

4th Grade

Solar Synergy –

The Source of Interdependence

Eco-Energy for Schools

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| **Unit Overview** |
| **Unit Title** | Solar Synergy – The Source of Interdependence |
| **Unit Summary** | This cross-curricular fourth grade unit will focus on the sun’s partnership with various biotic components. Students will learn about how the sun’s energy is essential for both the biological needs and physical needs of life. This unit will integrate the study of biological and physical science, literary themes and main ideas, summarizing text, writing opinion texts and explanatory text, short research projects, collaborative discussions, measurement and data, geometry, and communities, colonies, and early American government. The students will investigate careers associated with sustainable energy, green building, agriculture, and bioengineering. The Solar Synergy unit will excite students about the sun’s power and the interdependent relationship that involve the sun.   |
| **Subject Area Strands** | Science – Cells, Interdependence, Flow of Matter & Energy, EarthMath – Fractions, Measurement & Data, GeometryELA – Reading: Literary and Informational Text, Writing, Speaking & ListeningSocial Studies – Settling the Colonies to the 1700s |
| **Grade Level** | 4th Grade  |
| **Appropriate Time** | 17 days  |
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| **Lesson Foundation** |
| **Targeted Content Standards** | **Common Core Standards** |
|  | **Mathematics** | Measurement and Data * 2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
* 4. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.

Geometry* 1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
* 2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
* 3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.
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|  | **English / Language Arts** | Reading Strands for Literature* 2. Determine a theme of a story, drama, or poem from details in the text; summarize the text.

Reading Strands for Informational Text* 2. Determine the main ideas of a text and explain how it is supported by key details; summarize the text

Writing* 1. Write opinion pieces, in which they introduce the topic or name the book they are writing about, state an opinion, supply a reason for the opinion, and provide some sense of closure.
* 2. Write informative/ explanatory texts to examine a topic and convey ideas and information clearly.
* 7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.

Speaking and Listening* 1. Engage effectively in a range of collaborative discussions with diverse partners on grade four topics and tests, building on others’ ideas and expressing their own clearly.
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| **TN Standards** |
|  | **Science** | Embedded Inquiry* GLE 0407.Inq.1

Explore different scientific phenomena by asking questions, making logical predictions, planning investigations, and recording data. * GLE 0407.Inq.2

Select and use appropriate tools and simple equipment to conduct an investigation. * GLE 0407.Inq.3

Organize data into appropriate tables, graphs, drawings, or diagrams.Embedded Technology & Engineering * GLE 0407.T/E.2

Recognize that new tools, technology, and inventions are always being developed.* GLE 0407.T/E.3

Identify appropriate materials, tools, and machines that can extend or enhance the ability to solve a specified problem.* GLE 0407.T/E.5

Apply a creative design strategy to solve a particular problem generated by societal needs and wants.Cells* GLE 0407.1.1

Recognize that cells are the building blocks of all living things. Interdependence* GLE 0407.2.1

Analyze the effects of changes in the environment on the stability of an ecosystem.Flow of Matter & Energy* GLE 0407.3.1

Demonstrate that plants require light energy to grow and survive.* GLE 0407.3.2

Investigate different ways that organisms meet their energy needs. Earth* GLE 0407.7.2

Evaluate how some earth materials can be used to solve human problems and enhance the quality of life.  |
|  | **Social Studies** | Settling the Colonies to the 1700’s* 4.9

Compare and contrast the differing views of American Indians and colonists on ownership or use of land and the conflicts between them, including the Pequot and King Philip’s Wars in New England. (G, P) * 4.10

Explain the cooperation that existed between the colonists and American Indians during the 1600s and 1700s, including fur trade, military alliances, treaties, and cultural interchanges. (G, P) * 4.13

Locate the first 13 colonies and explain how their location and geographic features influenced their development and settlement patterns. (G) |
| **Next Generation Science Standards** | 4-PS3 Energy* 4-PS3-2.

Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.* 4-PS3-3.

Ask questions and predict outcomes about the changes in energy that occur when objects collide. * 4-PS3-4.

Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.4-PS4 Waves and their Applications in Technologies for Information Transfer* 4-PS4-2.

Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.4-LS1 From Molecules to Organisms: Structures and Processes* 4-LS1-1.

Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. * 4-LS1-2.

Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.4-ESS2 Earth’s Systems* 4-ESS2-2.

Analyze and interpret data from maps to describe patterns of Earth’s features.4-ESS3 Earth and Human Activity* 4-ESS3-1.

Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. * 4-ESS3-2.

Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. |
| **Lesson Foundation – Big Ideas & Cross-Curricular Connections** |
| Big Ideas:1. What are the Basics?
2. What are the Components of the Basics?
3. How do the Basics work together to make more complex structures?
4. How does the Energy Flow in a Complex System?
5. What is the source of a System’s Energy?
6. The Needs of Complex Systems
7. Meeting Needs through Nature

Cross Curricular ConnectionsThis unit will engage students in activities and explorations that integrate the academic content areas. Students will study biological science, literature, informational text, writing, research, collaboration and group work, communication and presentation skills, measurement and data, geometry, and communities. The projects in this unit will include: * Model Investigations
* Ingredients Comparison
* Tetris Model Investigation
* Angles of Food Webs
* Cool to be Green
* School Interdependence
* How the Sun’s Energy Works
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| **Lesson Foundation – Essential Questions** |
| 1. What type of energy do communities need?
2. How is energy transferred throughout communities?
3. How is energy affected by characteristics of various objects?
4. How are physical needs and biologic needs meet?
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| **Lesson Foundation – Student Objectives** |
| **Going Beyond** | * I can design and conduct open-ended scientific investigations.
* I can use appropriate tools and techniques to gather, organize, analyze, and interpret data.
* I can synthesize information to determine cause and effect relationships between evidence and explanations.
* I can recognize possible sources of bias and error, alternative explanations, and questions for further exploration.
* I can communicate scientific understanding using descriptions, explanations, and models.
* I can explore how technology responds to social, political, and economic needs.
* I can explain that the engineering design process involves an ongoing series of events that incorporate design constraints, model building, testing, evaluating, modifying, and retesting.
* I can compare the intended benefits with the unintended consequences of a new technology.
* I can distinguish between the basic structures and functions of plant and animal cells.
* I can identify the major parts of plant and animal cells such as, the nucleus, cell membrane, cell wall, and cytoplasm.
* I can investigate different nutritional relationships among organisms in an ecosystem.
* I can explain how organisms interact through symbiotic, commensal, and parasitic relationships.
* I can establish the connections between human activities and natural disasters and their impact on the environment.
* I can evaluate producer/consumer, predator/prey, and parasite/host relationships.
* I can classify interspecific relationships within an ecosystem as mutualism, commensalism, or parasitism.
* I can create a simple model illustrating the interspecific relationships within an ecosystem.
* I can differentiate between renewable and nonrenewable resources in terms of their use by man.
* I can determine the impact of man’s use of renewable and nonrenewable resources on future supplies.
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| **Mastery** | * I can explain how communities rely on the sun’s energy.
* I can describe light energy.
* I can investigate how an object’s properties affect light energy.
* I can explain how the sun meets biological needs.
* I can explain how the sun meets physical needs.
* I can explore different scientific phenomena by asking questions, making logical predictions, planning investigations, and recording data.
* I can select and use appropriate tools and simple equipment to conduct an investigation.
* I can organize data into appropriate tables, graphs, drawings, or diagrams.
* I can recognize that new tools, technology, and inventions are always being developed.
* I can identify appropriate materials, tools, and machines that can extend or enhance the ability to solve a specified problem.
* I can apply a creative design strategy to solve a particular problem generated by societal needs and wants.
* I can recognize that cells are the building blocks of all living things.
* I can create a basic model of the cell that illustrates different cell structures and describes their functions.
* I can analyze the effects of changes in the environment on the stability of an ecosystem.
* I can analyze how an increase or decrease in competition or predation affects an ecosystem.
* I can design a simple experiment to illustrate the effects of competition, predation, and interdependency among living things.
* I can recognize the impact of predation and competition on an ecosystem.
* I can demonstrate the plants require light energy to grow and survive.
* I can investigate different ways that organisms meet their energy needs.
* I can create a food web that illustrates the energy relationships between plants and animals and the key issues or assumptions found in the model.
* I can classify organisms as carnivores, herbivores, or omnivores.
* I can identify how a variety of organisms meet their energy needs.
* I can determine how different organisms function within an environment in terms of their location on an energy pyramid.
* I can demonstrate how all living things rely on the processes of photosynthesis to obtain energy.
* I can identify the cell structures that enable plants to conduct photosynthesis.
* I can design a graphic organizer that illustrates the difference between plants and animals in the movement of food energy through an ecosystem.
* I can use data from a variety of informational texts to analyze and evaluate man’s impact on non-renewable resources.
* I can analyze how different earth materials are utilized to solve human problems or improve the quality of life.
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| **Building the Basics** | * I can observe the world of familiar objects using the senses and tools.
* I can ask questions, make logical predictions, plan investigations, and represent data.
* I can explain the data from an investigation.
* I can apply engineering design and creative thinking to solve practical problems.
* I can explain how simple tools are used to extend the senses, make life easier, and solve everyday problems.
* I can invent designs for simple products.
* I can use tools to measure materials and construct simple products.
* I can identify specific parts of a plant and describe their function.
* I can categorize things as living or non-living.
* I can explain how organisms with similar needs compete with one another for resources.
* I can use a T-Chart to compare and contrast the characteristics of living and non-living things.
* I can label a drawing of an environment to illustrate interrelationships among plants and animals.
* I can construct a diagram to demonstrate how plants, animals, and the environment interact to provide basic life requirements.
* I can describe how animals use food to obtain energy and materials for growth and repair.
* I can label a diagram to illustrate the food relationships that exist between plant and animals.
* I can create a chart to show how plants and animals satisfy their energy requirements.
* I can identify structures used by different plants and animals to meet their basic energy requirements.
* I can distinguish between natural and man-made objects.
* I can design a simple investigation to demonstrate how earth materials can be conserved or recycled.
* I can create a web that demonstrates the link between basic human needs and the earth’s resources.
* I can determine methods for conserving natural resources.
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| **Lesson Foundations – Prerequisite Content & Skills**  |
| **Content Knowledge** | * I can describe a community.
* I can recognize that the sun is a source of energy.
* I can identify my five senses.
* I can distinguish between needs and wants.
* I can provide examples of physical needs.
* I can distinguish between increase and decrease.
* I can identify tools and their appropriate use.
* I can distinguish between living and non-living things.
* I can identify when an environment changes.
* I can explain how a plant grows.
* I can explain how I use energy to get work done.
* I can identify an energy resource.
* I can provide examples of human needs and human problems.
* I can describe energy.
* I can describe abiotic components.
* I can describe biotic components.
* I can provide characteristics of abiotic and biotic objects.
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| **Skills** | * I can provide proof, examples, and rationales for an explanation.
* I can work with a group to complete an investigation.
* I can follow the scientific method to complete an investigation.
* I can ask questions related to class content.
* I can make predictions.
* I can organize and make plans to complete a task.
* I can record information and observations.
* I can use tools appropriately to solve problems.
* I can create a basic model.
* I can classify and organize information.
* I can create graphic organizers associated with academic content.
* I can create written descriptions.
* I can participate in hands-on investigations and experimentations.
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| **Unit Anchor Text**  |
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| https://store.scholastic.com/content/stores/media/products/15/9780590302715_sm.jpg | **The Teacher Store**[**Charlotte's Web**](http://shop.scholastic.com/webapp/wcs/stores/servlet/ProductDisplayView?productId=71689&langId=-1&storeId=10751&catalogId=10004)By E. B. White and Garth Williams**Paperback Book | Grades 2-4** In this enduring classic, Wilbur, the barnyard pig, makes friends with a wonderful girl and a wise, little spider who saves his life. |

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| https://store.scholastic.com/content/stores/media/products/79/9780688166779_sm.jpg | **The Teacher Store**[**The Wonderful Wizard of Oz**](http://shop.scholastic.com/webapp/wcs/stores/servlet/ProductDisplayView?productId=132246&langId=-1&storeId=10751&catalogId=10004)By L. Frank Baum and W. W. Denslow**Paperback Book | Grades 1-5**  |

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| https://store.scholastic.com/content/stores/media/products/85/9780590980685_sm.jpg | **The Teacher Store**[**The Great Kapok Tree**](http://shop.scholastic.com/webapp/wcs/stores/servlet/ProductDisplayView?productId=72158&langId=-1&storeId=10751&catalogId=10004)By Lynne Cherry and Lynne Cherry**Paperback Book | Grades 2-4** Through simple text and lavish illustrations, readers learn facts about the rain forest and the animals that live there. A "breathtakingly beautiful picture book."—Publishers Weekly |

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| **Unit Companion Texts** |
| **Informational Text(s)** | Ocean**Pre-Order**Life Cycles **Ocean** **Discover Earth's Ecosystems** Sean Callery (Author) Deserts**Deserts** **All New, All True** Peter Benoit (Author) In the Rain Forest**In the Rain Forest** Dina Anastasio (Author) Pass the Energy, Please!**Pass the Energy, Please!** Barbara Shaw McKinney (Author) |Chad Wallace (Illustrator) Rainforest**Rainforest** **Discover Earth's Ecosystems** Sean Callery (Author) Life in the Rainforests[**Life in the Rainforests**](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780590461313)by [Lucy Baker](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780590461313) Ecology: The Study of Ecosystems[**Ecology: The Study of Ecosystems**](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780531282694)by [Susan H. Gray](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780531282694) Oceans &amp; Seas[**Oceans & Seas**](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780753465417)by [Margaret Hynes](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780753465417) | Thomas Bayley (illustrator)Oceans[**Oceans**](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780531281055)by [Peter Benoit](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780531281055) Coral Reef[**Coral Reef**](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780516203751)by [Gary W. Davis](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780516203751) First Encyclopedia of Seas &amp; Oceans[**First Encyclopedia of Seas & Oceans**](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780545419864)by [Ben Denne](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780545419864) | David Hancock (illustrator)World Ecosystems Grades 3-5**World Ecosystems Grades 3-5** **6 Books** **Set Includes:**• Climate Change• Deserts• Oceans• Temperate Forests• Tropical Rain Forests• WetlandsThe Exxon Valdez Oil Spill**The Exxon Valdez Oil Spill** **All New, All True** Peter Benoit (Author) Habitats**Habitats** **Fast Facts** Grasslands[**Grasslands**](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780516267623)by [Darlene R. Stille](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780516267623) The BP Oil Spill[**The BP Oil Spill**](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780531289990)by [Peter Benoit](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780531289990) Mountain MammalsA True Book™—Animals **Mountain Mammals** Elaine Landau (Author) Wetlands[**Wetlands**](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780531281000)by [Peter Benoit](http://shop.scholastic.com/shop/en/teacherstore/nav/shops/Common%20Core%20Collections/ProductDisplayView?langId=&storeId=10751&catalogId=10051&partNumber=9780531281000) The teacher should also gather current non-fiction, grade level appropriate science articles on the following topics:* Ecosystems
* Food Web
* The Thirteen Colonies
* Sustainability
 |
| **Assessments** |
| **Formative Assessments** | * **Hand Signals**

Ask students to display a designated hand signal to indicate their understanding of a specific concept, principal, or process: - I understand\_\_\_\_\_\_\_\_\_\_\_\_ and can explain it (e.g., thumbs up). - I do not yet understand \_\_\_\_\_\_\_\_\_\_\_\_ (e.g., thumbs down). - I’m not completely sure about \_\_\_\_\_\_\_\_\_\_\_\_ (e.g., wave hand).* **Analogy Prompt**

Present students with an analogy prompt: (A designated concept, principle, or process) is like\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.* **Misconception Check**

Present students with common or predictable misconceptions about a designated concept, principle, or process. Ask them whether they agree or disagree and explain why. The misconception check can also be presented in the form of a multiple-choice or true-false quiz.* **Web or Concept Map**

Any of several forms of graphical organizers which allow learners to perceive relationships between concepts through diagramming key words representing those concepts. * **Three Minute Pause**

The Three-Minute Pause provides a chance for students to stop, reflect on the concepts and ideas that have just been introduced, make connections to prior knowledge or experience, and seek clarification. I changed my attitude about…, I became more aware of …, I was surprised about…, I felt…, I related to…, or I empathized with…* **Quiz**

Quizzes assess students for factual information, concepts and discrete skill. There is usually a single best answer. Some quiz examples are: multiple choice, true/ false, short answer, paper and pencil, matching, and extended response.* **Idea Spinner**

The teacher creates a spinner marked into 4 quadrants and labeled “Predict, Explain,Summarize, Evaluate.” After new material is presented, the teacher spins the spinner and asks students to answer a question based on the location of the spinner. For example, if the spinner lands in the “Summarize” quadrant, the teacher might say, “List the key concepts just presented.”* **Think-Pair-Share**

Students think individually, write their thinking, pair and discuss with partner, then share with the class.Source: http://www.levy.k12.fl.us/instruction/Instructional\_Tools/60FormativeAssessment.pdf |
| **Summative Assessments** | * Unit Test
 |
| **Writing Assessments** | * KWL Chart
* Interdependence Writing Reflection
* Unit Writing Closure
* Graphic Organizers
* Foldable
* Reflection Writing
* Presentations
 |
| **Unit Vocabulary**  |
| **Term** | **Definition** |
| ELACompare Contrast Conclusions Genre Inference Metaphor Outline Proofread Topic sentence MATHAcute angleDiameter Obtuse angleRadius (pl. radii) Relationship SCIENCECarnivore Cell Cell wall Cell membraneCytoplasmNucleusVacuoleclimate ecosystem energy pyramid food web herbivore omnivore SOCIAL STUDIESColonistAmerican IndianCooperationFur TradeTreaty CultureLocationGeographic FeatureSettlement PatternsImmigrationEmigration | To examine (two or more objects, ideas, people, etc.) in order to note similarities and differences. To compare in order to show unlikeness or differences; not the opposite natures, purposes, etc.The end or close. A reasoned deduction or inference.A class or category of artistic endeavor having a particular form, content, technique, or the like.The process of deriving the strict logical consequences of assumed premises. The process of arriving at some conclusion that, though it is not logically derivable from the assumed premises, possesses some degree of probability relative to the premises. A figure of speech in which a term or phrase is applied to something to which it is not literally applicable in order to suggest a resemblance. The essential features or main aspects of something under discussion.To read in order to detect and mark errors to be corrected.A sentence that expresses the essential idea of a paragraph or larger section, usually appearing at the beginning.An angle whose measure is between zero and ninety degrees.A straight line passing through the center of a circle or sphere and meeting the circumference or surface at each end. An angle greater than ninety degrees but less than one hundred and eight degrees. A circular area having an extent determined by the length of the radius from a given or specified central point. A connection, association, or involvement.An animal that eats flesh.A usually microscopic structure containing nuclear and cytoplasmic material enclosed by a semipermeable membrane and, in plants, a cell wall; the basic structural unit of all organisms. The definite boundary or wall that is part of the outer structure of certain cells, as a plant cell. The semipermeable membrane enclosing the cytoplasm of a cell. The cell substance between the cell membrane and the nucleus, contains the cytosol, organelles, cytoskeleton, and various particles. A specialized, usually spherical mass of protoplasm encased in a double membrane, and found in most living eukaryotic cells, directing their growth, metabolism, and reproduction, and functioning in the transmission of genic characters. A space or vesicle within the cytoplasm of a cell, enclosed by a membrane and typically containing fluid. The weather conditions prevailing in an area in general or over a long period. A biological community of interacting organisms and their physical environment. A graphical model of energy flow in a community. The different levels represent different groups of organisms that might compose a food chain.A system of interlocking and independent food chains.An animal that feeds on plants. An animal or person that eats food of plant and animal origin. A settler in or inhabitant of a colony. A member of any of the indigenous peoples of North, Central, and South America, especially those of North America. The process of working together to the same end. The fur trade was one of the earliest and most important industries in North America. The fur trading industry played a major role in the development of the United States and Canada for more than three hundred years. The fur trade began in the 1500’s as an exchange between Indians and Europeans. A formally concluded and ratified agreement between countries. The arts and other manifestations of human intellectual achievement regarded collectively.A particular place or position. Geographical features are the components of the Earth. There are two types of geographical features, namely natural geographical features and artificial geographical features. Natural geographical features include but are not limited to landforms and ecosystems. Distribution of human settlements on the landscape. The action of coming to live permanently in a foreign country. Emigration is the act of leaving one’s country or region with the intent to settle permanently in another. It is the same as immigration but from a perspective of the country of origin. Human movement in general is termed migration.  |
| **Teaching the Unit**  |
| **Initial Strategies** | Working Together* Students will begin this unit by learning the importance and impact of working together.
* Students will watch a short video-approximately 15 minutes – about the Rube Goldberg Machine.
* The students will be given a response style-writing prompt after watching the video. The writing prompt will be titled “Working Together – What is the Purpose?” Students will explain how the Rube Goldberg Machine utilizes cooperation to achieve a goal. The students will also provide examples of other things that work together to produce energy. Students will be asked to provide at least one example that has an impact on living things. The setup of this writing prompt will be similar to the state writing assessment to provide students with practice on this style of assessment. The same prompt will be given at the end of the unit to determine how their opinion, subject knowledge, and content area writing have improved through the unit.
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| **Direct Instruction** | ELA:* Themes of Literature PPT
* Writing Styles PPT
* Writing Opinion Pieces PPT
* Informative & Explanatory Writing PPT
* Research Writing PPT

Math: * Geometric Shapes PPT
* Geometry of Angles PPT
* What is Data and How to Use It PPT

Science:* Levels of Organization PPT
* Cells PPT
* Cell Organelles and their Jobs PPT
* Biological Communities PPT
* Trophic Levels PPT
* Food Webs PPT
* Autotrophs and Heterotrophs PPT
* Energy Flow in an Ecosystem PPT
* Plants and Energy PPT
* Why we need Natural Solutions to the Energy Crisis PPT
* Solar Panels and Collecting the Sun’s Energy PPT

Social Studies:* The Thirteen Colony
* Who Made Up the Thirteen Colonies
 |
| **Higher-Level Cognitive Function Strategies**  |  |
| **Guided Practice & Activities** | **Introduction*** Unit Pre-Test
* Students will complete a twenty-four-question pretest. Each question will represent one of the standards addressed during the unit. There are twenty-four standards for this unit therefore there will be a twenty-four question pre-test and post-test. These questions will be modeled after the state assessment for fourth grade. This will ensure that students have practice working on this style of questions during assessments.
* Initial Challenge
* Present students will the following prompt:
* You are preparing for a cross-country road trip vacation. As an anxious traveler your mother insists that each member of the family prepare their own survival kit in case of an unexpected emergency. Each family member will need to be able to carry his or her survival pack on his or her own back in a backpack. You are working to gather the necessities for your survival kit. What will you pack? Create a packing list that will guide your preparation.
* Discuss the students’ lists as a class. Asking students what their reasoning is for the components of their survival kit. When the students have finished sharing and discussing talk about the purpose of a survival kit. The survival kit is intended to provide the basic necessities in the case of an emergency. This unit will begin with a study of the basics in each subject area.

**Lesson 1 – The Basics**

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| **Science** | **Social Studies** | **Math** | **ELA** |
| Plant Cells and Organelles | 13 Colonies Geography | Geometric Patterns – Lines of Symmetry | Structure of Literature |

* **ELA**

Introduce students to the Unit Anchor Text. Discuss the style, genre, format, and structure of the anchor text. Give students a reading scavenger hunt for items in the anchor text. Students will become familiar with the components, characters, and theme of the text. * **Math**

Scavenger Hunt for symmetrical items. How do student know that they are symmetrical? Students will find examples (actual physical items in the classroom) of items and collect these items in their treasure bag. Then students will create drawings to explain how each object is symmetrical. The class will discuss these items and what makes an object symmetrical, along with other geometric patterns. * **Activity – Think-Pair-Share**

The class will then transition to discuss how symmetry can be found in living things. Students will think-pair-share to develop a list of living items that are symmetrical based on the mathematical principles and rules discussed in the math lesson. * **Science**

Students will then learn about what makes up plants and animals. The students will learn about the basics of the levels of organization that work together to build an animal or a plant. Students will compare and contrast plant and animal cells. They will also learn the names and identifying characteristics of the basic cell organelles. * **Social Studies**

Students will learn about the basic geography of our county. The students will study the geography, the formation, and the structure of the thirteen colonies. * **Activity – Small Groups**

The class will then relate symmetry and similarities. The students will work in small groups to create a graphic organizer illustrating how the structure needed for a community and settlement in today’s time and during the time that the thirteen colonies were established. Student will learn how some of the components of community structure are consistent and how some have changed to meet the demands of society. The graphic organizer will be titled – Symmetry in Society. * **Whole Group Discussion**

The class will continue their study of symmetry by discussing the community structure of the unit literature. The students will complete a writing activity to describe the community components of the literary text. The class will discuss the components and characteristics of this community. * **Closure**

The wrap-up activity for this lesson will include creating a digital presentation – through keynote, Prezi, or power point. This presentation could also be done as a construction paper booklet if the technology is not accessible. Each page of the construction paper would represent one slide of the digital presentation. The presentation will be title “The Basics – Working together level by level”. Students will work in groups of three to complete this task. The slides will include the following information:* Title slide with artwork
* Bubble Map demonstrating the relationship between the levels of organization, cells, plant and animal structure, 13 colonies geography, 13 colonies community structure, symmetry, theme, literary communities and how the basics work together level by level.
* The next 8 slides will detail what they have learned about each concept listed in the bubble map.
* The next 3 slides will contain one Venn diagram each. The students must select three sets of concepts to compare and contrast utilizing the Venn diagrams. Each portion of each Venn diagram must contain at least two sentences and one illustration.
* Closure slide with artwork. This will include one sentence and one piece of art that clearly communicated what they have learned from this set of lessons.

**Lesson 2 – What Makes up the Basics?**

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| **Science** | **Social Studies** | **Math** | **ELA** |
| Plant Structures & Function | 13 Colonies Settlers | Simple Geometric Shapes | Themes of Literature |

* **Set**

Model Investigation* The teacher will ask: How does what you have to make your structure affect function?
* Give student groups (pairs) a baggy of mixed building pieces. All of the bags are different (Legos, pipe cleaners, twist ties, etc.) none of the baggies will be same. Some baggies will have more of some items and other baggies will have less of some items.
* Instruct students to build something that capture energy. The teacher will be intentionally vague in these directions, allowing students the autonomy to exercise creativity with the design and materials provided.
* Student groups will show their model to the class. Each student group will present their model and how it captures energy in front of the class. The teacher will record the name of each model and the function of each model on the board or in a note taking application while air playing. The teacher will also note their building materials.
* The class will discuss why each of the items presented are models. The teacher will provide instruction on different types of models, how models are used, and what makes an item a model.
* The class will discuss how the structure that they built was related to its job and function. The teacher will introduce the idea of structure and function during this portion of the set. The class will continue the discussion to explain how the materials they were provided affected their building process and building decisions.
* The teacher will then combine two groups to make a four person team and the team will reconfigure and re-design the model to meet the original challenge in a more advanced and efficient manner.
* **Math**

**Direct Instruction with Manipulatives**The teacher will guide students through the introduction of simple geometric shapes. Each student will be provided with a manipulative for each of the geometric shapes presented and discussed. The students will hold up the manipulative when that shape is described during the presentation. This will serve as a quick-check, formative assessment to determine how well each student comprehends the characteristics of each shape and their ability to identify each shape.* **Activity**

Students will go on a nature hike on the school campus. Students will take their iPads to utilize a journaling app that allows them to take pictures. If the students do not have iPad technology they may use a paper notebook to record their findings and use a pencil to sketch their “finds” instead of taking pictures. Students will take a nature hike to find components of nature that consist of the geometric shapes presented during the math presentation. The students will record the geometric shape they have found, the nature object that has this shape, and the rationale or proof that the geometric shape is related to the nature object. The teacher will pair students up and one of the students will be given a baggie containing the manipulatives used during the presentation for student comprehension checks. This will allow students to check the answers and provide evidence and support for their journaling records. * **Science**

Direct Instruction with Models – Cell Organelles and their Jobs* **Activity**

Just as the organelles make up the cell the colonies were made of settlers. Relate the cellular organelles to the different roles of the settlers. * **Activity**

Utilizing the simple geometric shapes create a labeled diagram of a plant cell and an animal cell. Label the geometric shapes used in the diagram and the name of the organelle the shape represents.* **Social Studies**

Direct Instruction – Who made up the 13 ColoniesStudents will complete a job, task, and contribution chart that accompanies the 13 Colonies presentation. The class will then discuss how the members of the 13 Colonies were interdependent and worked together to create a functioning community.* **ELA**

Direct Instruction – Themes of Literature* The teacher will provide examples from a variety of stories, drama, and poems.
* The teacher will determine how to find details in the text.
* The teacher will also discuss how to summarize text with the class.

Lit Circles – Charlotte’s Web* The teacher will introduce the text and read chapter one aloud to the whole class.
* The teacher will create lit circle groups.
* The lit circle groups will assign roles using a “job wheel”. This is available at the following website: <http://www.mrcoley.com/litcircles_faqs.htm>
* The lit circle groups will keep track of their group assignments and due dates using the assignment sheet. This is available at the following website: <http://www.mrcoley.com/litcircles_faqs.htm>
* Students will work with their lit circle groups to read chapter two.
* Student groups will discuss and answer the following question:
* What is the main idea of this text? What evidence can be used to support this answer?
* What are the key details presented in chapters one and two?
* Summarize chapter one and chapter two.
* How is the theme of a piece of literature comparable to the nucleus of a cell?
* **Closure**

Writing Activity – Interviews* The topic for this activity will be “Why are the basics essential?”
* Students will create and write questions for interviews. Students must have a minimum of five questions.
* Students will answer each of the interview questions from their own perspective.
* The students will interview one other student in the class.
* The students will interview one parent and one sibling or cousin (similar in age).
* If students are using paper and pencil they will compile their interviews and related documents in the form of a booklet. If the students are using technology to complete this assignment they will create a video of each interview and compile a keynote, power point, or Prezi presentation.

**Lesson 3 –** * **How do the Basics Work Together to Make More Complex Structures?**
* **How does the Energy Flow in this Structure?**
* **Where does the Energy and Power for this Structure Originate?**

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| **Science** | **Social Studies** | **Math** | **ELA** |
| Biological Communities | 13 Colonies Community | Geometry of Plants | Lit Study: Charlotte’s Web |
| Ecosystems & the Role of Plants | 13 Colonies Cooperation – Colonists & Indians | Geometry of Angles  | Lit Study: Article – Main Idea & Opinion Writing  |
| Food Webs and the Sun’s Energy: | 13 Colonies and the effect of Geography and Resources  | Measurement & Data | Lit Study: Article – Main Ideas & Explanatory Writing |

* **Set**
* Pre-Test – 10 question, multiple choice quiz
* Activity – KWL Chart
* K: Know, W: Want to Know, L: Learned
* Topic – “Making a Cake: Ingredient Comparison Activity
* The teacher will ask students – How do our basic ingredients work and interact with one another to make a complex structure?
* Students will write in the “K” section of the KWL chart at this point in the lesson.
* Students will then share with a partner what they know about this topic.
* The students will then complete the “W” section of the KWL chart at this point in the lesson.
* The teacher will group students in groups of four.
* Each group will be given one box of cake mix – Betty Crocker chocolate cake mix.
* Each group will also receive one small container of vegetable oil, water, and three eggs per group. The teacher may wish to use a small contain such as a baby food jar for the oil and water for each group.
* Each group will also be provided with an old fashioned (made from scratch style) recipe – Mamaw Janie’s chocolate cake. The teacher may also wish to invite a guest speaker to talk to the class about making a cake or other baked good from scratch. The teacher may also want to invite grandparents and community members to work with student groups during this activity.
* Students will create a graphic organizer in the form of a T-chart. The T-chart will compare the following:

What are the basics for the Betty Crocker chocolate cake mix? And What are the basics for Mamaw Janie’s chocolate cake?* The teacher will give students five minutes to read and record. Some students will not read the box recipe ingredients. The student groups will share their T-charts with the class.
* Discuss how each item shared with the class is considered a basic ingredient.
* The teacher will ask students: Can you make a cake without any basics? (The teacher will discuss how like each cake ingredient is like the subject content area – ela, math, science, and social studies) Why does box cake seem simpler? (The teacher will discuss the difference between dry ingredients and other ingredients.) What is the cost difference between making a box cake mix and a home-made cake? How would settlers have make cakes?
* Students will complete the KWL chart by filing out the “W” portion of the chart. The teacher will ask students to reflect on how they can use ela, math, science, and social studies to work together at school.
* ELA
* Lit Circles – Charlotte’s Web
* The teacher will review chapter two.
* The teacher will read chapter three and four aloud to the whole class.
* The teacher will then have students work in their assigned lit circle groups.
* The lit circle groups will complete work using the “job wheel”. This is available at the following website: <http://www.mrcoley.com/litcircles_faqs.htm>
* The lit circle groups will keep track of their group assignments and due dates using the assignment sheet. This is available at the following website: <http://www.mrcoley.com/litcircles_faqs.htm>
* Students will work with their lit circle groups to read chapters five through ten.
* The students will discuss the interdependence found in Charlotte’s Web.
* Science
* Direct Instruction – Biological Communities
* The teacher will present a power point presentation on Biological Communities. The students will take notes using their science notebooks or a note taking app.
* The teacher will address any misconceptions and answer any questions during this activity.
* Biological Communities Comparison Activity
* The students will work in pairs to compare three different Biological Communities. The students may choose the three locations that they would like to compare. The teacher will model examples of good comparison communities – rural, city, inland, sea level, mountain, jungle, rainforest, polar, etc.
* The students will create a comparison chart that illustrates how the biological communities are different in at least five ways.
* The team will them create a Venn diagram that includes only diagrams and illustrations of how the biological communities compare and contrast.
* The pairs will present their work to the class and display their Venn diagram and chart in the classroom.
* Interdependence Activity
* The students will complete a written assignment that reflects on the interdependence among the members of one of the biological communities that they researched with their partner for the Biological Communities Comparison activity.
* Math
* Direct Instruction – Geometry of Angles
* The teacher will present a power point presentation on Geometry of Angles. The students will take notes using their science notebooks or a note taking app.
* The teacher will address any misconceptions and answer any questions during this activity.
* Basic Practice
* The students will complete an individual practice that requires them to measure angles, describe angles, and compare angles.
* The teacher will teacher will check with each student during the practice time to aid in completion of the assignment and to address any misconceptions.
* Triangle Investigations
* Student will make triangles using geoboards or craft materials to investigate the angles of triangles.
* <http://www.k-5mathteachingresources.com/support-files/right-triangles-on-the-geoboard.pdf>
* <http://www.k-5mathteachingresources.com/support-files/isosceles-triangles-on-the-geoboard.pdf>
* <http://www.k-5mathteachingresources.com/support-files/classifyingtriangles1.pdf>
* <http://www.k-5mathteachingresources.com/support-files/classifyingtriangles1.pdf>
* Tetris Model Investigation
* <http://www.josietrue.com/teachers/6-tetris.pdf>
* The class will discuss how perpendicular and parallel are used in this game.
* The class will also discuss how geometric shapes are used in this game.
* The students will then complete are graphic organizer that describes how geometrical shapes and concepts are used in other digital games, sports, or other activities.
* Each student will then choose one of their examples and create a drawing that identifies each geometric shape, concept, and angle used in this activity. The students will then present their concept maps and illustrations to the class.
* ELA
* Lit Circles – Charlotte’s Web
* The teacher will review chapters five through ten.
* The teacher will read chapter eleven and twelve aloud to the whole class.
* The teacher will then have students work in their assigned lit circle groups.
* The lit circle groups will complete work using the “job wheel”. This is available at the following website: <http://www.mrcoley.com/litcircles_faqs.htm>
* The lit circle groups will keep track of their group assignments and due dates using the assignment sheet. This is available at the following website: <http://www.mrcoley.com/litcircles_faqs.htm>
* Students will work with their lit circle groups to read chapters thirteen through fifteen.
* The students will discuss how math and geometric concepts have been used in Charlotte’s Web.
* Science
* Vocabulary Activity – Biological Communities
* Students will complete an individual practice activity that reviews the vocabulary presented in the Biological Communities power point and discussion.
* Students will work in their table groups to review the vocabulary activity.
* The class will then create a bubble map using the vocabulary terms. The class will discuss where each term belongs and how the terms are related.
* Triangles and Biological Communities
* The class will study tropic levels using triangles and the terms reviewed during the Biological Communities review.
* The students will compare the different types of triangles.
* The students will complete an independent practice requiring each student to correctly identify, classify, and characterize the different types of triangles.
* Direct Instruction – Tropic Levels
* The teacher will then present a power point on Tropic Levels.
* The students will take notes using their science notebooks or a note taking app.
* The teacher will address any misconceptions and answer any questions during this activity.
* Students will then draw a triangle representing each of the different types of triangles.
* For each type of triangle the student will use a provided biological community example to complete the triangles representing each trophic level. The class will complete the first example together using a traditional energy pyramid. The students will first identify the type of triangle being used and note its identifying characteristics. The teacher will explain how energy is transferred to each trophic level of the energy pyramid. The students will then work in partners to complete the remaining triangles.
* Food Webs
* Direct Instruction – Food Webs
* The teacher will present a power point presentation on Biological Communities. The students will take notes using their science notebooks or a note taking app.
* The teacher will address any misconceptions and answer any questions during this activity.
* The students will complete a Food Web practice. The teacher will provide the students with a written example of biological communities from each biome. The students will take each written example and create a food web illustrating the flow of energy in that biological community. The student will then label each member of the community based on its role in the food web – carnivore, herbivore, etc. This activity could be completed using manipulatives or an app on a device.
* Food Webs and Angles
* Students will complete the Web of Life Activity. The objectives of this lesson activity includes:
* Describe a food web.
* Identify the connections between plants and animals in an ecosystem.
* Explain how the introduction of an invasive species impacts a food web.
* Student will discuss the angles created by the food web activity. The students will work to identify the type of angle (obtuse or acute) along with its identifying characteristics. The class will also work to measure the angle using the appropriate tools.
* The students will also discuss the amount of energy transferred each time the food web adds another member. The students will use provided mathematic examples to determine how much energy is transferred to each level.
* The students will complete a graphic organizer that has each student reflect on items that would impact a biological community and food web. The students will determine items that negatively impact and positively contribute to a biological community. The class will discuss their graphic organizers with their table groups. The class will then discuss examples as a whole.
* Social Studies
* The students will evaluate communities.
* The students will discuss what makes up a community.
* The students will then list the components of a community including biological communities. The class with then discuss the roles of each member of the community and the interdependence of the members of the community.
* The students will then discuss how conflict can be present in community. The students will read current event articles and documents to determine examples of conflict in community.
* The students will create a graphic organizer illustrating examples of conflict in a community.
* The class will then discuss who the predator is and who the prey in each example is. Who is the consumer and who the producer in each example is? The class will continue to discuss the similarities between the examples and the terms used to describe a biological community.
* The class will discuss how cooperation is also present in a community. The class will read current event articles and documents to determine examples of cooperation in a community.
* The students will create a second graphic organizer illustrating examples of cooperation in a community.
* The class will then discuss the importance of interdependence and cooperation in a community.
* The class will evaluate the following examples and determine how each can illustrate cooperation or conflict, or both: fur trade, military alliances, treaties, and cultural interactions and exchanges. The teacher will provide information on each of the four topics. The teacher will provide articles and direct instruction for the four topics. Each student will illustrate their viewpoint on the four provided topics. The students may choose how to illustrate their viewpoint – written, oral presentation, drawing, diagram, illustration, interview, acting out, etc.
* American Indians & Colonists Video Clip
* Direct Instruction - American Indians & Colonists
* The teacher will present a power point presentation on American Indians and Colonists. The students will take notes using their science notebooks or a note taking app.
* The teacher will address any misconceptions and answer any questions during this activity.
* The class will then read Pequot and King Philip. The class will discuss the reading and the conflict presented in the community.
* The students will work in partners to make a movie poster advertisement for a movie about one of the conflicts discussed during class. The teacher will discuss media and advertising with the class. The discussion will focus on the purpose and tactics used in media and advertising.
* ELA
* Lit Circles – Charlotte’s Web
* The teacher will review chapters thirteen through fifteen.
* The teacher will read chapter sixteen and seventeen aloud to the whole class.
* The teacher will then have students work in their assigned lit circle groups.
* The lit circle groups will complete work using the “job wheel”. This is available at the following website: <http://www.mrcoley.com/litcircles_faqs.htm>
* The lit circle groups will keep track of their group assignments and due dates using the assignment sheet. This is available at the following website: <http://www.mrcoley.com/litcircles_faqs.htm>
* Students will work with their lit circle groups to read chapters eighteen through twenty.
* The students will discuss the examples of cooperation and conflict found in Charlotte’s Web.
* Closure
* What is the ecosystem and community structure of our school?
* The teacher will review examples of ecosystems from different biomes.
* The teacher will review the roles in an ecosystem and biological community.
* The students will determine the components of the ecosystem of our school. The students will work in teams to discuss the cooperation and conflict in the school ecosystem.
* The students will then reflect on the following question: Where is the energy source for our school? How is the energy transferred in our school?
* The students will discuss their responses in their table groups.
* The teacher will address any misconceptions and questions raised during this activity.

**Lesson 4 –** **What are the Needs of this System?****How are the Needs of this System Met?**

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| **Science** | **Social Studies** | **Math** | **ELA** |
| Physical Needs & Biological Needs | 13 Colonies and the effect of Geography and Resources | Measurement & Data | Lit Study:Charlotte’s Web |
| Natural Solutions | 13 Colonies and the effect of Geography and Resources | Measurement & Data | Research Project |

* Set
* Students will respond to the following questions:
* What is a need? How are your needs met?
* Do you have a pet? What are your pet’s need? How are your pet’s need met?
* The class will discuss their responses with their table groups.
* Jigsaw Activity
* The students will participate in a Jigsaw Activity. They will be part of a home group and an expert group. The focus of this Jigsaw Activity will focus on energy flow in a system. The students will read a variety of articles on the agriculture systems of various geographic locations. The home groups will compare and contrast the agriculture of different areas of the globe.
* Informational Summary
* The class will discuss the following question: Are we dependent on the sun?
* Students will write an individual response to this questions. The students must cite three sources and provide supportive evidence for their response.
* The teacher will provide students with a writing template a rubric.
* ELA
* Lit Circles – Charlotte’s Web
* The teacher will review chapters eighteen through twenty.
* The teacher will read chapter sixteen and seventeen aloud to the whole class.
* The teacher will then have students work in their assigned lit circle groups.
* The lit circle groups will complete work using the “job wheel”. This is available at the following website: <http://www.mrcoley.com/litcircles_faqs.htm>
* The lit circle groups will keep track of their group assignments and due dates using the assignment sheet. This is available at the following website: <http://www.mrcoley.com/litcircles_faqs.htm>
* Students will work with their lit circle groups to read chapters twenty one and twenty two.
* The students will discuss the source of energy and the flow of energy found in Charlotte’s Web.
* Ecosystems Research
* Students will research an ecosystem food web from our area.
* The students will create a food web based on their research. The food web that the students create must have a minimum of ten organisms.
* The students will then post their example food web in the classroom.
* Cool to Be Green Activity
* Direct Instruction - Plants and Energy
* The class will discuss how plants need light from the sun to grow. The students will learn about the importance of chloroplast and their function in producer organisms.
* Plants and Sunlight Lab
* What do Plants Need to Grow Lab
* The purpose of this lesson is for students to review the fundamentals required for plants to survive. Students will understand that healthy plants need water, air, light, and nutrients. The lesson will also demonstrate the many ways that humans rely on plants in everyday life.
* <http://www.cfaitc.org/lessonplans/pdf/401.pdf>
* Direct Instruction – What is Data & How to Use It
* The teacher will present a power point presentation on Data, Representing Data, Analyzing Data, and Measurement. The students will take notes using their science notebooks or a note taking app.
* The teacher will address any misconceptions and answer any questions during this activity.
* The students will complete a graphing practice about the sun’s energy and plants.
* The class will watch a video on The Greenhouse Effect and Pollution’s Effect on the Environment.
* The class will then participate in a Jigsaw Activity that will focus on Greenhouse gases and Climate Change. The home group will then create an informational brochure on climate change, pollution, and the effect on ecosystems.
* Students will then complete an individual writing assignment. The students will create a written response to the following question: Will alternate energy make a difference? Students will complete research and cite a minimum of two sources that support their view and response to the posed question.
* Why is the Sun important to us?
* Direct Instruction – Why we need Natural Solutions to the Energy Crisis
* The teacher will present a power point presentation on why we need natural solutions to the energy crisis and global warming. The students will take notes using their science notebooks or a note taking app.
* The teacher will address any misconceptions and answer any questions during this activity.
* Students will create a graphic organizer to illustrate how natural solutions and resources can be used to solve the dependence on nonrenewable energy sources.
* STEM Culminating Event – Solar Panel Modeling
* Students will research alternate energy sources.
* The teacher may invite a guest speaker that represents alternate energy sources such as wind energy, solar energy, and/or geothermal energy.
* Students will design a model solar panel. The students will research the current design and components of solar panels, and then students will brainstorm about how to improve the design and effectiveness of solar panels using the engineering design process.
* Direct Instruction – Solar Panels & Collecting the Sun’s Energy
* The teacher will present a power point presentation on Solar Panels and Collecting the Sun’s Energy. The students will take notes using their science notebooks or a note taking app.
* The teacher will address any misconceptions and answer any questions during this activity.
* Solar Panels and Angles
* The students will review data on the angle of solar panels and the kilowatts produced.
* Students will create a graph of the provided data.
* The class will then analyze the data and form a conclusion about the effect of the angle of a solar panel.
* Creating Solar Panel Models
* Students will create a simple blueprint of their solar panel design. Students should use the material presented to begin their design.
* Students will then build their model using materials that they have brought from home or the teacher has chosen to provide (ex. aluminum foil, Popsicle sticks, yarn, etc.). The students will note what each material represents in their blueprint.
* Class Presentation
* Students will present their model to the class.

**Closure*** Unit Summative Assessment
* Unit Writing Closure
* Students will create a media collage mash-up. The students will create a poster collage (or a digital collage) on the topic “Why it is Cool to Be Green”. Students will use the materials and content covered in this unit to build a display illustrating their reason for being more environmentally minded in their choices. The teacher will provide students with a rubric for this activity, along with a variety of resources and materials to complete the project (ex. cardboard, glue, scissors, magazine pictures and articles, construction paper, etc.)
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| **STEM Projects** | * Model Investigations
* Ingredients Comparison
* Tetris Model Investigation
* Angles of Food Webs
* Cool to be Green
* School Interdependence
* How the Sun’s Energy Works
 |
| **STEM Culminating Event** | * STEM Culminating Event – Solar Panel Modeling
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* Class Presentation
* Students will present their model to the class.
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| **Differentiated Instruction**  | * Modified assessment – multiple choice, short answer, and fill in the blank
* Study guides
* Teacher created flash cards
* Prompting
* Activity hints, written, and verbal guidance
* Extended time
* Abbreviated assignments
* Assignments can be re-submitted for grading
* Context clues
* Content guides
* Peer Tutoring
* Heterogeneous grouping
* Leveled reading
 |
| **Re-teaching Strategies**  | * Small group re-teaching groups
* Small group tutoring
* Computer and digital aids
* Graphic organizers and foldable
* Vocabulary building activities and review
 |
| **Enrichment Strategies** | * Modified assessment – critical thinking and constructed response
* Student created study tools – ex. study games
* Career related study for activities and projects
* Research emphasis
* Heterogeneous grouping
* Student choice for reading
* Group leadership
* Integrated community service projects with activities
 |
| **Independent Practice Activities** | Lesson 1 – * ELA = Reading Scavenger Hunt, Structure of Literature Practice
* Math = Symmetry Practice, Symmetry Hunt
* Science = Levels of Organization, Animal versus Plant Cell Characteristics
* Social Studies = Geography of your country, Geography of the Thirteen Colonies (Map)

Lesson 2 – Geometric Patterns and Symmetry* ELA = Theme, Reading Selection, and Theme Questions
* Math = Geometrical Shapes Identification
* Science = Cell Organelles Identification (shape)
* Social Studies = Thirteen Colonies Settlement and Settlers

Lesson 3 – Theme of Literary Text* ELA = Writing – Opinion, Information, and Research
* Math = Angles Practice, Triangle Practice
* Science = Biological Communities – Interference Activity and Comparison Activity, Ecosystems, Energy Flow, Role of Plants
* Social Studies = Individual versus Colonist Review (cooperation and conflict)

Lesson 4 – The Thirteen Colonies* ELA = Summarizing Practice
* Math = Measurement Practice
* Science = Sun’s Energy, Alternate Energy Practice, Natural Solutions Practice
 |
| **Materials & Resources** | Resource: * <http://www.k-5mathteachingresources.com/support-files/right-triangles-on-the-geoboard.pdf>
* <http://www.k-5mathteachingresources.com/support-files/isosceles-triangles-on-the-geoboard.pdf>
* <http://www.k-5mathteachingresources.com/support-files/classifyingtriangles1.pdf>
* <http://www.k-5mathteachingresources.com/support-files/classifyingtriangles1.pdf>
* <http://www.cfaitc.org/lessonplans/pdf/401.pdf>
* <http://www.mrcoley.com/litcircles_faqs.htm>
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| **Comments** | If you have an questions you may contact:Jessica Carr at jessicawcarr@hotmail.com |