

# *Sci-Tech Connections*

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*Scope and Sequence*

*Grade 4*

### Sci Tech Connections Scope and Sequence - Grade 4

Name of Module	Lesson	Name of Activity	Main Concepts	Specific Expectations	Materials Required	Pacing *
<i>A Visit to a Castle</i>	1	The Ups and Downs	Explores pulleys, designs and makes a drawbridge.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• explore and discover the function of a pulley system</li> <li>• design and create a pulley system for a drawbridge</li> <li>• identify and make modifications to your pulley system</li> <li>• explain how your pulley system works</li> <li>• relate how pulleys are used in our world</li> </ul>	<ul style="list-style-type: none"> <li>• string</li> <li>• paper clips</li> <li>• small items to lift</li> <li>• elastic bands</li> <li>• cardboard</li> <li>• small spools</li> <li>• dowels</li> <li>• larger spools</li> <li>• tape</li> </ul>	1 – 60 min. period + 1 – 40 min. period
<i>A Visit to a Castle</i>	2	Lowering Down, Raising Up	Explores how to use a simple pulley system to carry a load.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• explore and discover the function of a pulley system</li> <li>• design and create a pulley system to lift a load</li> <li>• identify and make modifications to your pulley system</li> <li>• explain how your pulley system works</li> <li>• relate how pulleys are used in medieval times</li> </ul>	<ul style="list-style-type: none"> <li>• spools</li> <li>• yard (meter) stick</li> <li>• pulleys</li> <li>• string</li> <li>• cup hooks</li> <li>• a load (mass, small pail of sand)</li> <li>• tape</li> <li>• straws</li> <li>• dowels</li> <li>• toothpicks</li> <li>• paper clips</li> </ul>	1 – 60 min. period + 1 – 40 min. period
<i>A Visit to a Castle</i>	3	Where is the Pulley?	Investigates the advantage of fixed and movable pulley systems.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• design, make, and use a fixed pulley system and a movable pulley system</li> <li>• identify and make modifications</li> <li>• evaluate the performance of the two systems</li> <li>• communicate the procedures and results of the investigation using an oral presentation and your working models</li> </ul>	<ul style="list-style-type: none"> <li>• spools</li> <li>• tape</li> <li>• yard (meter) stick</li> <li>• straws</li> <li>• pulleys</li> <li>• dowels</li> <li>• string</li> <li>• toothpicks</li> <li>• cup (pail with mass inside)</li> <li>• hooks</li> <li>• paper clips</li> <li>• a load</li> </ul>	1 – 60 min. period

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<i>A Visit to a Castle</i>	4	Heave Ho!	Designs and builds a model of a block and tackle system.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• describe the functions of the block and tackle system</li> <li>• design, make, and use a block and tackle system</li> <li>• identify and make modifications</li> <li>• evaluate the performance of systems</li> <li>• communicate the procedures and results of your investigation using an oral presentation and your working model</li> </ul>	<ul style="list-style-type: none"> <li>• spools</li> <li>• tape</li> <li>• yard (meter) stick</li> <li>• straws</li> <li>• pulleys</li> <li>• dowels</li> <li>• string</li> <li>• toothpicks</li> <li>• cup</li> <li>• paper clips</li> <li>• hooks</li> <li>• a load</li> </ul>	1 – 60 min. period
<i>A Visit to a Castle</i>	5	How Far Will It Go?	Builds a siege machine and tests its function.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• describe the functions of the siege machine</li> <li>• design, make, and use a siege machine</li> <li>• identify and make modifications</li> <li>• evaluate the performance of the systems</li> <li>• communicate the procedures and results of your investigation using an oral presentation and your working model</li> </ul>	<ul style="list-style-type: none"> <li>• spools</li> <li>• tape</li> <li>• yard (meter) stick</li> <li>• straws</li> <li>• pulleys</li> <li>• dowels</li> <li>• string</li> <li>• cup hooks</li> <li>• plastic cube</li> <li>• heavy book</li> </ul>	2 – 40 min. periods
<i>A Visit to a Castle</i>	6	Life and Times	Researches about the life and times in a medieval community and builds a map of a medieval castle and/or community.	<ul style="list-style-type: none"> <li>• listen to the story</li> <li>• identify and describe elements of a story</li> <li>• research to find out more information</li> <li>• present researched information in an interesting way</li> <li>• communicate learning to others</li> </ul>	<ul style="list-style-type: none"> <li>• paper</li> <li>• pencil</li> <li>• chart paper</li> <li>• glue</li> <li>• tape</li> <li>• markers</li> <li>• paint</li> <li>• paintbrushes</li> <li>• modeling clay</li> <li>• other materials as required</li> <li>• research books</li> </ul>	3 – 40 min. periods

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<i>A Visit to a Castle</i>	7	The Final Curtain	Investigates how stage curtains work and builds a model to use to present a medieval scene.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• describe the function of the belt drive system</li> <li>• design, make, and use a belt drive system</li> <li>• identify and make modifications to your own pulley system</li> <li>• evaluate the performance of the systems</li> <li>• communicate the procedures and results of the investigation using an oral presentation and your working model</li> </ul>	<ul style="list-style-type: none"> <li>• spools</li> <li>• pulleys</li> <li>• cloth</li> <li>• string</li> <li>• tape</li> <li>• paper clips</li> <li>• cardboard</li> <li>• cardboard boxes</li> <li>• other materials as required</li> </ul>	3 – 40 min. period
<i>Light, Sound, Action ...</i>	8	Da da da ... Sound!!!	Investigates how sound is produced and explores different sounds in the environment.	<ul style="list-style-type: none"> <li>• work cooperatively as a group, respect other people, work safely, and keep a clean work space</li> <li>• recognize that sound is caused by vibrations</li> <li>• identify objects by the sound they make</li> <li>• investigate sounds in the environment and identify them as natural or artificial</li> <li>• order sounds according to pitch and loudness</li> <li>• recognize that sound vibrations travel</li> <li>• use the words vibration, loudness, and pitch</li> <li>• identify different materials through which sound can travel</li> </ul>	<ul style="list-style-type: none"> <li>• collection of different objects that produce sound</li> <li>• drum</li> <li>• rice</li> <li>• plastic container half-filled with water</li> <li>• tuning fork</li> <li>• crazy kazoos</li> <li>• wax paper</li> <li>• salt</li> <li>• tape recorder</li> </ul>	2 – 40 min. periods

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<i>Light, Sound, Action ...</i>	9	Getting the Beat	Discovers how sound is produced in different ways and explores ways in which sound can be changed through designing and making musical instruments.	<ul style="list-style-type: none"> <li>• work cooperatively as a group, respect other people, work safely, and keep a clean work space</li> <li>• explore and discover how sound is produced in different ways</li> <li>• explore ways in which sound can be changed</li> <li>• discover and describe how to cause changes in pitch and volume</li> <li>• use the words vibration, volume, and pitch</li> <li>• design and make instruments</li> <li>• create a presentation using the instruments</li> </ul>	<ul style="list-style-type: none"> <li>• musical instrument sheets (pages 22 to 28)</li> </ul>	2 – 60 min. periods
<i>Light, Sound, Action ...</i>	10	Sound on the Move	Recognizes that sound vibrations travel; designs a system to transmit sound from one place to another.	<ul style="list-style-type: none"> <li>• work cooperatively as a group, respect other people, work safely, and keep a clean work space</li> <li>• recognize that sound vibrations travel</li> <li>• investigate different ways to make a communication system with string and cups</li> <li>• compare the systems that you create</li> <li>• present your results to another group</li> <li>• discuss and evaluate the best criteria for a communication system</li> </ul>	<ul style="list-style-type: none"> <li>• string (various thicknesses and types)</li> <li>• fishing line</li> <li>• cups (Styrofoam, paper, and plastic)</li> <li>• measuring tape</li> <li>• graph paper</li> <li>• other materials as requested</li> </ul>	2 – 40 min. periods
<i>Light, Sound, Action ...</i>	11	Muffling and Magnifying	Investigates which materials muffle sound and which materials amplify sound.	<ul style="list-style-type: none"> <li>• work cooperatively as a group, respect other people, work safely, and keep a clean work space</li> <li>• compare the ways in which materials transmit, reflect, or absorb sound</li> <li>• identify and describe the harmful effects of noise and noise hazards</li> <li>• identify sound-related jobs</li> <li>• describe ways in which materials that absorb sound are used</li> <li>• present and explain the results of the investigations to the class</li> </ul>	<ul style="list-style-type: none"> <li>• shoebox</li> <li>• alarm clock</li> <li>• Styrofoam pieces</li> <li>• fabric</li> <li>• cotton batting</li> <li>• newspaper</li> <li>• wood</li> <li>• bubble packing</li> <li>• scissors</li> <li>• cardboard rolls</li> <li>• cookie sheet</li> <li>• pieces of Plexiglas</li> <li>• bricks</li> </ul>	1 – 60 min. period + 1 – 40 min. period

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<i>Light, Sound, Action ...</i>	12	Let There be Light	Identifies sources of light in the environment.	<ul style="list-style-type: none"> <li>• work cooperatively as a group, respect other people, work safely, and keep a clean work space</li> <li>• identify sources of light in the environment</li> <li>• classify these as natural or artificial</li> <li>• recognize that certain sources give off heat as well as light</li> <li>• compare light sources</li> </ul>	<ul style="list-style-type: none"> <li>• paper</li> <li>• pencils</li> <li>• magazines</li> <li>• scissors</li> <li>• poster-size paper</li> </ul>	2 – 40 min. periods
<i>Light, Sound, Action ...</i>	13	Looking Through	Explores how a beam of light passes through different materials; creates a shadow puppet show.	<ul style="list-style-type: none"> <li>• work cooperatively as a group, respect other people, work safely, and keep a clean work space</li> <li>• compare the beam of light passing through the materials</li> <li>• classify materials as transparent, translucent, or opaque</li> <li>• use the words transparent, translucent, and opaque</li> <li>• demonstrate which materials cast shadows</li> <li>• predict the location, size, and shape of shadows</li> <li>• explain the uses of the different materials as natural or human-made</li> </ul>	<ul style="list-style-type: none"> <li>• flashlight</li> <li>• book</li> <li>• tissue paper</li> <li>• aluminum foil</li> <li>• wood</li> <li>• wax paper</li> <li>• plastic wrap</li> <li>• glass – clear and frosted</li> <li>• brown paper bag</li> <li>• cellophane wrap</li> <li>• cooking oil</li> <li>• different-colored bottles and containers</li> <li>• glass of water</li> <li>• glass of milk</li> <li>• thick white paper</li> <li>• thick cardboard</li> <li>• popsicle sticks</li> <li>• scissors</li> <li>• Look Through Recording Sheet (page 51)</li> </ul>	2 – 40 min. periods

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<i>Light, Sound, Action ...</i>	14	Light's Magical Powers	Investigates the refraction of light.	<ul style="list-style-type: none"> <li>• work cooperatively as a group, respect other people, work safely, and keep a clean work space</li> <li>• explore and discover how light beams can be bent</li> <li>• investigate the behavior of light using different mediums and materials</li> <li>• compare how light interacts with different optical devices</li> <li>• present learning to another group</li> </ul>	<ul style="list-style-type: none"> <li>• jars of water</li> <li>• milk</li> <li>• vinegar</li> <li>• sugar</li> <li>• cooking oil</li> <li>• variety of different-shaped glass containers</li> <li>• convex and concave lenses</li> <li>• magnifying glasses</li> <li>• old spectacles or sunglasses</li> <li>• flashlight</li> <li>• telescopes</li> <li>• dark box</li> <li>• cardboard</li> <li>• scissors</li> <li>• tape</li> </ul>	1 – 60 min. period
<i>Light, Sound, Action ...</i>	15	It's a Maze of Light	Discovers that light beams can be bent.	<ul style="list-style-type: none"> <li>• work cooperatively as a group, respect other people, work safely, and keep a clean work space</li> <li>• recognize that light can be reflected off certain materials</li> <li>• identify reflectors in our environment</li> <li>• explore a light maze</li> <li>• design an object to see around a corner</li> </ul>	<ul style="list-style-type: none"> <li>• collection of shiny objects</li> <li>• mirrors</li> <li>• aluminum foil</li> <li>• jar of water</li> <li>• flashlight</li> <li>• box</li> <li>• rulers</li> <li>• scissors</li> <li>• modeling clay</li> <li>• tape</li> </ul>	2 – 40 min. periods
<i>Light, Sound, Action ...</i>	16	Lights, Camera, Sound ... COLOR!!!	Explores the color spectrum; demonstrates that white light can be split into various colors.	<ul style="list-style-type: none"> <li>• work cooperatively as a group, respect other people, work safely, and keep a clean work space</li> <li>• explore ways to split light into various colors</li> <li>• investigate properties of rainbows/the spectrum</li> <li>• use words beam of light, light source, and reflection</li> <li>• explain how you split light and communicate your learning to others</li> <li>• design a lighting chart for the lighting technician</li> </ul>	<ul style="list-style-type: none"> <li>• prisms</li> <li>• glass (with safety features)</li> <li>• crystals</li> <li>• crystal jewelry</li> <li>• bubble mixture</li> <li>• flashlights</li> <li>• oil</li> <li>• diffraction grating film</li> <li>• mirrors</li> <li>• water</li> <li>• colored acetate sheets</li> <li>• white paper</li> </ul>	2 or 3 – 40 min. periods

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<i>Connecting the U.S.A.</i>	17	Getting to Know You	Creates a quiz about the United States that draws on students previous knowledge and research skills.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• generate ideas and thoughts about America</li> <li>• sort and classify the information into common groupings</li> <li>• use the facts to create a quiz for others in class</li> <li>• reflect on questions about America</li> </ul>	<ul style="list-style-type: none"> <li>• paper</li> <li>• markers</li> <li>• scissors</li> <li>• research materials</li> </ul>	1 – 60 min. period + 1 – 40 min. period
<i>Connecting the U.S.A.</i>	18	The Travel Tool	Constructs a geographical and a political map and discusses the importance of waterways.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• construct and read a wide variety of maps</li> <li>• create sketch maps of familiar places using symbols for places and routes</li> <li>• locate and label the districts, counties, and capital cities within each of America’s states</li> <li>• locate and label the Great Lakes and other major bodies of water and waterways</li> <li>• locate and label key information about the geographic regions of America</li> </ul>	<ul style="list-style-type: none"> <li>• paper</li> <li>• chart paper</li> <li>• poster paper</li> <li>• pencils</li> <li>• pencil crayons or markers</li> <li>• rulers</li> <li>• map of America (page 60)</li> <li>• atlases</li> </ul>	2 – 40 min. periods
<i>Connecting the U.S.A.</i>	19	National Park Virtual Tour and Scavenger Hunt	Explores the different regions of the United States through finding out about the national parks and their role in protection and preservation of the environment.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• identify and use a variety of sources and technologies to gather information on national parks</li> <li>• compare two parks with respect to location, physical features, and habitat</li> <li>• communicate information to other students</li> </ul>	<ul style="list-style-type: none"> <li>• Internet access</li> <li>• Scavenger Hunt Questions (pages 62 and 63)</li> <li>• chart paper</li> <li>• pens</li> </ul>	2 or 3 – 40 min. periods

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<i>Connecting the U.S.A.</i>	20	East, West, North, and South	Researches and presents, through a travel convention, an area of the United States.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• willingly observe, question, explore, and investigate</li> <li>• use a variety of research and reference materials to find information</li> <li>• create a display area of your region (for a travel convention) that communicates information to other students using a variety of media</li> <li>• write a short quiz for classmates based on the information gathered</li> </ul>	<ul style="list-style-type: none"> <li>• reference books</li> <li>• atlases</li> <li>• reference CD-ROMs</li> <li>• travel brochures</li> <li>• internet access</li> <li>• Research Project Checklist (page 64)</li> <li>• paper</li> <li>• art supplies</li> </ul>	3 – 40 min. periods + homework
<i>Connecting the U.S.A.</i>	21	Salt Marsh	Investigates and constructs different food chains, drawing on information about a salt marsh in New Jersey.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• discusses the interrelationship between plants and animals in a marsh environment</li> <li>• classify organisms into producers, consumers, and decomposers</li> <li>• create food chains and food webs using diagrams and Post-it note charts</li> <li>• identify the differences between herbivores, carnivores, and omnivores</li> <li>• discuss similarities and differences among different food chains</li> <li>• reflect on the activity and use the vocabulary <i>ecosystem, biodiversity, populations, producers, consumers, and decomposers</i></li> </ul>	<ul style="list-style-type: none"> <li>• Food Chain Creation List (page 65)</li> <li>• narrow strips of colored paper</li> <li>• poster paper</li> <li>• chart paper</li> <li>• multi-colored Post-it notes or Post-its and different colored markers</li> <li>• wool or string</li> <li>• scissors</li> </ul>	2 – 40 min. periods

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<i>Connecting the U.S.A.</i>	22	Ecosystem in Crisis?: A Look at Frogs	Examines an ecosystem in crisis, researches to find out about another ecosystem and presents information at an environmental symposium.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• demonstrate an understanding of the concepts of habitat and community, and identify the factors that could affect habitats and communities of plants and animals</li> <li>• research an environmental habitat to find out what changes have occurred and why these changes might have occurred</li> <li>• describe what could be done in order to conserve natural habitats and resources</li> <li>• present information to others in a symposium setting</li> <li>• ask questions and discuss ideas with others</li> </ul>	<ul style="list-style-type: none"> <li>• research materials</li> <li>• journals</li> <li>• internet access</li> <li>• Research Topics and Checklist (page 66)</li> </ul>	3 – 40 min. periods + homework
<i>Unearthing It All</i>	23	The Ever-Changing Landscape – An Introduction to Geology	Explores and describes the geological evolution of the landscape.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• listen to a simulation of the formation of the earth’s crust and follow along with the building of a model of the earth’s crust</li> <li>• create a presentation to show understanding of how the earth’s crust was formed</li> <li>• use the terms igneous, sedimentary, and metamorphic</li> <li>• communicate the procedures and results of investigations</li> </ul>	<ul style="list-style-type: none"> <li>• cookie sheets (one per group)</li> <li>• assorted types of store-bought refrigerated cookie dough</li> <li>• bars of sweetened chocolate</li> <li>• box of crisp rice cereal (or sesame seeds)</li> <li>• bag of miniature marshmallows</li> <li>• hot plate and pan for melting the chocolate (or electric frying pan)</li> <li>• oven mitts</li> <li>• table knife</li> </ul>	3 – 40 min. periods

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<i>Unearthing It All</i>	24	Like a Rock ... But What Kind of Rock?	Investigates, tests, and compares the physical properties of rocks and minerals.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• describe rocks and minerals according to physical properties such as color, texture, luster, hardness, and crystal shape (minerals).</li> <li>• relate the characteristics of rocks and minerals to their uses</li> <li>• compare different rocks and minerals from the local area with those from other places</li> </ul>	<ul style="list-style-type: none"> <li>• samples of rocks</li> <li>• journals or Bubble Map Chart (BLM 12)</li> <li>• rock and mineral stations (pages 35 to 38)</li> <li>• Rocks and Minerals Observation Sheet (page 39)</li> </ul>	2 – 60 min. periods
<i>Unearthing It All</i>	25	The Treasures of the Earth	Describes the effects that human activity can have on the physical landscape.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• work through the simulation game with group</li> <li>• reflect on the issues involved in the mining industry</li> <li>• present four issues about mining to the class</li> </ul>	<ul style="list-style-type: none"> <li>• minerals (pages 50 to 52)</li> <li>• small shoebox (or piece of paper) to represent the processing plant</li> <li>• straw</li> <li>• cup</li> <li>• chart paper</li> <li>• pencil</li> <li>• ruler</li> <li>• string</li> <li>• scissors</li> <li>• Mining Rules and Regulations (page 48)</li> <li>• Mining Processing Sheet (page 49)</li> </ul>	1 – 90 min. period

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<i>Unearthing It All</i>	26	When Is a Gear Not a Gear?	Investigates and explores the gear system of a bicycle.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• observe and describe gear systems</li> <li>• tell how the different parts of a bicycle work together</li> <li>• observe and describe how rotary motion in one system is transferred to rotary motion in another in the same structure</li> <li>• use gears to demonstrate the concept of mechanical advantage</li> <li>• understand that most mechanical systems are fixed and dependent on structures</li> <li>• identify everyday items that use gears</li> <li>• draw and label a diagram of how a bicycle works</li> </ul>	<ul style="list-style-type: none"> <li>• bicycle</li> <li>• masking tape</li> </ul>	2 or 3 – 40 min. periods
<i>Unearthing It All</i>	27	Gearing Around	Creates gears and explores and describes the motion of the gears. Designs and creates a toy using a gear system.	<ul style="list-style-type: none"> <li>• work as a group, respect other people, work safely, and keep a clean work space</li> <li>• explore and investigate objects that contain gears</li> <li>• observe the movement of gears</li> <li>• discuss the different types of gears (bevel, spur, and worm)</li> <li>• keep a record of work and discuss work and findings with others</li> <li>• design and create a toy that includes a gear system</li> <li>• create an advertisement to present group's new toy</li> </ul>	<ul style="list-style-type: none"> <li>• gear kits</li> <li>• gears</li> <li>• Gearing Around station sheets (page 65 to 69)</li> <li>• wooden skewers</li> <li>• tagboard</li> <li>• corrugated cardboard</li> <li>• lids</li> <li>• matchsticks</li> <li>• miter box, saw, and drill</li> <li>• wooden rods</li> <li>• small boxes</li> <li>• cardboard</li> <li>• glue guns</li> <li>• markers</li> <li>• paint and brushes</li> <li>• other materials as required</li> </ul>	3 or 4 – 40 min. periods

\* Timing will vary based on student's new inquiries from original investigation and how many activities from Connecting the Curriculum are introduced. Remember Language Arts activities are integrated into each investigation.