# **Grade 4 Science Course Overview**

Content Area:	Science
Course(s):	SCIENCE-4
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Cover

### EAST BRUNSWICK PUBLIC SCHOOLS

East Brunswick New Jersey

### **Superintendent of Schools**

Dr. Victor P. Valeski

### Science

### **Grade 4 Science**

Course Number: 4104

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### **Course Overview**

The K-12 science curriculum in all schools in New Jersey must be aligned with the Core Curriculum Content Standards. These standards focus on the processes of science as well as content in three major areas: earth, life and physical science. Each of these areas of science needs to be addressed at every grade level in order to foster a strong science knowledge base for students as well as an appreciation and understanding of how science works to help people solve problems.

One of the strong points of the East Brunswick Schools' science curriculum is the emphasis on hands-on investigations of the natural world. Our science program emphasizes doing science, not reading about it in a book. The fourth grade science curriculum consists of two modules that were selected from a nationally-recognized program – *Science and Technology for Children (STC)*. The life science unit is *Animal Studies,* which examines the behavior of animals. The physical science unit is *Motion and Design,* which allows students to build model vehicles and investigate the variables that affect performance. The third unit of study in earth science unit is *Astronomy* using the Starlab planetarium and a curriculum which was developed by East Brunswick's fourth grade science teachers. It introduces students to the subject of astronomy with specific reference to the constellations as interpreted by different cultural groups.

### **Textbooks and other resources**

Carolina STC Animal Studies, 2nd Edition, Copyright 2004

Carolina STC Motion & Design, 2nd Edition, Copyright 2004

Standards	
SCI.3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
SCI.3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
SCI.3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
SCI.4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.
SCI.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.

SCI.4-LS1-1	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
SCI.4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
SCI.4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
SCI.4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.
SCI.4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
SCI.5-ESS1-2	Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.
SCI.5-ESS1-1	Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.
SCI.MS-ESS1-1	Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
SCI.MS-ESS1-3	Analyze and interpret data to determine scale properties of objects in the solar system.
SOC.6.1.8.D.1.a	Compare and contrast gender roles, religion, values, cultural practices, and political systems of Native American groups.

**Grading and Evaluation Guidelines** Grade level common assessments are used throughout the units.

## Grade 4 Science Planning Guide

Instructional Objectives	Instructional Activities/	Materials/ Resources	Formative & Summa Assessment Strateg
	Methods/Assignments		
Astronomy Unit	<u>Astronomy Unit</u>	<u>Astronomy Unit</u>	<u>Astronomy Uni</u>
-			
<b>Part 1-Introduction</b>	<b>Star Introduction</b>		
		Astronomy Manual	
<ol> <li>The students will be able to:</li> <li>1. Recognize that the sun is a star.</li> <li>2. Recognize that</li> </ol>	<ul> <li>Read and discuss "Introduction to Astronomy."</li> <li>Students will discover the definition of a constellation</li> </ul>	Unitedstreaming.com	<ul> <li>Class discussi (F)</li> <li>Astronomy manual pages</li> </ul>

<ul> <li>some stars are brighter than others.</li> <li>3. Discuss star colors and recognize that they are different colors based on temperature.</li> <li>4. Associate magnitude with brightness of stars and how it is used as a tool for astronomers.</li> <li>5. Name magnitude of several important stars.</li> <li>6. Discover that constellations are pictures in the sky based on the imagination of people who view them.</li> </ul>	<ul> <li>and why people can view the same set of stars and see different pictures.</li> <li>Read and discuss <i>A</i> <i>Daytime Star</i>-complete page 3 &amp; 4</li> <li>Read and discuss "What is a Star" and "How Large is s Star."</li> <li>Show Unitedstreaming videoà <u>A Spin Around the</u> <u>Solar System: Look to the</u> <u>Stars</u></li> <li>Talk about star color, and how stars are different colors based on temperature. Read "Are all Stars the Same Color?" Complete Astronomy manual page 9.</li> <li>Read with the partner about the magnitude of stars on pages 10-12</li> </ul>	- - - Astronomy Unit, cont'd., cont'd. Starlab	12 (F) - - - <u>Astronomy Unit,</u> <u>cont'd., cont'd.</u>
- <u>Astronomy Unit, cont'd.,</u> <u>cont'd.</u> Part 2-Starlab	- - <u>Astronomy Unit, cont'd., cont'd.</u>	Astronomy Manual	<ul> <li>Class discuss: (F)</li> <li>Native Ameriquiz (S)</li> <li>Astronomy Manual page (S/F)</li> </ul>
<ol> <li>The students will be able to:</li> <li>Recognize and locate various constellations in the night sky.</li> <li>Recognize major stars and asterisms within the constellations.</li> <li>Identify the correlation between</li> </ol>	<ul> <li>Native American Constellations</li> <li>Brief introduction to Native American Culture</li> <li>Discuss the important role nature plays in the daily life of Native Americans.</li> <li>Read and discuss myths related to these constellations—Astronomy</li> </ul>	-	

<ul> <li>the constellations and the seasons.</li> <li>4. Develop an understanding of the relationship between various cultures and the myths connected to the constellations.</li> <li>5. Identify the significance of nature in cultures and constellations.</li> </ul>	<ul> <li>manual pages 13-28</li> <li>Visit the Starlab and locate constellations associated with the myths.</li> </ul>	- <u>Astronomy Unit, cont'd.</u>	- - - <u>Astronomy Unit, co</u>
		Starlab	
	-		
-	-	Astronomy manual	
_	-		
-	<u>Astronomy Unit, cont'd.</u>	www.wingedsandals.com	Astronomy     manual page
Astronomy Unit, cont'd.,			(F)
<u>cont u.</u>	Greek Constellations		
Part 2-Starlab	Circumpolar		
The students will be able to: 1. Recognize and locate various constellations in the night sky.	<ul> <li>Introduce the concepts of circumpolar, zenith, horizon, reference point, constellation and asterism.</li> <li>Identify the circumpolar constellations.</li> <li>Relate the position of the</li> </ul>	Starlab Astronomy manual	
2. Recognize major stars and asterisms within the constellations.	<ul> <li>Big Dipper to the seasons.</li> <li>Read and discuss myths related to these constellations—pages 30-25</li> </ul>	www.wingedsandals.com	
5. Identify the correlation between	• Visit the Starlab and locate	-	• Fall Sky
the constellations	constellations associated		Crossword pu
and the seasons.	with the myths.	-	page 43 (S)
understanding of the	Fall Sky	-	
relationship between	• Identify Deserve as the	Astronomy Unit, cont'd.	
various cultures and the myths connected	• Identity regasts as the reference point of the fall		

to the constellations. 5. Identify the significance of nature in cultures and constellations. -	<ul> <li>sky.</li> <li>Identify the constellations, their major stars and their asterisms on a star map.</li> <li>Read and discuss myths related to these constellations-Astronomy manual pages 36-43.</li> <li>Visit the Starlab and locate constellations associated with myths.</li> </ul>	Starlab Astronomy manual	– - <u>Astronomy Unit, co</u>
-	-	www.wingedsandals.com	<ul> <li>Class discussi (F)</li> <li>Winter Sky Crossword pu page 51 (S)</li> </ul>
		Starlab	
- <u>Astronomy Unit, cont'd.</u>	- <u>Astronomy Unit, cont'd.</u>	Astronomy manual	
Part 2-Starlab		www.wingedsandals.com	<ul> <li>Class discussi (F)</li> <li>Spring Sky Crossword pu page 57 (S)</li> </ul>
	Winter Sky	-	
The students will be able to:	• Identify Orion's belt as the	-	
1. Recognize and locate various constellations in the night sky.	<ul> <li>reference point</li> <li>Identify the constellations, their major stars and their asterisms on a star map</li> </ul>	- <u>Astronomy Unit, cont'd.</u>	
<ol> <li>Recognize major stars and asterisms within the constellations.</li> <li>Identify the correlation between the constellations and the seasons.</li> <li>Develop an understanding of the</li> </ol>	<ul> <li>Read and discuss myths related to these constellations –astronomy manual pages 44-51</li> <li>Visit the Starlab and locate constellations associated with myths</li> </ul>	Starlab	- - - <u>Astronomy Unit, co</u>

relationship between	Spring Sky	Astronomy manual	
various cultures and the myths connected to the constellations. 5. Identify the significance of nature in cultures and constellations.	<ul> <li>Identify the Big Dipper as the reference point of the spring sky.</li> <li>Identify the constellations, their major stars and their asterisms on a star map.</li> <li>Read and discuss myths related to these constellations –astronomy manual pages 52-57.</li> <li>Visit the Starlab and locate constellations associated with myths.</li> </ul>	www.wingedsandals.com Astronomy Manual	<ul> <li>Class discussi (F)</li> <li>Summer Sky Crossword pu page 65 (S)</li> </ul>
-	- - -	Astronomy Manual	• Written myth picture F/S)
<u>Astronomy Unit, cont'd.</u>	- <u>Astronomy Unit, cont'd.</u>	-	• Stars crosswo pages 66-67 (
Part 2-Starlab		- - <u>Astronomy Unit, cont'd.</u>	• Constellation crossword pa 68-69 (F)
The students will be able to:	Summer Sky		
<ol> <li>Recognize and locate various constellations in the night sky.</li> <li>Recognize major stars and asterisms within the</li> </ol>	<ul> <li>Identify the summer triangle as the reference point of the summer sky.</li> <li>Identify the constellations, their major stars and their asterisms on a star map.</li> <li>Read and discuss myths</li> </ul>		<ul> <li>Greek Constellation:</li> <li>Test (S)</li> <li>-</li> <li>-</li> </ul>
<ul> <li>constellations.</li> <li>3. Identify the correlation between the constellations and the seasons.</li> <li>4. Develop an understanding of the relationship between various cultures and</li> </ul>	<ul> <li>related to these constellations –astronomy manual pages 58-65.</li> <li>Visit the Starlab and locate constellations associated with myths.</li> </ul>	Starlab Astronomy Manual	<u>Astronomy Unit, co</u>

the myths connected to the constellations. 5. Identify the significance of nature in cultures and constellations. - - - <u>-</u> Astronomy Unit, cont'd.	Enrichment <ul> <li>Student will create an original constellation and write a myth.</li> </ul> Greek Review & Test <ul> <li>Play games to review for test.</li> <li>Reread all stories and summarize to prepare for test.</li> <li>Complete 'Stars' crossword puzzle</li> <li>Complete 'Constellation' crossword puzzle</li> <li>Take Greek Constellations test</li> </ul> - <ul> <li>-</li> <li>Astronomy Unit, cont'd.</li> </ul>	- - - <b>Astronomy Unit, cont'd.</b> Astronomy Manual	<ul> <li>Class discussi (F)</li> <li>Chinese Constellation (S)</li> <li>Chinese crossword pa; 93A (S/F)</li> </ul>
Part 2-Starlab		Unitedstreaming.com	- <u>Astronomy Unit, co</u>
The students will be able to:			
<ol> <li>Recognize and locate various constellations in the night sky.</li> <li>Recognize major stars and asterisms within the constellations.</li> <li>Identify the correlation between the constellations and the seasons.</li> <li>Develop an</li> </ol>	<ul> <li>Chinese Constellations</li> <li>Brief introduction to Chinese Culture.</li> <li>Read and discuss myths related to these constellations—Astronomy manual pages 70-93.</li> <li>Visit the Starlab and locate constellations</li> <li>associated with the myths.</li> </ul>		<ul> <li>"Our Sun" (F</li> <li>"Sunny Facts</li> <li>"Learning Ab the Moon" pa 101-102 (F)</li> <li>Astronomy Manual page 104 (F)</li> <li>"The Planets"</li> </ul>

understanding of the relationship between various cultures and the myths connected to the constellations. 5. Identify the significance of nature in cultures and constellations.	• Discuss the important role nature plays in the daily life of the Chinese people.	- <u>Motion and Design</u> Teacher's Manual: STC Motion & Design	<ul> <li>Astronomy Manual pages 132-134 (S/F)</li> <li>Astronomy Manual page (S)</li> <li>"True or False (S)</li> </ul>
- - - <u>Astronomy Unit, cont'd.</u>	- - Astronomy Unit sont'd		- - <u>Motion and Design</u>
<ul> <li>Part 3-The Solar System</li> <li>The students will be able to: <ol> <li>Describe the Earth <ul> <li>as one of several <ul> <li>planets that orbit the <ul> <li>sun.</li> </ul> </li> <li>Identify the moon as <ul> <li>a satellite of the <ul> <li>Earth.</li> <li>Compare and</li> </ul> </li> </ul></li></ul></li></ul></li></ol></li></ul>	<ul> <li>Astronomy Unit, cont'd.</li> <li>The Sun, Moon &amp; Planets</li> <li>Read and discuss "Our Sun" and "Sunny Facts"</li> <li>Talk about the Moon and explain how to Moon is Earth's satellite. Read and discuss page 98-102.</li> <li>Introduce both a lunar and a solar eclipse. Read and discuss pages 103-104.</li> <li>Show Unitedstreaming</li> </ul>	- - <u>Motion and Design,</u> <u>cont'd</u> -	<ul> <li>Student respo during brainstorming sessions (F)</li> <li>Teacher observation o vehicle design</li> <li>Responses in notebook (F)</li> </ul>
<ol> <li>Compare and contrast between a solar eclipse and a lunar eclipse.</li> <li>Demonstrate knowledge of phases of the moon by drawing them.</li> <li>Identify the planets in our solar system and their location in relation to the sun and each other.</li> </ol>	<ul> <li>Show Unitedstreaming videoà <u>A Closer Look at</u> the Moon: Space Science Series.</li> <li>Talk about the phases of the Moon-use pages 105-107.</li> <li>Show Unitedstreaming videoà <u>Junior Space</u> Scientist: Voyage to the Moon.</li> <li>Take time to do a brief review of the planets in general.</li> </ul>	- - - -	• Students'

Motion and Design	<ul> <li>Show Unitedstreaming videoà <u>A Closer Look at</u> the Planets: Space <u>Science Series</u>.</li> <li>Take time to discuss each planet individually. Complete pages that correspond with each planet. (Astronomy manual pages 111-123).</li> <li>Complete workbook activities when time allows.</li> </ul>	- - <u>Motion and Design,</u> <u>cont'd.</u>	<ul> <li>drawings of vehicle fromI graph paper (.</li> <li>Students' responses to reading select (F)</li> </ul>
<ul> <li>The students will beable to:</li> <li>1. Set up their science notebooks.</li> <li>2. Record and share their ideas and questions about Motion and Design, cont'd.</li> <li>3. Design and build a vehicle to meet certain requirements.</li> </ul>	<ul> <li>Motion and Design</li> <li>Lesson 1: TE 3-14</li> <li>Brainstorm "What We Know about the Motion and Design, cont'd. of Vehicles" in science notebooks.</li> <li>Share responses.</li> <li>Brainstorm "What We Want to Find Out about Motion &amp; Design."</li> <li>Share responses.</li> <li>Teams explore building pieces.</li> <li>Teams build vehicle to meet design challenge.</li> <li>Students record responses to questions about vehicle designs.</li> </ul>	- - - <u>Motion and Design,</u> <u>cont'd.</u>	- Motion and Design, cont'd. • Responses to Record Shee A: Recording How Our Ve Moves (F) • Teacher Observation (
1. Make a record of the vehicles built in L1.	-		Motion and Design,

2. Build a vehicle by	Motion and Design, cont'd.		<u>cont'd.</u>
following a			
technical drawing.			
3. Identify important			
details in technical			
drawings.	Losson 2, TE 15 23		
4. Compare their own	Lesson 2. TE 13-25		
drawings with a	• Students draw their group's		
technical drawing.	vehicle from L1 on graph		
5. Read to learn about	paper.		
the challenges of	Disassemble vehicles from		
technological	L1		<ul> <li>Responses to</li> </ul>
design.	<ul> <li>Discuss drawings as</li> </ul>		Record Shee
	bluenrints		A: Graphing
	Build a vehicle from a		Data (F)
	blueprint		
	Compare completed		
	vehicles and discuss	-	T 1
	Compare student drawing		• Teacher
_	with technical drawing	-	Observation (
	Read "The Race That	_	
Motion and Design,	Wasn't Run" with partners.		
<u>cont'd.</u>	Make connections to	Motion and Design,	
	Bobby in science notebook.	<u>cont'd.</u>	
1. Set up a system to	_		
pull vehicle.			
2. Compare and	-		
discuss how motion	Motion and Design cont'd		
of vehicle changes	Motion and Design, cont d.		
with more or less			
weight.	-		
3. Record observations			
in writing.	Γ		_
4. Draw conclusions	Lesson 3: TE 25-33		
about the effect of			Motion and Design,
differing weight on	• Introduce instructions for		<u>cont'a.</u>
the motion of	setting up a falling-weight		
vehicles.	system.		
	Students complete		
	investigation with falling-		
	weight system.		
	• Record findings on <b>Record</b>		
	Sheet 3-A.		
	• Share findings.		
			• Teacher
	1	1	

-		-	Observation ( • Responses to questions (F) • Drawing of vehicle (F)
<ul> <li>Motion and Design, cont'd.</li> <li>1. Investigate the effects of a load on the motion of a vehicle.</li> <li>2. Measure the time it takes for a loaded</li> </ul>	- - <u>Motion and Design, cont'd.</u>	- <u>Motion and Design,</u> <u>cont'd.</u>	<ul> <li>Teacher Observation (</li> <li>Responses to Record Shee A: Evaluatin Our Vehicle Design for Rubber Band Energy (F)</li> </ul>
vehicle to move a given distance. 3. Graph results.	<ul> <li>Lesson 4: TE 35-45</li> <li>Students predict how adding blocks will change how vehicle moves in notebook.</li> <li>Discuss predictions.</li> <li>Practice using timers as student volunteer moves across classroom.</li> <li>Brainstorm examples of motion that are measured with time.</li> <li>Introduce instructions for Testing the Motion of Vehicles Carrying a Load</li> <li>Complete the investigation for testing the motion of vehicles carrying a load</li> <li>Record findings on Record Sheet 4-A</li> <li>Respond to Final Activities questions in notebook</li> <li>Discuss results of</li> </ul>	- <u>Motion and Design,</u> <u>cont'd.</u>	Motion and Design, cont'd • Teacher Observation ( • Response to questions in notebook (F)

1. Design vehicles and systems to pull vehicles to meet time requirements.       Motion and Design, cont'd.       • Teacher Observation (         2. Apply previously collected data to dearn about a specialized vehicle: The Lumar Rover.       Motion and Design, cont'd.       • Teacher Observation (         1. Move vehicles using rubber band energy.       • Students write in notebooks, what caused vehicles to move slowly and fast (L3 & L4)       • Students ornylet design challenge.       • Teacher Observation (         2. Evaluate the design of the standard vehicle for rubber band energy.       • Students complete design challenge.       • Students complete design challenge.       • Teacher Observation (         9. Evaluate the design of the standard vehicle for rubber band energy.       • Students complete design challenge.       • Students complete design challenge.       • Teacher Observation (         9. Draw vehicle on graph paper.       • Read The Lunar Rover: Making Tracks on the Moon in pairs.       • Motion and Design, cont'd.       • Teacher Observation (         Motion and Design, cont'd.       • Students conplete design of the vehicle.       • Discuss and demonstrate.       • Teacher Observation (         0. Braw replore how rubber bands enfort       • Discuss observations.       • Teacher Observation (         0. Braw replore how rubber bands enfort       • Discuss observations.       • Teacher Observation (         0. Braw replore how rubber bands enfort       • Discuss observations.       • Teacher Observation (	cont'd.	investigation and graphs.		Motion and Design,
Lesson 5: TE 47-54• Students write in notebooks, what caused vehicles to move slowly and fast (L3 & L4)• Share responses. • Students complete design of the standard vehicle for rubber band energy.• Evaluate the design of the standard vehicle for rubber band energy.• Respond to Final Activities questions in notebook. • Draw vehicle on graph paper. • Read The Lunar Rover: Making Tracks on the Moon in pairs.• Motion and Design, cont'd.• Motion and Design, cont'd.• Motion and Design, cont'd.• Motion and Design, cont'd.	<ol> <li>Design vehicles and systems to pull vehicles to meet time requirements.</li> <li>Apply previously collected data to design systems.</li> <li>Read to learn about a specialized vehicle: The Lunar Rover.</li> </ol>	- - - <u>Motion and Design, cont'd.</u> -		<ul> <li>Teacher Observation (</li> <li>Responses to Record Shee A: Evaluatin Vehicle Desiş for Friction (</li> </ul>
- Lesson 6: TE 57-62 - Students explore how rubber bands effect movement of the vehicle. - Discuss and demonstrate. - Carry out investigation. - Use Record Sheet 6-A. - Discuss observations. - Teacher Observation (	<ol> <li>Move vehicles using rubber band energy.</li> <li>Evaluate the design of the standard vehicle for rubber band energy.</li> </ol>	<ul> <li>Lesson 5: TE 47-54</li> <li>Students write in notebooks, what caused vehicles to move slowly and fast (L3 &amp; L4)</li> <li>Share responses.</li> <li>Students complete design challenge.</li> <li>Respond to Final Activities questions in notebook.</li> <li>Draw vehicle on graph paper.</li> <li>Read The Lunar Rover: Making Tracks on the Moon in pairs.</li> </ul>	- <u>Motion and Design,</u> <u>cont'd.</u>	<ul> <li>Teacher Observation (</li> <li>Responses to Final Activit questions (F)</li> <li>Student Self- Assessment 4</li> </ul>
	- - <u>Motion and Design,</u> <u>cont'd.</u>	<ul> <li>Lesson 6: TE 57-62</li> <li>Students explore how rubber bands effect movement of the vehicle.</li> <li>Discuss and demonstrate.</li> <li>Carry out investigation.</li> <li>Use Record Sheet 6-A.</li> <li>Discuss observations.</li> </ul>	<u>Motion and Design, cont'd.</u>	- <u>Motion and Design,</u> <u>cont'd.</u> • Teacher Observation (
1. Predict and investigate how	1. Predict and investigate how	-		

<ul> <li>variations in rubber band energy affect the distance vehicles travel.</li> <li>Record results of investigation.</li> <li>Identify patterns in group investigations.</li> </ul>	<ul> <li>Motion and Design, cont'd.</li> <li>Motion and Design, cont'd.</li> <li>Lesson 7: TE 65-71 <ul> <li>Write predictions in notebook of how the number of turns of the rubber band will affect the distance traveled.</li> <li>Discuss predictions.</li> <li>Introduce instructions for Collecting Data on Rubber Band Energy.</li> <li>Teams conduct investigation.</li> <li>Compare paper strip distance results from each team.</li> <li>Respond to Final Activities questions in notebook.</li> <li>Discuss responses</li> </ul> </li> </ul>	<u>Motion and Design,</u> <u>cont'd.</u>	Motion and Design, cont'd. • Teacher Observation ( • Response to I Activities question in notebook (F)
<ol> <li>Brainstorm what students know and want to know about friction.</li> <li>Evaluate specific design features that reduce or increase friction on vehicles.</li> </ol>	- - <u>Motion and Design, cont'd.</u>		<u>Motion and Design, cont'd.</u>
<ol> <li>Brainstorm how a sail might affect the</li> </ol>	<ul> <li>Lesson 8: TE 73-79</li> <li>Investigate how wheel on vehicle spins.</li> <li>Brainstorm what they know about friction and what questions they would like answered.</li> <li>Discuss friction.</li> <li>Complete observation</li> </ul>		<ul> <li>Teacher Observation (</li> <li>Responses to Record Shee A: What Happens If</li> </ul>

ľ				
	<ul> <li>motion of the vehicle.</li> <li>2. Adapt vehicles to hold a sail.</li> <li>3. Identify the influence of a sail on the vehicle's motion.</li> <li>4. Demonstrate understanding by completing self-assessment.</li> </ul>	<ul> <li>cards.</li> <li>Complete Record Sheet 8-A.</li> <li>Share observations of vehicle design features.</li> <li>Respond to Final Activities questions in notebook.</li> <li>Discuss responses.</li> </ul>	- - <u>Motion and Design,</u> <u>cont'd.</u>	• Responses to Record Shee A: Evaluatin the Cost of C Design (F)
	<ul> <li>Motion and Design, cont'd.</li> <li>1. Test how air resistance influences motion.</li> <li>2. Make connection between observations and real-world objects.</li> <li>3. Understand the effect of air resistance.</li> </ul>	<ul> <li>Lesson 9: TE 81-88</li> <li>Refer back to brainstorming list from L5 adding new ideas.</li> <li>Hypothesize influences sail might have if added to vehicle.</li> <li>Students sketch vehicle with sail.</li> <li>Teams build designed vehicles.</li> <li>Complete Final Activities questions in notebook.</li> <li>Discuss responses.</li> <li>Complete Self-Assessment A.</li> </ul>		Motion and Design, cont'd. • Responses to Record Shee A: Planning Final Design Challenge (I • List in notebc activities to d home or scho that relate to
, , , , , , , , , , , , , , , , , , , ,	<u>Motion and Design,</u> <u>cont'd.</u> -	<ul> <li>Hypothesize the effect of the sail on the motion of the vehicle.</li> <li>Introduce instructions for Testing Air Resistance.</li> <li>Teams conduct investigations.</li> <li>Discuss results.</li> <li>Read "Shirley Muldowney-Drag Racer".</li> <li>In notebooks, record ideas about the effect of the</li> </ul>		engineering a technological design. (F)

1. Brainstorm what is	shape of Shirley's vehicle		
known about	on its motion.		
propeller-driven			Motion and Design,
vehicles.			<u>cont'd.</u>
2. Identify design			
teatures needed for	-		
propeller-driven			
2 Duild propaller	Ē		
3. Build properties	Motion and Design, cont'd.		
technical drawing			
4 Compare axle-	-		• Teacher
driven vehicle to			observation (J
propeller-driven	-		
vehicle.	Lesson 11: TE 101-107		
	Brainstorm what is known		
	about propeller-driven		
	vehicles.		
	Observe assembled		
	propeller unit.	Motion and Dasign	
	Make hypothesis about	cont'd	
	vehicle design features		
	necessary to move vehicles		
	with a propeller.		Presentation (
	Compare technical drawing		Reflective wr
	of propeller-driven vehicle		activity (S)
	to drawing in L2.		
	• Teams build propeller-		
	driven vehicle.		
Motion and Design	<ul> <li>Record in notebook</li> </ul>		
cont'd	observations of vehicles'		
	motion.		
	• Teams present completed		
	vehicles to class.		
	• Respond to <b>Final</b>		Motion and Design
	Activities questions in		cont'd.
1. Analyze the features	notebook.		
ot propeller-driven	Discuss comparison of		
vehicles.	axle-driven vehicle to		
2. Compare features of	propeller-driven vehicle.		• Evaluate
propeller-driven	Modify brainstorming list.		notebook
venicies to leatures			responses from
vehicles			entire unit (S)
3 Pronose design			Design challe
changes for		Animal Studies	(S)
proneller-driven	Motion and Design, cont'd.		Student Self-
vehicles that will			Assessment E
not affect			

performance.			
<ol> <li>Determine the cost of their propeller- driven vehicles.</li> <li>Modify vehicles to reduce cost.</li> <li>Evaluate the strength and performance of their modified vehicles.</li> </ol>	<ul> <li>Lesson 12: TE 109-115</li> <li>Teams use Record Sheet 12-A to evaluate design features of propeller-driven vehicles.</li> <li>Teams complete investigation.</li> <li>Share responses.</li> <li>Discuss comparison of axle-driven vehicle to propeller-driven vehicle to from L11.</li> <li>Modify brainstorming list from L11.</li> </ul>	Teacher's Manual: STC Animal Studies, cont'd.	<u>Animal Studies</u>
<u>Motion and Design, cont'd.</u>	<ul> <li>Lesson 13: TE 117-122</li> <li>Discuss cost factor in designing and building a product.</li> <li>Model use of Record Sheet 13-A.</li> <li>Teams complete activity using Record Sheet 13-A.</li> <li>Brainstorm changes to reduce cost of vehicles.</li> <li>Teams redesign and modify</li> </ul>	<u>Animal Studies, cont'd.</u>	<ul> <li>Student respo during brainstorming sessions (F)</li> <li>Responses in notebook (F)</li> <li>Responses to Record Shee A: Studying Animals</li> </ul>
<ol> <li>Record and collect solutions to a challenge.</li> <li>Present plans to class.</li> <li>Understand about engineering as a career.</li> </ol>	<ul> <li>vehicles to reduce cost.</li> <li>Teams determine cost of modified vehicles.</li> <li>Share responses with class</li> </ul>		Animal Studies, con • Notes about organism surv (F)
	<u>Motion and Design, cont'd.</u> <u>Lesson 14: TE 125-136</u>	<u>Animal Studies, cont'd.</u>	(1')

- - - Motion and Design, cont'd. 1. Implement plans from L15 by building, testing and evaluating vehicles and the systems for moving them. 2. Determine cost of designs.	<ul> <li>Review the brainstorming list from L1 and make changes.</li> <li>Review responsibilities of team roles.</li> <li>Teacher hands out design challenge cards and students independently sketch ideas.</li> <li>Teams use design challenge card and Record Sheet 14-A to complete challenge together using their individual ideas.</li> <li>Each team presents the solution to the class.</li> <li>Teams modify plans and sketches as needed.</li> <li>Read "Making the Switch from Kids' Stuff to Engineering."</li> <li>List in notebook activities to do at home or school that relate to engineering and technological design.</li> </ul>	Animal Studios cont'd	<ul> <li>Notebook responses (F)</li> <li>Teacher observation (1)</li> </ul>
<ol> <li>Present solutions to a design challenge.</li> <li>Evaluate each team's solution for meeting the design requirements.</li> <li>Apply knowledge of technological design to the real world.</li> <li>Make a final record of design.</li> </ol>	<ul> <li>Motion and Design, cont'd.</li> <li>Motion and Design, cont'd.</li> <li>Lesson 15 TE 139-143 <ul> <li>Teams refer back to their plan from L14 and decide what materials they need to build and test their vehicles.</li> <li>Teams build and test vehicles based on plans.</li> <li>Complete Record Sheet 13-A.</li> </ul> </li> </ul>	<u>Animal Studies, cont'd.</u>	<u>Animal Studies, con</u>

cont'd.			
1. Demonstrate understanding of concepts learned in Motion and Design, cont'd. Unit.	<ul> <li>Lesson 16 TE 145-150</li> <li>Teams present their solutions to the challenge</li> <li>Have students discuss each team presentation</li> <li>Students make a final record of their vehicle on graph paper</li> <li>Students complete reflective writing activities in notebooks</li> <li>Have students share ideas</li> </ul>		<ul> <li>Record Shee A: Observinţ Frog (F)</li> <li>Record Shee B: Drawing 1 Frog (F)</li> <li>Teacher Observation (</li> </ul>
	Motion and Design, cont'd.	- - <u>-</u> <u>Animal Studies, cont'd</u>	<ul> <li>Notebook responses (F)</li> <li>Teacher observation (I)</li> <li>Student respo to reading (F)</li> </ul>
Animal Studies	Lesson 17 1E 153-158		
<ul> <li>The students will beable to:</li> <li>1. Discuss ways scientists learn about animals.</li> <li>2. Brainstorm what they know about frogs, crabs and millipedes.</li> <li>3. Compare and contrast frogs, crabs and millipedes.</li> <li>4. Record what they know about animal survival.</li> </ul>	<ul> <li>Brainstorm in notebooks a list of concepts students now know about designing vehicles and how vehicles move</li> <li>Make chart of student ideas</li> <li>Compare to brainstormed list from L1.</li> <li>Teams work together to complete the final design challenge.</li> <li>Teams test their final vehicle.</li> <li>Teams will share final design with class.</li> <li>Complete Student Self-Assessment B</li> </ul>		• Teacher

- Animal Studies, cont'd.	<u>Animal Studies</u>	- <u>Animal Studies, cont'd.</u>	Observation ( • Responses to Record Shee A: Observing Frogs (F) • Record Shee A: Observing Crab (F)
<ol> <li>Describe living and non-living elements of the school environment.</li> <li>Learn about the natural habitats of the 3 organisms.</li> <li>Apply information from readings to list elements necessary for each organism's classroom habitat.</li> <li>Compare 3 habitats</li> </ol>	<ul> <li>Lesson 1: TE 3-9</li> <li>In notebooks students write what they know about frogs, crabs and millipedes.</li> <li>Students share responses and teacher records class data</li> <li>As a class, compare frogs, crabs and millipedes.</li> <li>Respond to Final Activities questions in notebook.</li> <li>Complete Record Sheet 1-A</li> </ul>		<ul> <li>Record Shee B: Drawing ( Crab (F)</li> <li>My Habitat s (F)</li> </ul>
to identify each organism's basic and special survival needs.		- <u>Animal Studies, cont'd.</u>	<ul> <li>Teacher Observation (</li> <li>Student Self- Assessment</li> </ul>
<u>Animal Studies, cont'd.</u>	<ul> <li>Animal Studies, cont'd.</li> <li>Lesson 2: TE 11-19 <ul> <li>Students spend several minutes observing living and non-living parts of the classroom.</li> <li>Create web chart entitled 'School'</li> <li>Students share observations and help group on the web chart</li> <li>Refer back to Record</li> </ul> </li> </ul>		
non-living elements	Sheet 1-A to brainstorm		

necessary to frog	ideas about what is needed		Animal Studies, con
habitat.	to bring animals into the		
2. Create a habitat for	classroom.		
frog and record	• Groups learn about one of		
elements in it.	the three organisms and		
3. Discuss frog care	record in notebook how the		
and feeding	class could meet its		
schedules.	survival needs. (Animal		
4. Observe frogs and	Background 2-A, 2-B, 2-		
record questions	( C)		Teacher
about them.	Have groups share ideas for	ſ	Observation (
5. Create an animal log	how to meet needs of	-	Notebook
checklist.	organism to survive in the		responses (F)
	classroom.	-	
		Animal Studies cont'd	
	ŀ	Timinai Studies, cont u.	
	Γ		
	L		
	Animal Studies, cont'd.		
	ŀ		
Animal Studies, cont'd.	F		
	L		
	Lesson 3: TE 21-35		
	• Using information from		
	L2 review important		
	elements of a frog's home.		
	• Students decide what		
1 Discuss the sum area	materials are needed for		-
1. Discuss the purpose	frog habitats based on		Animal Studies, con
drawings and	proposals.		
elements that should	Groups make frog habitat		
be included.	and introduce frog	<u> </u>	
2. Observe, describe	• Teach students how to feed		
and record	the frogs	Γ	
characteristics of a	Respond in notebook to	-	
frog.	questions about		Teacher
_	observations of feeding the	Animai Studies, cont'd.	Observation (
	frogs.		Record Shee
	• With class create a Venn		<b>A</b> (F)
	circle for living and no-		Record Shee
	living elements of the frog.		<b>B</b> (F)
	• Discuss frog schedule with		
Animal Studies, cont'd.	the class		
	Students write down		

<ol> <li>Create 'Habitat Information Table'</li> <li>Identify necessary elements of a habitat for crabs.</li> <li>Create a habitat for crabs</li> <li>Record living and non-living elements necessary to crab habitat.</li> <li>Observe crabs and record questions.</li> <li>Learn about real life research on animal behavior and the value of long term observation and record keeping.</li> </ol>	<ul> <li>questions they have about frogs.</li> <li>Students set up notebooks to record observations.</li> <li>Students observe frogs and record observations</li> </ul> <b>Animal Studies, cont'd. Lesson 4: TE 37-47</b> <ul> <li>Brainstorm ideas about characteristics of the frog to focus on when observing</li> <li>Complete <b>Record Sheet 4-</b> A</li> <li>Complete <b>Record Sheet 4-</b> B</li> <li>Students discuss observations within groups and add new questions to the class list</li> <li>Students share observations and drawings</li> </ul>	- - Animal Studies, cont'd.	Animal Studies, con  Teacher Observation ( Responses to Record Shee A: Our Investigation
1. Observe, describe	- <u>Animal Studies, cont'd.</u> -		- - <u>Animal Studies, con</u>
<ul> <li>and record characteristics of a crab in words and drawings.</li> <li>2. Analyze student habitats.</li> </ul>	<ul> <li>Lesson 5: TE 49-62</li> <li>Complete 'Habitat Information Table' for basic frog needs.</li> <li>Using information from L2, review important elements of a crab's home.</li> <li>Students decide what materials are needed for</li> </ul>	-	<ul> <li>Responses to Record Shee A: My Schoo Habitat (F)</li> <li>Responses to</li> </ul>

<ol> <li>Observe and record the crabs' and frogs' behavior.</li> <li>Identify questions they can now answer.</li> <li>Use a self- assessment to reflect on learning.</li> </ol>	<ul> <li>crab habitats based on proposals.</li> <li>Groups make crab habitat and introduce crab</li> <li>Teach students how to feed the crabs</li> <li>Respond in notebook to questions about observations of feeding the crabs.</li> <li>With class create a Venn circle for living and noliving elements of the crab.</li> <li>Discuss crab schedule with the class</li> <li>Students write down questions they have about crabs.</li> <li>Students set up notebooks to record observations.</li> <li>Record what they know about people who study dolphins and read "Diving into Dolphin Behavior."</li> <li>Have students record 2 or 3 things they discovered about people who study dolphins.</li> <li>Share discoveries from reading.</li> </ul>	- Animal Studies, cont'd.	<ul> <li>Record Shee B: Observing Humans (F)</li> <li>Notebook responses (F)</li> <li>Animal Studies, con</li> <li>Responses to Record Shee A: Animal Behavior Research (F)</li> <li>Teacher observation (I)</li> </ul>
	<u>Lesson 6: TE 65-73</u>		
- <u>Animal Studies, cont'd.</u>	<ul> <li>Revise Record Sheet 4-A based on observations of crabs</li> <li>Complete Record Sheet 6-A</li> <li>Complete Record Sheet 6-B</li> <li>Students discuss observations within groups and add new questions to</li> </ul>		

r	1	
1. Add information about crabs to the 'Habitat Information	<ul> <li>the class list.</li> <li>Students share observations and drawings.</li> <li>Distribute the My Habitat sheet for children to work on at home</li> </ul>	- - <u>Animal Studies, con</u>
<ol> <li>Identify necessary elements of a habitat for millipedes.</li> <li>Create a habitat for millipedes.</li> <li>Record living and non-living elements necessary to millipede habitat.</li> <li>Observe millipedes and record questions.</li> </ol>	- - <u>Animal Studies, cont'd.</u> -	<ul> <li>Teacher observation (I</li> <li>Responses to Record Shee A: Humans- Structures an Behaviors (F</li> </ul>
- - <u>Animal Studies, cont'd.</u>	<ul> <li>Lesson 7: TE 75-85</li> <li>Continue observing organisms and work on animal logs.</li> <li>Revise Record Sheet 4-A.</li> <li>Revise Record Sheet 6-A.</li> <li>Share information about each animal from the logs and record sheets.</li> <li>Compare how the behaviors of the two animals and alike and different.</li> <li>Make additions to the class Frogs and Crabs lists.</li> <li>Complete Student Self- Assessment</li> </ul>	<ul> <li>Teacher observation (]</li> <li>Responses to Record Shee A:Dwarf Afr Frog- Struction</li> </ul>
<ol> <li>Observe, describe and record characteristics of a millipede.</li> <li>Record questions about millipedes.</li> <li>Compare elements</li> </ol>	-	and Behavio 14-B: Fiddle Crab- Struct and Behavio or 14-C: Millipede- Structures a

of the frog, crab and		Behaviors, (I
millipede habitats.		• Responses to
	Animal Studies, cont'd.	Final Activit
		questions (S)
<ol> <li>Identify daily behaviors of the 3 organisms.</li> <li>Identify elements of the organisms' habitats that could change.</li> <li>Outline an experiment to test the animals' responses to a change in one element in their</li> </ol>	<ul> <li>Lesson 8: TE 87-94</li> <li>Complete 'Habitat Information Table' for basic crab needs.</li> <li>Using information from L2, review important elements of a millipede's home.</li> <li>Students decide what materials are needed for a millipede habitat based on proposals.</li> <li>Groups make millipede habitat and introduce millipede</li> <li>Teach students how to feed the millipedes</li> <li>Respond in notebook to questions about observations of feeding the millipedes.</li> <li>With class create a Venn circle for living and non- living elements of the millipede's habitat.</li> <li>Discuss millipede schedula</li> </ul>	<ul> <li>Responses in questions on J TE159(S)</li> <li>Responses to Final Activit questions rela to reading selection. (S)</li> </ul>
<ul> <li>habitats.</li> <li>4. Predict, test, observe and record each animal's response to a change in its habitat.</li> <li>5. Analyze how test results relate to each animal's normal behavior.</li> </ul>	<ul> <li>Discuss initipede schedule with the class</li> <li>Students write down questions they have about millipedes.</li> <li>Students record observations.</li> </ul>	- - - <u>Animal Studies, con</u>
	- <u>Animal Studies, cont'd.</u>	Responses in notebooks to questions abo class findings

- <u>Animal Studies, cont'd.</u>		Responses to     Final Activit     questions (F)
<ol> <li>Identify where and how there basic needs are met in their homes.</li> <li>Decide whether or not their school habitat meets all their basic needs.</li> <li>Observe, describe, and record human characteristics.</li> <li>Brainstorm why they think humans can live in many different environments.</li> </ol>	<ul> <li>Lesson 9: TE 97-104</li> <li>Copy characteristics from Record Sheet 6-A to Record Sheet 9-A.</li> <li>Observe millipedes and complete Record Sheet 9-B.</li> <li>Discuss observations and add any new questions to class list.</li> <li>Share observations and drawings.</li> <li>Combine Venn circles to make a Venn diagram.</li> <li>Add millipede information to the 'Habitat Information Table'</li> </ul>	Animal Studies, con     Evaluate     notebook     responses (S)     Responses to     Record Shee     A: Studying     Animals (S).
	- <u>Animal Studies, cont'd.</u> -	
- - <u>Animal Studies, cont'd.</u>	<ul> <li>Lesson 10: TE 107-112</li> <li>Share observations of animal's daily behavior from animal logs.</li> <li>Focus on the habitat elements in the intersection of the Venn diagram.</li> <li>Identify which of these habitat elements could abange and discuss how</li> </ul>	
1. Identify a specific animal behavior to study in detail.	<ul> <li>each change would affect the organism.</li> <li>Complete Record Sheet</li> </ul>	

2. Identify potential	10-A	
research questions	• Discussing one animal at a	
that can be	time, each group will share	
answered only	what they predicted and	
through behavioral.	why.	
observation.	• Groups will decide if	
3. Create outline for	responses fit with their	
research.	observations of animal's	
4. Research a	behavior under normal	
particular animal's	habitat conditions.	
specific behavior.		
	-	
	-	
	Animal Studies cont'd	
	ſ	
	_	
	1 11 75 115 133	
	Lesson 11: 1E 115-133	
-	• Students share their home	
	habitat studies and	
Ē	descriptions of their daily	
Animal Studies, cont'd.	behaviors.	
	• Focusing on the "school"	
	web, have students identify	
	the living and nonliving	
	elements of their school	
	habitat. Add to the web.	
	• Teams complete <b>Record</b>	
1. Identify specific	Sheet 11-A to indicate	
characteristics of	ways the school provides	
humans that enable	for their needs.	
them to survive in a	<ul> <li>Discuss results. Have</li> </ul>	
variety of habitats.	students decide if they	
2. Identify human	think that the habitats of	
structures and	the frog, crab, and	
behaviors and how	millipede are complete.	
these relate to living	• Students complete <b>Record</b>	
in a variety of	Sheet II-B and write notes	
1 1aoilais.	in their animal logsas they	
5. Conduct research on	observe numans.	
behavior	• Students share	
	observations.	
	• Students respond to	
	questions about why	
	students can live in	

Animal Studies, cont'd.	different places in their notebooks. • Add humans to the "Habitat Information Table"	
<ol> <li>Identify structures and behaviors that enable animals to survive in the habitats.</li> <li>Learn facts about frogs, crabs, and millipedes that are not easily observed in the classroom.</li> <li>Record the ways certain structures and behaviors help animals survive in the habitats.</li> </ol>	<ul> <li>Animal Studies, cont'd.</li> <li>Lesson 12: TE 123-133</li> <li>Discuss the study of dolphin behavior at the DolphinResearchCenter.</li> <li>Brainstorm with class behaviors that could be researched further through behavioral observation.</li> <li>Teams work to complete Record Sheet 12-A to choose a behavior and formulate a question.</li> <li>Teams share research questions.</li> <li>Teams work on the planning section of the research.</li> <li>Teams share the log sheets that they designed.</li> <li>Discuss methods that students can use to present their results.</li> <li>Begin research (will be continued as lessons 13- 15 are done over the next 5-10 days).</li> </ul>	

<ol> <li>Identify similarities and differences in animal structures and behaviors.</li> <li>Compare animal structures and behaviors that illustrate differences between life in different habitats.</li> <li>Understand how animals can alter their environments to survive.</li> </ol>	<ul> <li><u>Animal Studies, cont'd.</u></li> <li><u>Lesson 13: TE 135-140</u></li> <li>Class completes Record Sheet 13-A as they focus on specific body structures and behaviors.</li> <li>Students respond to questions about how humans get what they need from their habitat in their</li> </ul>	
	<ul> <li>notebooks.</li> <li>With class discuss the function of one human structure and how it helps humans meet their needs.</li> <li>Teams choose a particular body structure and record how it helps humans meet their needs.</li> <li>Teams share results.</li> <li>Teams complete the "behaviors section of Record Sheet 13-A.</li> </ul>	
<u>Animal Studies, cont'd.</u>		
<ol> <li>Discuss research results.</li> <li>Determine whether another team's findings support their observations.</li> <li>Present results to class.</li> </ol>	Animal Studies, cont'd. Lesson 14: TE 143- 154 • Teams complete Record Sheet 14-A, 14-B, or 14-C as they focus on one animal. • Teams share observations	

<u>Animal Studies, cont'd.</u>	<ul> <li>and drawings.</li> <li>Students read "Did You Discover?"</li> <li>Share connections with class.</li> <li>Respond in notebook to the Final Activities questions.</li> </ul>	
1. Demonstrate understanding of concepts learned in Animal Studies, cont'd.		
	<u>Animal Studies, cont'd.</u>	
	<ul> <li>Lesson 15 TE 157- 163</li> <li>Brainstorm what structures or behaviors reveal differences in animals and their ways of life.</li> <li>With class complete "Comparing Animals" table.</li> <li>Each group records information about one structure.</li> <li>Groups share response.</li> <li>Students respond in notebook to questions on page TE159.</li> <li>Read "What Makes Beavers Special?".</li> <li>In notebook, respond to Final Activities questions related to reading selection.</li> </ul>	

## Animal Studies, cont'd.

### 16 TE 165 169 Ь

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	<ul> <li>Teams share results of research with other teams who researched same animal.</li> <li>Students respond in notebooks to questions about class findings.</li> <li>Teams share results of research with class.</li> <li>Discuss why some research questions could not be answered completely.</li> <li>Compare research methods used in class with those used by scientists at the DolphinResearchCenter in notebooks (Final Activities questions).</li> </ul>
<u>-</u>	<u>Animal Studies, cont'd.</u> Lesson 17 TE 169-171

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	<ul> <li>Brainstorm with class what students now know about animals compared to what they wanted to know in the beginning of the unit.</li> <li>Students decide if facts from original lists about each animal are true or not and edit.</li> <li>Have students respond to questions on TE170 in their notebooks.</li> <li>Students complete Record Sheet 1-A.</li> </ul>	
	Sheet 1-A.	

### **Other Details**

### SCED

### 53234 Science (Grade 4)

Science (Grade 4) courses typically explore complex systems, such as plant and animal adaptation, forces and motion, and physical and chemical changes in matter, or content consistent with state academic standards. Students may identify causes and effects of change, make predictions, and gather data from multiple sources.