

Quarterly Theme: How does technology change our lives?

5th Grade Essential Question: How did industrial technology revolutionize our world?

Standards of Learning:

ENVIRONMENT

**Standard 1:
Ecological, Social, and Economic Systems**
**Standard 1:
Ecological, Social, and Economic Systems**
Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels.

**Standard 2:
The Natural and Built Environment**
Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-built environments.

**Standard 3:
Sustainability and Civic Responsibility**
Students develop and apply the knowledge, perspective, vision, skills, and habits of mind necessary to make personal and collective decisions and take actions that promote sustainability.

Related Environmental Objectives:

- The students will understand the connections among the world’s natural resources, energy use, and human activities.
- Students will analyze a global environmental issue.

Related Integrated Activities:

Activities:

- [PLT 86 -Changing the World](#) Students will use the graphic organizer to illustration the interconnectedness of the Earth systems. S5.6
- [PLT 52 – A Look at Aluminum](#) Students will be able to sequence the steps needed to produce aluminum. S5.7, M5.3, Lang. 5.1, 5.2
- [PLT 4 – Sounds Around](#) Students will identify sounds and map their location in the environment. E 5.5, 5.6, 5.8, S 5.2
- [PLT 2 – Get in Touch With Trees](#) Students will describe a variety of textures. Students will demonstrate how they use their sense of touch to explore and respond to the environment around them. S5.5

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Standards of Learning:

SCIENCE

5.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations

Force, Motion, and Energy

5.2 The student will investigate and understand how sound is created and transmitted, and how it is used. Key concepts include

- a) compression waves;
- b) vibration, compression, wavelength, frequency, amplitude;
- c) the ability of different media (solids, liquids, and gases) to transmit sound; and
- d) uses and applications of sound waves.

5.3 The student will investigate and understand basic characteristics of visible light and how it behaves. Key concepts include

- a) transverse waves;
- b) the visible spectrum;
- c) opaque, transparent, and translucent;
- d) reflection of light from reflective surfaces; and
- e) refraction of light through water and prisms.

Related Environmental Objectives:

- Students will explain how noise can be a problem in the community. S5.2
- Students will create and carry out a plan to lessen a local noise problem. S5.2
- Students will study a Greek myth about sounds in nature. S5.2
- Students will describe how plants are used to make various kinds of foods. S5.1

Related Integrated Activities

- [PLT 16 – Pass the Plants, Please](#)
- [PLT 4 – Sounds Around](#)

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Standards of Learning:

SOCIAL STUDIES

USI.1 The student will demonstrate skills for historical and geographical analysis and responsible citizenship, including the ability to

- a) identify and interpret primary and secondary source documents to increase understanding of events and life in United States history to 1865;
- b) make connections between the past and the present;
- c) sequence events in United States history from pre-Columbian times to 1865;
- d) interpret ideas and events from different historical perspectives;
- e) evaluate and discuss issues orally and in writing;
- f) analyze and interpret maps to explain relationships among landforms, water features, climatic characteristics, and historical events;
- g) distinguish between parallels of latitude and meridians of longitude;
- h) interpret patriotic slogans and excerpts from notable speeches and documents;
- i) identify the costs and benefits of specific choices made, including the consequences, both intended and unintended, of the decisions and how people and nations responded to positive and negative incentives.

USI.4 The student will demonstrate knowledge of European exploration in North America and West Africa by

- a) describing the motivations for, obstacles to, and accomplishments of the Spanish, French, Portuguese, and English explorations;
- b) describing cultural and economic interactions between Europeans and American Indians that led to cooperation and conflict, with emphasis on the American Indian concept of land;
- c) identifying the location and describing the characteristics of West African societies (Ghana, Mali, and Songhai) and

Related Environmental Objectives:

The student will:

- Understand that the geographic features of North America have influenced the movement of people.
- Understand and analyze the impact of the European colonist' movement to the Americas on the land and the indigenous peoples.
- Increase public knowledge of the environment and of the need for conservation of natural resources.

Related Integrated Activities:

- **PLT- 92 – A Look at Lifestyles** – The students will understand that the items and resources we use meet our basic needs, maintain our way of life and provide us with luxuries. US1.1, US1.4; E 5.1, 5.5, 5.7
- People of the Forest
- Tale of the Sun
- Native Ways
- In the Good Old Days

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their interactions with traders.

- USI.5 The student will demonstrate knowledge of the factors that shaped colonial America by
- a) describing the religious and economic events and conditions that led to the colonization of America;
 - b) describing life in the New England, Mid-Atlantic, and Southern colonies, with emphasis on how people interacted with their environment to produce goods and services, including examples of specialization and interdependence;
 - c) describing colonial life in America from the perspectives of large landowners, farmers, artisans, women, free African Americans, indentured servants, and enslaved African Americans;
 - d) identifying the political and economic relationships between the colonies and Great Britain.

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Standards of Learning:

READING

- 5.6 The student will read and demonstrate comprehension of nonfiction.
- a) Use text organizers, such as type, headings, and graphics, to predict and categorize information.
 - b) Identify structural patterns found in nonfiction.
 - c) Locate information to support opinions, predictions, and conclusions.
 - d) Identify cause-and-effect relationships.
 - e) Identify compare-and-contrast relationships.
 - f) Skim materials to develop a general overview of content and to locate specific information.
 - g) Identify new information gained from reading.

Anchor Text Bibliography:

[Biomimicry - The Genius of Nature](#)

The EverGreen Twins: Rick Reynolds

[Global Warming](#)

William is Going Green: James Martin II

[Pollution Activity](#)

Someday a Tree: Eve Bunting

[Black and White Bottle Experiment](#)

A Hot Planet Needs Cool Kids : Julie Hall

Dear Children of the Earth

Written and Illustrated by Schim Schimmel

Wonderful Nature, Wonderful You

Written by Karin Ireland • Illustrated by Christopher Canyon

<http://www.greeneducationfoundation.org>

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Standards of Learning:

WRITING

- 5.8 The student will write for a variety of purposes: to describe, to inform, to entertain, and to explain.
- a) Choose planning strategies for various writing purposes.
 - b) Organize information.
 - c) Demonstrate awareness of intended audience.
 - d) Use precise and descriptive vocabulary to create tone and voice.
 - e) Vary sentence structure.
 - f) Revise writing for clarity.
 - g) Use available technology to access information.

- 5.9 The student will edit writing for correct grammar, capitalization, spelling, punctuation, and sentence structure.
- a) Use plural possessives.
 - b) Use adjective and adverb comparisons.
 - c) Identify and use interjections.
 - d) Use apostrophes in contractions and possessives.
 - e) Use quotation marks with dialogue.
 - f) Use commas to indicate interrupters and in the salutation and closing of a letter.
 - g) Use a hyphen to divide words at the end of a line.
 - h) Edit for clausal fragments, run-on sentences, and excessive coordination.

Related Inquiry Unit Texts:

- Define technologies and the technological design process to understand the use of technology in different cultures.

Inquiry Activity:

- Identifying the Problem
- Becoming Familiar with the Problem
- Planning, Assigning and Performing a task
- Sharing with Others
- Reflecting, Extending and Evaluating

Related Integrated Activities:

Environmental Writing Prompts:

- 403. In cartoons like Cinderella, a whistle and a song bring on dozens of little animal friends to help out the main character. What would your life be like if you had friends throughout the forest to help you on your way? Which animals would they be and how did you become friends?
- 404. There are lots of potential threats to the environment like pollution and deforestation. Some people even believe that the environment will be damaged beyond repair for your generation. What will you do to keep the environment safe for you and future generations?

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Standards of Learning:

MATHEMATICS

- 5.3 The student will
 - a) identify and describe the characteristics of prime and composite numbers; and
 - b) identify and describe the characteristics of even and odd numbers.
- 5.4 The student will create and solve single-step and multistep practical problems involving addition, subtraction, multiplication, and division with and without remainders of whole numbers.
- 5.5 The student will
 - a) find the sum, difference, product, and quotient of two numbers expressed as decimals through thousandths (divisors with only one nonzero digit); and
 - b) create and solve single-step and multistep practical problem involving decimals.
- 5.6 The student will solve single-step and multistep practical problems involving addition and subtraction with fractions and mixed numbers and express answers in simplest form.
- 5.7 The student will evaluate whole number numerical expressions, using the order of operations limited to parentheses, addition, subtraction, multiplication, and division.
- 5.10 The student will determine an amount of elapsed time in hours and minutes within a 24-hour period.
- 5.15 The student, given a problem situation, will collect, organize, and interpret data in a variety of forms, using stem-and-leaf plots and line graphs.
- 5.16 The student will
 - a) describe mean, median, and mode as measures of center;

Related Environmental Objectives:

The student will:

- Identify resources (goods and ecosystems services) that people use in everyday life(e.g., food, air, water, clothing).
- Describe the origins of everyday resources

Related Integrated Activities:

<http://illuminations.nctm.org/LessonDetail.aspx?ID=U84>

[Lesson 1 - Classroom Paper](#) Students participate in an activity in which they investigate data in connection with recyclable materials and develop plans to help the environment. This activity requires students to keep track of their own paper use for a week then interpret their results with partners. After studying information on paper use, students will be ready to discuss ideas and implement plans for saving paper in the classroom.

[Lesson 3 - How to Bag It?](#) Students participate in an activity in which they investigate the data in connection with recyclable materials and develop plans to help the environment. Students discuss the pros and cons of using various types of bags at the grocery store. Classmates are surveyed to determine which type of bag is the "best".

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| | <ul style="list-style-type: none">b) describe mean as fair share;c) find the mean, median, mode, and range of a set of data;
andd) describe the range of a set of data as a measure of variation. | |
|--|---|--|

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Standards of Learning:

ART

Cultural Context and Art History

- 5.19 The student will identify the influences of historic events, subject matter, and media in works of art.
- 5.20 The student will research artists from a variety of cultures and the works of art they have produced.
- 5.21 The student will identify and discuss how American historical events influenced works of art, with emphases on westward expansion and the Civil War.
- 5.23 The student will compare and contrast art from various cultures and periods, including Pre-Columbian, African-American, Colonial American, and European, using appropriate art vocabulary.

Related Environmental Objectives:

The student will:

- Explore line, shape, color and texture in natural forms.
- Research a period of Art History.

Related Integrated Activities:

Shapes in the Woods - In this unit, children explore line, shape, color and texture in natural forms. They make observations of natural objects and use their observations as the basis for textile design.

Have students create educational Art History videos - You will need to teach students how to use digital video recording devices prior to this assignment. Have your classes research a period of Art History, write a script, and film educational video shorts. These informative video clips can be posted on your school website, art page, or made into a DVD.

Conduct art scavenger hunts - Whether students use reference books or the Internet, you can create classroom excitement by having students compete in an art scavenger hunt. Write a list of art items to find and have places for students to write down their information. For instance, "Find two paintings created in the 1700's that contain fruit. List the artists, titles and dates." This activity allows the students to have fun while perusing lots of art!

<http://www.teachingtrees.org.uk/resources/art/art.htm>

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Standards of Learning:

MUSIC

5.5 The student will perform music of increasing difficulty in musical ensembles, using pitched and rhythm instruments.

5.9 The student will identify instruments from various music ensembles, including instruments from other cultures, using sight and sound.

Related Environmental Objectives:

The student will:

- Create and sing environmental songs set to music.

Related Integrated Activities:

Earth Man Project:

- Uses the power of music, video, the arts, and integrated web design promoting environmental protection. Songs include "Earth Anthem," "Earthman Blues," "H₂O," and a music video with wonderful photographs of the Everglades in "River of Grass" - a tribute to environmentalist Marjorie Stoneman Douglas. Home page includes a built-in flash music player with streaming audio of the featured songs. Songs feature a calypso beat, with positive themes about world peace and environmental protection. Sponsored by Miami-Dade Public Schools and several south Florida environmental agencies.

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Standards of Learning:

HEALTH & PE

5.3 The student will analyze the risks associated with dependence on and addiction to alcohol, tobacco, inhalants and other drugs. Key concepts/skills include:
 a) the effects on the integrated functioning of the body’s systems; the effects on academic performance; the effects on relationships with family, peers, and other individuals.

Related Environmental Objectives:

The students will be able to:

- Identify which foods are rich in vitamins and calcium, as well as, to discuss which foods are good for us and which foods are not good for us.
- Explain why certain foods are good for you and why certain foods are not good for you.
- Explain why it is important to eat foods that are good for you.
- Discuss how the body systems work together.

Related Environmental Activities:

- “Felt” astic Foods
- Pick and Choose
- Fruit and Veggie Wash
- Be A Pal – Coloring Book Activity

<http://www.epa.gov/region4/air/pesticides/hlthyenvcur.pdf>

INSTRUCTIONAL ELEMENTS

Key Vocabulary	Instructional Strategies	Instructional Materials	Technology
Sound waves Prism Opaque Translucent Transparent Wavelength White light Crest Echolocation Radar Volume Frequency Refraction Reflection Light ray Resources Interdependent Revolution King George 3 Cornwallis George Washington Battle of Yorktown Right angle Obtuse angle Acute angle Chord Diameter Radius Circumference Volume Area Perimeter	<ul style="list-style-type: none"> • Integrating content into • Language Arts activities • Author/Illustrator studies • Book talks • Web-based inquiry • Experiential learning (projectbased) • Direct instruction • Small group work • Reflective discussions • Comparing/contrasting • Peer partner learning • Field Trips <ul style="list-style-type: none"> ❖ History museum ❖ Park activities 	<ul style="list-style-type: none"> • Websites referenced in VDOE • Natural materials from Forest Hill Park • Related texts • Assessment resources • Graphic organizers • Project Learning Tree guide • Computers • Digital Cameras • City, state, region, and country maps. • Journals • Charts and Graphs • LCD Projector • Crayons, markers, paints • Rulers • White boards and markers • Sorts • Index cards • stick notes • reusable materials 	<ul style="list-style-type: none"> • Web resources • United Streaming • Powerpoint • Publisher • Word • Evernote • Wikis • Audacity • Webquest • Blogspots

INQUIRY PROJECT & CULMINATING ACTIVITY

Goal:

The 5th grade class will work together to research life in colonial America then plan and execute a COLONIAL DAY CELEBRATION.

Elements:

TLW:

1. Read nonfiction accounts of colonial life
2. Create games based on colonial technology
3. Create colonial instruments
4. Write a diary entry
5. Read and understand battle maps as it relates to perimeter and area
6. Draw propaganda posters (revolution)

Pacing:

This project will be executed in 9 weeks. In class work will be completed during the inquiry block. Component pieces may be executed as home-based projects at the discretion of the classroom teacher.

Evaluation and Assessment:

Component pieces will be evaluated with assignment specific, standards related rubric. Scores for each standard will be entered into Kickboard and averaged as part of the quarterly student mastery grade. An SOL-aligned teacher-created rubric will assess the culminating activity.

ENVIRONMENT			
Driving Objectives:	Essential Understanding:	Essential Skills:	Essential Questions:
<p>Standard 1: Ecological, Social, and Economic Systems Standard 1: Ecological, Social, and Economic Systems Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels.</p>	<p>Ecological systems encompass the living (biotic) and the non-living (abiotic) components of an environment.</p> <p>People have to make choices between wants and needs and evaluate the outcomes of those choices.</p>	<ul style="list-style-type: none"> • Construct charts and graphs from data and observations. • Use tools and equipment appropriate to scientific investigations. • Generate scientific questions based on observations, investigations and research. 	<ul style="list-style-type: none"> • What is the function of plants and animals in an ecosystem? • How has technology affected the way people live? • How can we use natural resources to sustain the economy of the region.
<p>Standard 2: The Natural and Built Environment Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-built environments.</p>	<p>Geographic features of the North American have influenced the movement of people.</p> <p>Students having a sense of being connected to the environment.</p> <p>Students having a sense of learning outside the formal classroom walls.</p>	<ul style="list-style-type: none"> • Design solutions to problems using technology. • Identify technology used in everyday life. 	<ul style="list-style-type: none"> • How can heat, light, sound and electrical energy be transferred?
<p>Standard 3: Sustainability and Civic Responsibility Students develop and apply the knowledge, perspective, vision, skills, and habits of mind necessary to make personal and collective decisions and take actions that promote sustainability.</p>	<p>Students should envision a world that is sustainable.</p> <p>Students should use learning experiences to understand the structure and components of natural and human built environments.</p>	<ul style="list-style-type: none"> • Communication • Collaboration • Imagination 	<ul style="list-style-type: none"> • What are major public issues that affect the environment? • How is technology used effectively in different cultures?

SCIENCE

Driving Objectives:	Essential Understanding:	Essential Skills:	Essential Questions:
<p>Scientific Investigation, Reasoning, and Logic</p> <p>5.1 The student will plan and conduct investigations in which</p> <ol style="list-style-type: none"> a) rocks, minerals, and organisms are identified using a classification key; b) estimations of length, mass, and volume are made; c) appropriate instruments are selected and used for making quantitative observations of length, mass, volume, and elapsed time; d) accurate measurements are made using basic tools (thermometer, meter stick, balance, graduated cylinder); e) data are collected, recorded, and reported using the appropriate graphical representation (graphs, charts, diagrams); f) predictions are made using patterns, and 	<ul style="list-style-type: none"> • Systematic investigations require standard measures and consistent and reliable tools. Metric measures are a standard way to make measurements and are recognized around the world. • A classification key is an important tool used to help identify objects and organisms. It consists of a branching set of choices organized in levels, with most levels of the key having two choices. Each level provides more specific descriptors, eventually leading to identification. • Systematic investigations require organized reporting of data. The way the data are displayed can make it easier to see important patterns, trends, and relationships. Bar graphs and line graphs are useful tools for reporting discrete data and continuous data, respectively. • A scientific <i>prediction</i> is a forecast about what <i>may</i> happen in some future situation. It is based on the application of factual information and principles and recognition of trends and patterns. • Estimation is a useful tool for making approximate measures and 	<ul style="list-style-type: none"> • use classification keys to identify rocks, minerals, and organisms. • make plausible estimations of length, mass, and volume. • select and use the appropriate instruments, including centimeter rulers, meter sticks, graduated cylinders, balances, and stopwatches, for making basic measurements. • measure temperature, length, mass, and volume, using metric measures. This includes millimeters, centimeters, meters, kilometers, grams, kilograms, milliliters, liters, and degrees Celsius. • collect, record, and report data, using charts and tables, and translate numerical data into bar or line graphs. • make predictions based on trends in data. This requires the recognition of patterns and trends and determination of what those trends may represent. • analyze the variables in a simple experiment and identify the manipulated (independent) and responding (dependent) variables. 	<ul style="list-style-type: none"> • What is a control in an experiment? • What is an independent and dependent variable? • What are the variables in an experiment? • What is a trend line? • What is the difference between a gram, kilogram, centimeter, meter, liter and milliliter? • What is the difference between an observation and an inference? • Why is a classification key important? • What is the visible spectrum? • How does light travel through different matter? • How does sound travel through different matter? • How does a prism affect light? • What are the main difference of light and sound/ • What are some similarities between light and sound? • What affects the pitch of and instruments? • What is the relation between frequency and pitch? • What is sound use by humans and animals? • What is the difference between transparent, opaque and translucent?

<p>simple graphical data are extrapolated;</p> <p>g) manipulated and responding variables are identified; and</p> <p>h) an understanding of the nature of science is developed and reinforced.</p> <p>Force, Motion, and Energy</p> <p>5.2 The student will investigate and understand how sound is transmitted and is used as a means of communication. Key concepts include</p> <p>a) frequency, waves, wavelength, vibration;</p> <p>b) the ability of different media (solids, liquids, and gases) to transmit sound; and</p> <p>c) uses and applications (voice, sonar, animal sounds, and musical instruments).</p> <p>5.3 The student will investigate and understand basic characteristics of visible light and how it behaves. Key concepts include</p> <p>a) the visible spectrum</p>	<p>giving general descriptions. In order to make reliable estimates, one must have experience using the particular unit.</p> <ul style="list-style-type: none"> • Sound is a form of energy produced and transmitted by vibrating matter. • Sound waves are compression (longitudinal) waves. • When compression (longitudinal) waves move through matter (solid, liquid, or a gas), the molecules of the matter move backward and forward in the direction in which the wave is traveling. As sound waves travel, molecules are pressed together in some parts (compression) and in some parts are spread out (rarefaction). A child’s toy in the form of a coil is a good tool to demonstrate a compression (longitudinal) wave. • The frequency of sound is the number of wavelengths in a given unit of time. • The wavelength of sound is the distance between two compressions or between two rarefactions. • point on a wave as long as it is measured to the same point on the next wave. • When we talk, sound waves travel in air. Sound also travels in liquids and solids. Sound waves must have a medium through which to travel. In a vacuum sound cannot travel because there is no matter for it to move through. 	<ul style="list-style-type: none"> • define/make observations and inferences. • use the basic terminology of sound to describe what sound is, how it is formed, how it affects matter, and how it travels. • create and interpret a model or diagram of a compression wave. • explain why sound waves travel only where there is matter to transmit them. • explain the relationship between frequency and pitch. • design an investigation to determine what factors affect the pitch of a vibrating object. This includes vibrating strings, rubber bands, beakers/bottles of air and water, tubes (as in wind chimes), and other common materials. • compare and contrast sound traveling through a solid with sound traveling through the air. Explain how different media (solid, liquid, and gas) will affect the transmission of sound. • compare and contrast the sounds (voice) that humans make and hear to that of other animals. This includes bats, dogs, and whales. • compare and contrast how different kinds of musical 	
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<p>and light waves; b) refraction of light through water and prisms; c) reflection of light from reflective surfaces (mirrors); d) opaque, transparent, and translucent; and e) historical contributions in understanding light.</p>	<ul style="list-style-type: none"> • Pitch is determined by the frequency of a vibrating object. Objects vibrating faster have a higher pitch than objects vibrating slower. A change in frequency of sound waves causes an audible sensation—a difference in pitch. • Amplitude is the amount of energy in a compression (longitudinal) wave and is related to intensity and volume. For example, when a loud sound is heard, it is because many molecules have been vibrated with much force. A soft sound is made with fewer molecules being vibrated with less force. • Sound travels more quickly through solids than through liquids and gases because the molecules of a solid are closer together. Sound travels the slowest through gases because the molecules of a gas are farthest apart. • Some animals make and hear ranges of sound vibrations different from those that humans can make and hear. • Musical instruments vibrate to produce sound. There are many different types of musical instruments and each instrument causes the vibrations in different ways. The most widely accepted way to classify musical instruments is to classify them by the way in which the sound is produced by the instrument. The four basic classifications are percussion 	<p>instruments make sound. This includes string instruments, woodwinds, percussion instruments, and brass instruments</p> <ul style="list-style-type: none"> • explain the relationships between wavelength and the color of light. Name the colors of the visible spectrum. • diagram and label a representation of a light wave, including wavelength, peak, and trough. • compare and contrast reflection and refraction, using water, prisms, and mirrors. • explain the terms <i>transparent</i>, <i>translucent</i>, and <i>opaque</i>, and give an example of each. • analyze the effects of a prism on white light and describe why this occurs. Explain why a rainbow occurs. <p>In order to meet this standard, it is expected that students should be able to</p> <ul style="list-style-type: none"> • explain the relationships between wavelength and the color of light. Name the colors of the visible spectrum. • diagram and label a representation of a light wave, including wavelength, peak, and trough. • compare and contrast reflection and refraction, using water, prisms, and mirrors. 	
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	<p>instruments (e.g., drums, cymbals), stringed instruments</p> <ul style="list-style-type: none"> • Visible light is a combination of several different wavelengths of light traveling together. These wavelengths are represented by the colors red, orange, yellow, green, blue, indigo, and violet (ROYGBIV). • Light waves are characterized by their wavelengths. In the visible spectrum, red has the longest wavelength, and violet has the shortest. Wavelengths get progressively shorter from red to violet. • Light travels in waves. Compared to sound, light travels extremely fast. It takes light from the sun less than 8½ minutes to travel 150 million kilometers to reach the Earth. • Unlike sound, light waves travel in straight paths called <i>rays</i> and do not need a medium through which to move. • Light travels in straight paths until it hits an object, where it bounces off (is reflected), is bent (is refracted), passes through the object (is transmitted), or is absorbed as heat. • The relative terms <i>transparent</i>, <i>translucent</i>, and <i>opaque</i> indicate the amount of light that passes through an object. • A prism can be used to refract visible light. When the different wavelengths of light in visible light pass through a prism, they are bent at different angles. The colors of light we see are 	<ul style="list-style-type: none"> • explain the terms <i>transparent</i>, <i>translucent</i>, and <i>opaque</i>, and give an example of each. • analyze the effects of a prism on white light and describe why this occurs. Explain why a rainbow occurs. 	
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red, orange, yellow, green, blue, indigo, and violet

SOCIAL STUDIES

Driving Objectives:	Essential Understanding:	Essential Skills:	Essential Questions:
<p>USI.1 The student will demonstrate skills for historical and geographical analysis and responsible citizenship, including the ability to</p> <ol style="list-style-type: none"> a) identify and interpret primary and secondary source documents to increase understanding of events and life in United States history to 1865; b) make connections between the past and the present; c) sequence events in United States history from pre-Columbian times to 1865; d) interpret ideas and events from different historical perspectives; e) evaluate and discuss issues orally and in writing; f) analyze and interpret maps to 	<ul style="list-style-type: none"> • Major European countries were in competition to extend their power into North America and claim the land as their own. • The interactions between American Indians and Europeans sometimes led to cooperation and other times resulted in conflict. • Ghana, Mali, and Songhai each dominated West Africa in sequence from 300 to 1600 A.D. • African people and African goods played an important role in European interest in world resources. 	<p>Interpret ideas and events from different historical perspectives. (USI.1d)</p> <p>Analyze and interpret maps to explain relationships among landforms, water features, and historical events. (USI.1f)</p> <p>Distinguish between parallels of latitude and meridians of longitude. (USI.1g)</p>	<p>Why did European countries compete for power in North America?</p> <p>What were the obstacles faced by the explorers?</p> <p>What were the accomplishments of the explorations?</p> <p>What regions of North America were explored and settled by France, England, and Spain?</p> <p>What regions were explored by Portugal?</p> <p>How did the American Indians and Europeans interact with each other?</p> <p>What was the importance of Ghana, Mali, and Songhai?</p> <p>Where were the empires of Ghana, Mali, and Songhai located?</p> <p>When did the empires of Ghana, Mali, and Songhai exist in Africa?</p> <p>How did West African empires impact European trade?</p>

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<p>explain relationships among landforms, water features, climatic characteristics, and historical events;</p> <p>g) distinguish between parallels of latitude and meridians of longitude;</p> <p>h) interpret patriotic slogans and excerpts from notable speeches and documents;</p> <p>i) identify the costs and benefits of specific choices made, including the consequences, both intended and unintended, of the decisions and how people and nations responded to positive and negative incentives.</p>			
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<p>USI.4 The student will demonstrate knowledge of European exploration in North America and West Africa by</p> <p>a) describing the motivations for, obstacles to, and accomplishments of the Spanish, French, Portuguese, and English explorations;</p> <p>b) describing cultural and economic interactions between Europeans and American Indians that led to cooperation and conflict, with emphasis on the American Indian concept of land;</p> <p>c) identifying the location and describing the characteristics of West African societies (Ghana, Mali, and Songhai) and their interactions with traders.</p>		<p>Motivations for the explorations</p> <ul style="list-style-type: none"> • Economic—Gold, natural resources, and trade • Religious—Spread Christianity • Competitions for empire and belief in superiority of own culture <p>Obstacles to the explorations</p> <ul style="list-style-type: none"> • Poor maps and navigational tools • Disease and starvation • Fear of the unknown • Lack of adequate supplies <p>Accomplishments of the explorations</p> <ul style="list-style-type: none"> • Exchanged goods and ideas • Improved navigational tools and ships • Claimed territories (see countries below) <p>Regions of North America explored by Spain, France, and England</p> <ul style="list-style-type: none"> • Spain: Francisco Coronado claimed the Southwest of the present-day United States for Spain. • France: Samuel de Champlain established the French settlement of Québec. Robert La Salle claimed the Mississippi River Valley for France. • England: John Cabot explored eastern Canada. <p>Regions explored by Portugal</p> <ul style="list-style-type: none"> • The Portuguese made voyages of discovery along the coast of West 	
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		<p>Africa.</p> <p>Cultural interaction</p> <ul style="list-style-type: none"> • Spanish <ul style="list-style-type: none"> – Conquered and enslaved American Indians – Brought Christianity to the New World – Brought European diseases to American Indians • French <ul style="list-style-type: none"> – Established trading posts – Spread Christian religion • English <ul style="list-style-type: none"> – Established settlements and claimed ownership of land – Learned farming techniques from American Indians – Traded with American Indians • American Indians <ul style="list-style-type: none"> – Taught farming techniques to European settlers – Believed that land was to be used and shared but not owned <p>Areas of cooperation in economic interactions</p> <ul style="list-style-type: none"> • Europeans brought weapons and metal farm tools. • Trade • Crops <p>Areas of conflict</p> <ul style="list-style-type: none"> • Land • Competition for trade • Differences in cultures • Diseases <p>Language differences</p> <p>Ghana, Mali, and Songhai dominated West Africa one after</p>	
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		<p>another from 300 to 1600 A.D.</p> <p>Ghana, Mali, and Songhai were located in the western region of Africa, south of the Sahara Desert, near the Niger River.</p> <p>Ghana, Mali, and Songhai became powerful by controlling trade in West Africa.</p> <p>The Portuguese carried goods from Europe to West African empires, trading metals, cloth, and other manufactured goods for gold.</p>	
<p>USI.5 The student will demonstrate knowledge of the factors that shaped colonial America by</p> <p>a) describing the religious and economic events and conditions that led to the colonization of America;</p> <p>b) describing life in the New England, Mid-Atlantic, and Southern colonies, with emphasis on how people interacted with their environment to produce goods and services, including</p>	<p>Colonies in North America were established for religious and economic reasons.</p> <p>Life in the colonies was shaped by the geographical features of the settlements.</p> <p>Economic specialization and interdependence existed among the colonies in the production of goods and services.</p> <p>The colonies were made up of different groups of people whose lives varied greatly depending on their social position.</p>	<p>Identify and interpret primary and secondary source documents to increase understanding of events and life in United States history. (USI.1a)</p> <p>Sequence events in United States history. (USI.1c)</p> <p>Interpret ideas and events from different historical perspectives. (USI.1d)</p> <p>Identify and interpret primary and secondary source documents to increase understanding of events and life in United States history. (1a)</p> <p>Interpret ideas and events from different historical perspectives. (1d)</p> <p>Analyze and interpret maps to explain relationships among</p>	<p>Why did Europeans establish colonies in North America?</p> <p>How did climate, geographic features, and other available resources distinguish the three regions from each other?</p> <p>How did people use the natural resources of their region to earn a living?</p> <p>What are the benefits of specialization and trade?</p> <p>How did political and social life evolve in each of the three regions?</p> <p>How did people's lives vary among different social groups in colonial America?</p> <p>How did Great Britain impose</p>

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<p>examples of specialization and interdependence;</p> <p>c) describing colonial life in America from the perspectives of large landowners, farmers, artisans, women, free African Americans, indentured servants, and enslaved African Americans;</p> <p>d) identifying the political and economic relationships between the colonies and Great Britain.</p>		<p>landforms, water features, climatic characteristics, and historical events. (1f)</p> <p>Interpret ideas and events from different historical perspectives. (USI.1d)</p>	<p>political and economic control over the colonies?</p>
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MATHEMATICS

Driving Objectives:	Essential Understanding:	Essential Skills:	Essential Questions:
<p>5.3 The student will</p> <ul style="list-style-type: none"> a) identify and describe the characteristics of prime and composite numbers; and b) identify and describe the characteristics of even and odd numbers. 	<p style="text-align: center;">All students should</p> <ul style="list-style-type: none"> • Understand and use the unique characteristics of certain sets of numbers, including prime, composite, even, and odd numbers. • A prime number is a natural number that has exactly two different factors, one and the number itself. • A composite number is a natural number that has more than two different factors. • The number 1 is neither prime nor composite because it has only one factor, itself. • The prime factorization of a number is a representation of the number as the product of its prime factors. For example, the prime factorization of 18 is $2 \times 3 \times 3$. • Prime factorization concepts can be developed by using factor trees. • Prime or composite numbers can be represented by rectangular models or rectangular arrays on grid paper. A prime number can be represented by only one rectangular array (e.g., 7 can be represented by a 7×1 and a 1×7). A composite number can always be represented by more than two rectangular arrays (e.g., 9 can be 	<p style="text-align: center;">The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> • Identify prime numbers less than or equal to 100. • Identify composite numbers less than or equal to 100. • Explain orally and in writing why a number is prime or composite. • Identify which numbers are even or odd. • Explain and demonstrate with manipulatives, pictorial representations, oral language, or written language why a number is even or odd. 	

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	<p>represented by a 9×1, a 1×9, or a 3×3).</p> <ul style="list-style-type: none"> • Divisibility rules are useful tools in identifying prime and composite numbers. • Students should use manipulatives (e.g., Base-10 blocks, cubes, tiles, hundreds board, etc.) to explore and categorize numbers into groups of odd or even. • Students should use rules to categorize numbers into groups of odd or even. Rules can include: <ul style="list-style-type: none"> – An odd number does <i>not</i> have 2 as a factor or is <i>not</i> divisible by 2. <p>The sum of two even numbers is even.</p> <p>The sum of two odd numbers is even.</p> <p>The sum of an even and an odd is odd.</p> <p>Even numbers have an even number or zero in the ones place.</p> <p>Odd numbers have an odd number in the ones place.</p> <p>An even number has 2 as a factor or is divisible by 2.</p>		
<p>5.4 The student will create and solve single-step and multistep practical problems</p>	<p>All students should</p> <ul style="list-style-type: none"> • Understand the meaning of mathematical operations and how these operations relate to one 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and</p>	

<p>involving addition, subtraction, multiplication, and division with and without remainders of whole numbers.</p>	<p>another when creating and solving single-step and multistep word problems.</p> <ul style="list-style-type: none"> • An example of an approach to solving problems is Polya’s four-step plan: • Understand: Retell the problem; read it twice; take notes; study the charts or diagrams; look up words and symbols that are new. • Plan: Decide what operation(s) to use and what sequence of steps to use to solve the problem. • Solve: Follow the plan and work accurately. If the first attempt doesn’t work, try another plan. • Look back: Does the answer make sense? • Estimation gives a rough idea of an amount. Strategies such as front-end, rounding, and mental computation may be used to estimate addition, subtraction, multiplication, and division of whole numbers. • Examples of problems to be solved by using estimation strategies are encountered in shopping for groceries, buying school supplies, budgeting allowance, and sharing the cost of a pizza or the prize money from a contest. • Estimation can be used to check the reasonableness of the results. 	<p>representations to</p> <ul style="list-style-type: none"> • Select appropriate methods and tools from among paper and pencil, estimation, mental computation, and calculators according to the context and nature of the computation in order to compute with whole numbers. • Create single-step and multistep problems involving the operations of addition, subtraction, multiplication, and division with and without remainders of whole numbers, using practical situations. • Estimate the sum, difference, product, and quotient of whole number computations. • Solve single-step and multistep problems involving addition, subtraction, multiplication, and division with and without remainders of whole numbers, using paper and pencil, mental computation, and calculators in which <ul style="list-style-type: none"> ➤ sums, differences, and products will not exceed five digits; ➤ multipliers will not exceed two digits; ➤ divisors will not exceed two digits; or ➤ dividends will not exceed four digits. ➤ Use two or more operational steps to solve a multistep problem. Operations can be the same or different. 	
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<p>5.5</p> <p>The student will</p> <p>a) find the sum, difference, product, and quotient of two numbers expressed as decimals through thousandths (divisors with only one nonzero digit); and</p> <p>b) create and solve single-step and multistep practical problems involving decimals.</p>	<p>All students should</p> <ul style="list-style-type: none"> • Use similar procedures as those developed for whole number computation and apply them to decimal place values, giving careful attention to the placement of the decimal point in the solution. • Select appropriate methods and tools from among paper and pencil, estimation of division, i.e., $\text{dividend} \div \text{divisor} = \text{quotient}$ quotient $\text{divisor} \overline{) \text{dividend}}$ $\frac{\text{dividend}}{\text{divisor}} = \text{quotient}.$	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> • Determine an appropriate method of calculation to find the sum, difference, product, and quotient of two numbers expressed as decimals through thousandths, selecting from among paper and pencil, estimation, mental computation, and calculators. • Estimate to find the number that is closest to the sum, difference, and product of two numbers expressed as decimals through thousandths. • Find the sum, difference, and product of two numbers expressed as decimals through thousandths, using paper and pencil, estimation, mental computation, and calculators. • Determine the quotient, given a dividend expressed as a decimal through thousandths and a single-digit divisor. For example, 5.4 divided by 2 and 2.4 divided by 5. • Use estimation to check the reasonableness of a sum, difference, product, and quotient. • Create and solve single-step and multistep problems. 	
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		<ul style="list-style-type: none"> • A multistep problem needs to incorporate two or more operational steps (operations can be the same or different). 	
<p>5.6 The student will solve single-step and multistep practical problems involving addition and subtraction with fractions and mixed numbers and express answers in simplest form.</p>	<p style="text-align: center;">All students should</p> <ul style="list-style-type: none"> • Develop and use strategies to estimate and compute addition and subtraction of fractions. • Understand the concept of least common multiple and least common denominator as they are important when adding and subtracting fractions. • Understand that a fraction is in simplest form when its numerator and denominator have no common factors other than 1. The numerator can be greater than the denominator. 	<p style="text-align: center;">The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> • Solve single-step and multistep practical problems involving addition and subtraction with fractions having like and unlike denominators. Denominators in the problems should be limited to 12 or less (e.g., $\frac{1}{5} + \frac{1}{4}$) and answers should be expressed in simplest form. • Solve single-step and multistep practical problems involving addition and subtraction with mixed numbers having like and unlike denominators, with and without regrouping. Denominators in the problems should be limited to 12 or less, and answers should be expressed in simplest form. • Use estimation to check the reasonableness of a sum or difference. 	
<p>5.10 The student will determine an amount of elapsed time in hours and minutes within a 24-hour</p>	<p style="text-align: center;">All students should</p> <ul style="list-style-type: none"> • Understand that elapsed time can be found by counting on from the beginning time to the finishing time. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> • Determine elapsed time 	

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<p>period.</p>	<ul style="list-style-type: none"> • Elapsed time is the amount of time that has passed between two given times. • Elapsed time can be found by counting on from the beginning time to the finishing time. • Count the number of whole hours between the beginning time and the finishing time. • Count the remaining minutes. • Add the hours and minutes. For example, to find the elapsed time between 10:15 a.m. and 1:25 p.m., count on as follows: from 10:15 a.m. to 1:15 p.m., count 3 hours; from 1:15 p.m. to 1:25 p.m., count 10 minutes; and then add 3 hours to 10 minutes to find the total elapsed time of 3 hours and 10 minutes. 	<p>in hours and minutes within a 24-hour period.</p>	
<p>5.15 The student, given a problem situation, will collect, organize, and interpret data in a variety of forms, using stem-and-leaf plots and line graphs.</p>	<p>All students should</p> <ul style="list-style-type: none"> • Understand how to interpret collected and organized data. • Understand that stem-and-leaf plots list data in a meaningful array. It helps in finding median, modes, minimum and maximum values, and ranges. • Understand that line graphs show changes over time. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> • Formulate the question that will guide the data collection. • Collect data, using observations (e.g., weather), measurement (e.g., shoe sizes), surveys (e.g., hours watching television), or experiments (e.g., plant growth). • Organize the data into a chart, table, stem-and-leaf plots, and line graphs. 	

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		<ul style="list-style-type: none"> • Display data in line graphs and stem-and-leaf plots. • Construct line graphs, labeling the vertical axis with equal whole number, decimal, or fractional increments and the horizontal axis with continuous data commonly related to time (e.g., hours, days, months, years, and age). Line graphs will have no more than six identified points along a continuum for continuous data (e.g., the decades: 1950s, 1960s, 1970s, 1980s, 1990s, and 2000s). • Construct a stem-and-leaf plot to organize and display data, where the stem is listed in ascending order and the leaves are in ascending order, with or without commas between leaves. • Title the given graph or identify the title. • Interpret the data in a variety of forms (e.g., orally or in written form). 	
<p>. 5.16 The student will</p> <ol style="list-style-type: none"> a) describe mean, median, and mode as measures of center; b) describe mean as fair share; c) find the mean, median, mode, and range of a set of 	<p>All students should</p> <ul style="list-style-type: none"> • Understand that mean, median, and mode are described as measures of center. • Understand that mean, median, and mode are three of the various ways that data can be described or summarized. • Understand that mean as fair share is 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> • Describe and find the mean of a group of numbers representing data from a given context as a measure of center. 	

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<p>d) data; and describe the range of a set of data as a measure of variation</p>	<p>described as equally dividing the data set or the data set has already been divided equally.</p> <ul style="list-style-type: none"> • Understand how to find the mean, median, and mode of a set of data as measures of center. • Understand values in the context of other characteristics of the data in order to best describe the results. 	<ul style="list-style-type: none"> • Describe and find the median of a group of numbers representing data from a given context as a measure of center. • Describe and find the mode of a group of numbers representing data from a given context as a measure of center. • Describe mean as fair share. • Describe and find the range of a group of numbers representing data from a given context as a measure of variation. • Describe the impact on measures of center when a single value of a data set is added, removed, or changed.[†] 	
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