3rd-5th Grade Appendix

NGSS and Common Core Alignment

Keystone Projects -- Explain & Elaborate & Evaluate

All Ages Keystone Project Options	Science Practices	Cross Cutting Concepts	Disciplinary Core Ideas & Performance Expectations
Any of the following *Biodiversity PEEK STEAM Projects* also align with these standards plus more depending on how far and in what directions you and the students take the project(s). • **Just Add Water** • **Gimmie Shelter** • **Who's got the munchies?** • **Class Challenge** • **STEAM Exhibition**	Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Analyzing and Interpreting Data Developing and Using Models Connections to Nature of Science Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations	Patterns Cause and Effect Science Addresses Questions About the Natural and Material World Energy and Matter Systems and System Models Connections to Engineering, Technology, and Applications of Science Influence of Engineering, Technology, and Science on Society and the Natural World	ETS1.A: Defining and Delimiting Engineering Problems 3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5-ETS1-3: Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a prototype that can be improved. ETS1-C: Optimizing the Design Solution LS2.A: Interdependent Relationships in Ecosystems LS1-C: Organization for Matter and Energy Flow in Organisms

			LS2.B: Cycles of Matter and Energy Transfer in Ecosystems ESS3.C: Human Impacts on Earth Systems Reading and Math: RI.3.3, SL.3.4, 3.LS4-4, 3-LS4-1, 3-LS4-4, W.3.1, W.3.2, 4-PS4-3, MP.2, MP.4, MP.5

Engage Lesson Group I

Lessons	Science Practices	Cross Cutting Concepts	Disciplinary Core Ideas & Performance Expectations
1. *EyeSpots*: Students experience, observe in, and write/draw about their own special outdoor area. 2. *Beach Surprise*: Students read about a true student-citizen-science story and consider and discuss the importance of data/information to community action. 3. *Citizen-Science Race*: Students play a physical game to review the key concepts of *biodiversity, citizen-science, data,* and *observations.* 4. *Silly Skits*: Students read and discuss safety and ethics for citizen-scientists. Then they create and perform their own "what NOT to do" comedy skits. ***This is a perfect time to start a Biodiversity STEAM project!**	Obtaining, Evaluating, and Communicating Information Asking Questions and Defining Problems	Science Addresses Questions About the Natural and Material World Cause and Effect Influence of Science, Engineering, and Technology on Society and the Natural World	ESS3.C: Human Impacts on Earth Systems 5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. 3-LS4: (introduced) Biological Evolution: Unity and Diversity 4-LS1: (introduced) From Molecules to Organisms: Structures and Processes Reading Standards for Informational Text 3-5 3rd: 3.R1.1, 3.R1.2, 3.R1.3, 3.R1.4, 3.R1.6, 3.R1.7 4th: 4.R1.1, 4.R1.2, 4.R1.3, 4.R1.4, 4.R1.8 5th: 5.R1.1, 5.R1.2, 5.R1.3, 5.R1.4

Engage & Explore Lesson Group

Lessons	Science Practices	Cross Cutting Concepts	Disciplinary Core Ideas & Performance Expectations
5. *BioGRAPHing! :* Students interpret, graph, and recognize the importance of data through a true story of a young girl trying to protect her local, wild, suburban biodiversity. 6. *Biodiversity Assessment:* Students count and graph the variety and abundance of their own nearby biodiversity.	Analyzing and Interpreting Data Engaging in Argument from Evidence	Patterns Cause and Effect Science Addresses Questions About the Natural and Material World Influence of Engineering, Technology, and Science on Society and the Natural World	LS4-C: Adaptation 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. LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS3.B: Variation of Traits LS4.D: Biodiversity and Humans 3-LS4-4: (Introduced) 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. LS2.A: Interdependent Relationships in Ecosystems ETS1.B: (Introduced) Developing Possible Solutions 5-ESS3: Earth and Human Activity Reading and Math: RI.3.7 and MP.2, 3.MD.B.3, 3.MD.B.4, MP.4, MP.5

Engage Lesson Group II

Lessons	Science Practices	Cross Cutting Concepts	Disciplinary Core Ideas & Performance Expectations
7. *SunPrints*: Students are confused as they create art and investigate a mysterious phenomenon of light. They isolate and test one variable, make observations, and form an evidence-supported explanation. 8. *Math + Art = Frames!:* Students use math and measurement to solve the design problem of making a frame to showcase the SunPrints.	Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Analyzing and Interpreting Data Obtaining, Evaluating, and Communicating Information Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Obtaining, Evaluating, and Communicating Information	Cause and Effect Patterns Connections to Engineering, Technology, and Applications of Science	PS4.B: Electromagnetic Radiation 4-PS4-2: Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. (Stage is set here for this in Lesson 15) ETS1.A: Defining and Delimiting Engineering Problems ETS1.B: Developing Possible Solutions ETS1.C: Optimizing the Design Solution 3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria & constraints of the problem. MATH Standards Connections: MP.2, MP.4, MP.5, 3.NBT, 3.NF, 3.MD.B.4, 4.G.A.1, 4.MD.A.1, 4.MD.A.2, 5.MD.A.1

Engage & Explore Lesson Group

Lessons	Science Practices	Cross Cutting Concepts	Disciplinary Core Ideas & Performance Expectations
9. *Journal Wonderings*: Students use writing and drawing as they observe an organism in the wild and develop researchable questions about how some of their traits and behaviors help them survive there. 10. *Wonderings - Researched & Shared:* Students research their questions from lesson 8, then develop and present an argument with supporting evidence for how particular traits and behaviors help a particular organism survive there. 11. *Survival Game:* Students read a true story of survival and assume the role of a local plant or animal while playing a game to recognize how changes in the local environment can affect a population's survival there.	Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Developing and Using Models	Cause and Effect Systems and System Models Connections to Engineering, Technology, and Applications of Science Science Addresses Questions About the Natural and Material World	LS1.A: Structure and Function 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. LS4.C: Adaptation 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. 3-LS4-2 (students may also) 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. 5-LS1-1 (students may also) Support an argument that plants get the materials they need for growth chiefly from air and water. 5-LS2: (touches on) Ecosystems: Interactions, Energy and Dynamics 5-ESS3: (may touch on) Earth and Human Activity ESS3.C: Human Impacts on Earth Systems

Lessons	Science Practices	Cross Cutting Concepts	Disciplinary Core Ideas & Performance Expectations
			5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS4.D: Biodiversity and Humans 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. Students may also touch on: LS3.A: Inheritance of Traits LS3.B: Variation of Traits LS4.B: Natural Selection LS4.C: Adaption ELA: Reading Standards for Informational Text 3-5 3rd: 3.R1.1, 3.R1.2, 3.R1.3, 3.R1.4, 3.R1.6, 3.R1.7 4th: 4.R1.1, 4.R1.2, 4.R1.3, 4.R1.4, 4.R1.8 5th: 5.R1.1, 5.R1.2, 5.R1.3, 5.R1.4

Explore & Explain Lesson Group I

Lessons	Science Practices	Cross Cutting Concepts	Disciplinary Core Ideas & Performance Expectations
12. *In a Dark, Dark Room:* Students investigate to solve a seemingly ghostly property of light and learn the importance of isolating a variable. 13. *Tinkering:* Students apply what they learned in the prior lesson by using the iterative process to design and engineer their own handheld cameras obscura as a model of the human eye.	Developing and Using Models Planning and Carrying Out Investigations Constructing Explanations and Designing Solutions Asking Questions and Defining Problems Obtaining, Evaluating, and Communicating Information	Cause and Effect Patterns Connections to Engineering, Technology, and Applications of Science	PS4.B: Electromagnetic Radiation 4-PS4-2: Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. ETS1.A: Defining and Delimiting Engineering Problems 3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-3: Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. ETS1.B: Developing Possible Solutions 3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. ETS1-C: Optimizing the Design Solution MATH Standards Connections: MP.2, MP.4, MP.5, 3.NBT, 3.NF, 3.MD.B.4, 4.G.A.1, 4.MD.A.1, 4.MD.A.2, 5.MD.A.1

Explore & Explain Lesson Group II

Lessons	Science Practices	Cross Cutting Concepts	Disciplinary Core Ideas & Performance Expectations
14. *Your EyeSpot Environment:* Students write and draw in their nature journals as they observe and consider what aspects of their outdoor environment support and which challenge local biodiversity. 15. *Can You See It My Way?* Students apply their knowledge about how organisms are supported and challenged by their environment as they write an empathetic and creative short story from the perspective of a local life form very different from themselves.	Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information	Cause and Effect Energy and Matter Systems and System Models Influence of Engineering, Technology, and Science on Society and the Natural World	(some or all of the following) LS3.A: Inheritance of Traits LS3.B: Variation of Traits 3-LS3-2: Use evidence to support the explanation that traits can be influenced by the environment. LS4.C: Adaptation 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. LS2.C: Ecosystem Dynamics, Functioning, and Resilience 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 LS4.D: Biodiversity and Humans 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. ESS2.A: Earth Materials and Systems 4-ESS2-1: Make observations to provide evidence of the effects of weathering or erosion by water, ice, wind, or vegetation.

Lessons	Science Practices	Cross Cutting Concepts	Disciplinary Core Ideas & Performance Expectations
			LS1.C: Organization for Matter and Energy Flow in Organisms 5-LS1-1: Support an argument that plants get the materials they need for growth chiefly from air and water. LS2.A: Interdependent Relationships in Ecosystems LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS4.D: Biodiversity and Humans 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. ESS2.A: Earth Materials and Systems LS1.A: Structure and Function 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction 5-LS1-1 (students may also) Support an argument that plants get the materials they need for growth chiefly from air and water. 5-ESS3.C: Human Impacts on Earth Systems 5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect Earth's resources and environment.

Engage & Explore Lesson Group

Lessons	Science Practices	Cross Cutting Concepts	Disciplinary Core Ideas & Performance Expectations
16. *Adventure Matters:* Students write and illustrate their own wildly imaginative adventure story that follows a tiny bit of matter around, starting in their own lungs and traveling as far as another planet. 17. *Matter Maps:* Students visually model the multi-directional flow of matter around their own local, outdoor, wild space and discover the interconnectedness of all life.	Developing and Using Models Connections to Nature of Science	Energy and Matter Systems and System Models Patterns Cause and Effect	LS1.C: Organization for Matter and Energy Flow in Organisms LS2.A: Interdependent Relationships in Ecosystems LS2.B: Cycles of Matter and Energy Transfer in Ecosystems 5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. (touches on) LS1.B: Growth and Development of Organisms 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. 3-ESS2: Earth's Systems 4-PS3: Energy 4-ESS3: Earth and Human Activity Reading and Math: RI.3.7 and MP.2, 3.MD.B.3, 3.MD.B.4, MP.4, MP.5

Explain & Elaborate Lesson Group

Lessons	Science Practices	Cross Cutting Concepts	Disciplinary Core Ideas & Performance Expectations
18. *Patterns in Nature & Art:* Students extend their knowledge of patterns in data to finding patterns in nature and applying them in their own art and design. 19. *Faux Antique Frames* Students use math to create functional frames that meet specified criteria and with reflecting designs based on patterns they observed in nature.	Obtaining, Evaluating, and Communicating Information Constructing Explanations and Designing Solutions	Patterns Cause and Effect Connections to Engineering, Technology, and Applications of Science	LS1.A: (observed) Structure and Function LS3.B: (observed) Variation of Traits ETS1.A: Defining and Delimiting Engineering Problems 3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. ETS1.C: Optimizing the Design Solution Math: MP.2, MP.4, MP.5, 3.NBT, 3.NF, 3.MD.B.4, 4.G.A.1, 4.MD.A.1, 4.MD.A.2, 5.MD.A.1