K-4, all students should develop:** ○ **Abilities necessary to do scientific inquiry** ○ **Understanding about scientific inquiry.**	1. Design and build a biosphere based on a single ecosystem. 2. Determine the needs of an ecosystem. 3. Research the type of food and amount needed to sustain life in the biosphere . 4. Research the environmental needs of the biosphere. 5. Log data results over a one-month period.	1. Remember ecosystems have unique needs in terms of the amount of water, air, and sunlight necessary to support life. 2. Recognize that ecosystems have input and output by living and nonliving components that integrate to form a living interdependent unit.

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Unit 3 **Biodiversity** **Lesson 8:** **Exploding Populations** * To understand the problem on increasing population worldwide. * To recognize the relationship between population and availability of natural resources. (SCI, Math, SS)	**SCI/E1 – Biodiversity** Students differentiate among organisms based on biological characteristics and identify patterns of similarity. a. Compare physical characteristics that differentiate organisms into groups. **SCI/E2 – Ecosystems** Students examine how the characteristics of the physical, non-living environment, the types and behavior of living organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are a part. **Math/B1 – Data Analysis** Students use graphs and charts to represent, organize, interpret, and draw inferences from data	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols; W-7-3 In response to literary or informational text, students make and support analytical judgments about text by . . . W–7–3.1 Stating and maintaining a focus (purpose), a firm judgment, or point of view when responding to a given question. W–7–3.3 Using specific details and references to text or relevant citations to support focus or judgment. W–7–8.2 Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing, use of visual images.	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments **Science as Inquiry** • Content Standard A: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry.	1. Interpret statistics. 2. Understand multiple viewpoints. 3. Recognize trends. 4. Form and defend an opinion. 5. Decide which problem should become a priority: population control, reduction of consumption, or elimination of malnutrition. 6. Create a graph illustrating one aspect of the population explosion problem.	1. Understand the world population as a whole is reaching critical mass. 2. Realize natural resources and food production cannot support limitless population growth. 3. Support the idea that better methods of crop production and protection can help alleviate the problem.

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Unit 3 Biodiversity **Lesson 9: Consuming Passions** * To identify various perspectives regarding environmental issues. * To choose a plan of actions in which individuals, communities, businesses, and governments can deal effectively with biodiversity loss. * To present logical arguments to support individual opinions regarding biodiversity mess. (SCI, LA)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **SCI/E1 – Biodiversity** Students differentiate among organisms based on biological characteristics and identify patterns of similarity. a. Compare physical characteristics that differentiate organisms into groups.	W-7-3 In response to literary or informational text, students make and support analytical judgments about text by . . . W–7–3.1 Stating and maintaining a focus (purpose), a firm judgment, or point of view when responding to a given question. W–7–3.3 Using specific details and references to text or relevant citations to support focus or judgment. W–7–8.2 Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing, use of visual images.	**Life Science** • **Content Standard C: As a result of activities in grades K-4, all students should develop understanding of:** ○ **The characteristics of organisms** ○ **Life cycles of organisms** ○ **Organisms and Environments** **Science as Inquiry** • **Content Standard A: As a result of activities in grades K-4, all students should develop:** ○ **Abilities necessary to do scientific inquiry** ○ **Understanding about scientific inquiry.**	1. Comprehend expository materials. 2. Develop a defensible personal point of view regarding biodiversity issues. 3. Conduct research on the chosen topic using a minimum of four sources that include both sides of an issue. 4. Develop a position paper on a chosen environmental issue.	1. Remember all strategies to solve environmental issues require compromises by various groups. 2. Recognize that citizens in a democracy need to be educated regarding all the options concerning biodiversity.

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Unit 3 Biodiversity **Lesson 10: Biodiversity In Your Own Backyard** * To make detailed and accurate observations of a land plot. * To develop an understanding of the diverse populations of species and habitats that occur locally. * To design an investigation to observe how human behavior impacts biodiversity. (SCI, Math)	**SCI/B1 – Skills and Traits of Scientific Inquiry** Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. **Math/B1 – Data Analysis** Students use graphs and charts to represent, organize, interpret, and draw inferences from data.	M(F&A)–7–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship using words and symbols. W-7-3 In response to literary or informational text, students make and support analytical judgments about text by . . . W–7–3.1 Stating and maintaining a focus (purpose), a firm judgment, or point of view when responding to a given question. W–7–3.3 Using specific details and references to text or relevant citations to support focus or judgment. W–7–8.2 Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing, use of visual images.	**Life Science** • **Content Standard C**: As a result of activities in grades K-4, all students should develop understanding of: o The characteristics of organisms o Life cycles of organisms o Organisms and Environments **Science as Inquiry** • Content Standard A: As a result of activities in grades K-4, all students should develop: o Abilities necessary to do scientific inquiry o Understanding about scientific inquiry.	1. Demonstrate proper format in utilizing the scientific method. 2. Determine the correlation between the amount of human activity and plant and animal populations. 3. Count, tally, and assess data collected. 4. Develop a conservation strategy that could help protect species in a specific plot.	1. Recognize there is a correlation between the amount of human activity and the populations of species of plants, arthropods, and other animals.

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