Timeline ->	*Quarter Two (12 lessons)*
Guiding Questions	***Science:*** What are the steps of the scientific method? How is electricity created? Magnetism? How can we draw electrical circuits using symbols? (schematics) What are the main differences between series and parallel circuits? How do switches affect circuits? How are electricity and magnetism related? What variables affect the strength of an electromagnet? ***Language Arts:*** What can we learn about the characteristics of electricity, magnetism and other forces by reading? How can we use a variety of reading strategies to understand science vocabulary? How can we write to show the steps we have used in the scientific method? How can we use adjectives to help our written science descriptions and formative assessments? ***Math:*** How can we determine which tool to measure specific items with and use it correctly? How does a table help organize and provide data? What conclusions can we draw from the data collected? What patterns can we see? ***Social Studies:*** How can we use information about ancient civilizations to understand how they applied science and technology to solve problems? ***Art:*** How can we draw/illustrate and label sketches for a scientific notebook/portfolio?
General Learner Outcomes	***GLO#1: Self-Directed Learner:*** Students will be able to complete a series of experiments that helps them explore the characteristics of electricity, magnetism and other forces. Students will use the textbook and other resources to complete individual class and homework reading assignments (both science and social studies).

	GLO#2: Community Contributor: Students will work together in groups or pairs to complete experiments. ***GLO#3: Complex Thinker:*** Students will use their problem solving, math and writing skills to investigate the properties of forces. ***GLO#4: Quality Producer:*** Students will create math products (graphs, data tables, charts) that enhance their lab/experiment reports. ***GLO#5: Effective Communicator:*** Students will listen, discuss and record information from their different lessons through oral, written and math pieces that illustrate concepts they have learned about forces. ***GLO#5: Effective and Ethical User of Technology:*** Students will use a variety of scientific equipment and tools to safely collect data from their experiments.
Assessments	Formative = textbook/reading assignments Summative = lab experiment reports completed, Reading Support & Homework worksheets

Standards & Benchmarks

Big Idea(s) / Major Understanding(s): ***Students will understand that...***

Matter and energy transfer through and between organisms and their physical environment.

Electricity and magnetism are closely related because both are caused by negative and positive charges in matter, and when charges from one piece of matter interact with those from another piece, it produces both electric and magnetic forces.

Electricity can produce magnetism, and magnetism can create electricity.

- 6.1.1 **Scientific Inquiry**
  Formulate a testable hypothesis that can be answered through a controlled experiment
- 6.1.2 **Scientific Inquiry**
  Use appropriate tools, equipment, and techniques safely to collect, display, and analyze data
- 6.2.1 **Science, Technology, and Society**
  Explain how technology has an impact on society and science
- 6.2.2 **Science, Technology, and Society**
  Explain how the needs of society have influenced the development and use of technologies
- 6.7.2 **Forces of the Universe**
  Explain that electric currents can produce magnetic effects and that magnets can cause electric currents

Sample Performance Rubrics

Topic	Forces of the Universe
Benchmark SC.6.7.2	Explain that electric currents can produce magnetic effects and that magnets can cause electric currents
Sample Performance Assessment (SPA)	The student: Demonstrates and explains that magnets can produce electric currents and that electric currents produce a magnetic field.

Rubric			
Advanced	**Proficient**	**Partially Proficient**	**Novice**
Explain, and provide real world applications, that electric currents can produce magnetic effects and that magnets can cause electric currents	Explain that electric currents can produce magnetic effects, and that magnets can cause electric currents	Describe that electric currents can produce magnetic effects, or that magnets can cause electric currents	Recognize electric currents and magnetic effects

Lesson Plan Summary

(yellow highlighted lessons needed for exemplars and unit assessment)

Title	Basic goals of lesson – Students will be able to…
Chapter 15 – (lesson #2-3 ONLY)	
Harcourt Text	Lesson 2 – What is electricity and how is it produced? Lesson Quick Study RS 121-122
AIMS	Static electricity rubber-band booklet Static Strokes - need saran wrap and paper towel, salt, pencil sharpener shavings OR Different Stokes – 6" party balloons, salt, paper holes from hole punch
AIMS	Balance Your Charge Account
AIMS OPTIONAL	St. Elmo's fire (reading) Nature's Light & Sound Show Lightning reading Static electricity extensions
AIMS	Sparky's Light Show Path Finders After students complete the two activities above, then go over the "notes" on bulbs, circuits, batteries
Harcourt Text	Lesson 3 – What is a Circuit? • Possible Bellwork items: Use transparency IS 54 and then use RS54 • "Infer" (circuits) "Compare and Contrast Circuits" • Lesson Quick Study RS 121-122
AIMS	Conductor or Insulator (Ziploc with a variety of items to test)

AIMS **Electric Circuits (review)** Lesson #2 PGS 92-97	Use Key Question and Learning Goals – have students copy into their science notebooks – at the end of the lesson, have students answer the "Connected Learning" questions Review to focus on parallel and series circuits AS WELL AS schematics
AIMS **Make a Switch**	Use Key Question and Learning Goals – have students copy into their science notebooks – at the end of the lesson, have students answer the "Connected Learning" questions
AIMS Short Cuts Lesson #3 PGS 98-103	Use Key Question and Learning Goals – have students copy into their science notebooks – at the end of the lesson, have students answer the "Connected Learning" questions Focus of experiment is on what happens when you add a switch to a circuit
AIMS The Electromagnetic Connection Lesson #4 PGS 108-112 P. 265 (extra pg)	Use Question and Learning Goals – have students copy into their science notebooks – at the end of the lesson, have students answer the "Connected Learning" questions Focus on electricity and magnetism (could go outside with compasses)
AIMS Blade Spinners Lesson #5 PGS 195-199	Use Question and Learning Goals – have students copy into their science notebooks – at the end of the lesson, have students answer the "Connected Learning" questions
AIMS Electromagnets Optional Lesson PGS 123-136	Use Key Question and Learning Goals – have students copy into their science notebooks – at the end of the lesson, have students answer the "Connected Learning" questions
AIMS Galvanometer Optional lesson PGS 113-116 AIMS How to Make an Electric Motor Optional lesson PGS 117-122	

Materials & Supplies

Static Strokes	For each group: plastic wrap (Reynolds or Kirkland), paper towels, small objects (salt, paper clips, small bits of aluminum foil, Styrofoam pieces, thread, hole punches) Student pages: 11-12 for each student
Different Strokes	For each group: 2 balloons (party size 6"), nylon material or paper towel, 2 30 cm pieces of thread, small bits of paper (hole punches), book, pencil, pencil shavings, piece of plastic wrap, plastic ruler, tape Student pages: 17-18
Balance Your Charge Account	For each group: Game board pg 23-25, 1 paper fastener (brad), 1 paper clip, small objects of different colors (buttons or plastic chips for game pieces) For each student: Markers or crayons, scissors
Sparky's Light Kit	For each group: D cell, bulb, jumbo paper clip For each student: pg 43
Path Finders	For each group: D cell, flashlight bulb, 2 10-15 cm wires, scissors, red and yellow crayons or markers, glue For each student: pg 48, 50
Conductor or Insulator	Fore each group: 1 15-25 cm wire stripped, D cell, bulb, tape, materials to be tested (paper clip, tape, pencil, sting, ruler) For each student: pg 70-72
Electric Circuits	For each group: 2 D cells, 3 bulbs +holders, 7 wires 15-20 cm, 2 wires 30-40 cm For each student: pg 95-96
Make a Switch	For each group: Part 1: D cell, 3 wire 15 cm stripped, 2 brass paper fasteners, 1 .5V bulb + holder or mini xmas light, paper clip, masking tape, 8x8 cm tagboard, instruction page 84 Part 2: 2 10 cm wires stripped, 4 more brass paper fasteners, 1 more paper clip, 1 more 8x8 cm tagboard, instruction page 85
Short Cuts	For each group: 2 D cells, 2 bulbs + holders, (1 knife switch could be used) SWITCH = cardboard/oaktag with 2 brads and a paperclip 10 wires 15-25 cm pieces of wire For each student: pg 101-102

Electromagnetic Connection	For each group: 20 cm wire stripped, 1 D cell, directional compass, magnet For each student: pg 111
Blade Spinners	For each group: Spinner kits (cylinder magnet, 1 ¼" flat - phillips steel deck screw, 15 cm wire (stripped), paperclip for blade, 1 AA cell) For each student: pg 198
Electromagnets	Different core sizes bolts and lengths (iron content important) Bring a magnet to the store…
Make a Galvanometer	For each group: 50 cm insulated wire – stripped, D cell, directional compass For each student: pg 115
How to Make an Electric Motor	For each group: 2 D cells, 2 jumbo 5cm long metal paper clips, 3 ring magnets, 2 20-30 cm wires stripped, 55cm piece of 18-22 gauge magnetic wire (copper wire coated with enamel), 35 mm film canister, masking tape, ruler, scissors, modeling clay For each student: pg 120-121