Grade 4 Science Curriculum

Unit:	Electrical Energy
Big Ideas:	Completing a circuit to allow energy to flow
Unit Essential Questions:	

Concept & Pacing	New Emphasis (Pa Core Standard)	Key Vocabulary	Essential Questions	Mini-Lessons/Activities	Instructional Materials	Assessments
Lighting a Bulb	Make and communicate observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	Circuit, electric current, electricity, energy, energy source, conductor, insulator	1.What is needed to light a bulb?	Students have the battery,wires and an incandescent lightbulb Students discover how to figure out how to complete a circuit with the given materials Students then discuss the electricities pathway in the circuit	D-cell battery wires incandescent lightbulb	science notebook entry
Conductors and Circuits	Make and communicate observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	Circuit, electric current, electricity, energy, energy source, conductor, insulator	2.What is needed to make a complete pathway for current to flow in a circuit?	Students are introduced to a switch and a motor. They make a circuit that they can turn on and off. Students test various objects to determine which are conductors or insulators.	D-cell battery switch wires Circuit base motor various test objects (paper clips, yarn etc.)	science notebook entry
Series and Parallel circuits	Make and communicate observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	Circuit, electric current, electricity, energy, energy source, conductor, insulator	3.How can you get two bulbs to light at the same time?	Students find a way to operate more than one light bulb in a circuit. Students devise a series and parallel circuit to brightly light a bulb.	D-cell battery wires switch bulbs in holders	Science notebook entry Response sheet

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Solving the string of lights problem	Make and communicate observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	Circuit, electric current, electricity, energy, energy source, conductor, insulator	4. Which design is better for manufacturing long strings of lights-series or parallel ?	Students investigate which type of circuit would be the best design for a string of lights	Circuit base D-cell batteries light bulbs switch wires plastic straw scoops	summative assessment (Unit Test)

Unit:	Soils and weathering

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Big Ideas:	How and why is Earth constantly changing?
Unit Essential Questions:	

Concept & Pacing	New Emphasis (Pa Core Standard)	Key Vocabulary	Essential Questions	Mini-Lessons/Activities	Instructional Materials	Assessments
Soil Composition	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.	Earth materials Humus soil Silt and clay Sand	What is soil?	Students observe and compare four different soils . They learn that soils are composed of essentially the same types of materials but the amounts of the materials vary. Students speculate on where each of the four soils came from: mountain, desert, river delta or forests.	soil samples viles water syringe paper plates	Science notebook entry
Physcial Weathering	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.	physical weathering erosion deposition root wedging ice wedging	What causes big rocks to break down into smaller rocks?	Students begin to explore how large masses of rock break into smaller pieces. They tumble rocks and freeze water to see how these two types of physical weathering can break rocks.	plastic jar granite conglomerate glass jar water	Response sheet
Chemical Weathering	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.	chemical weathering acid rain chemical reaction calcite	How are rocks affected by acid rain?	Students plan and conduct and investigation to test rocks for interaction with “acid rain”. They see that some rocks are very susceptible to acid rain but other rocks are unaffected.	syringe viles plastic cup rock samples white vinegar	Performance assessment

School Yard Soils	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.	Earth materials Humus soil Silt and clay Sand	What's in our school yard soils?	Students collect and observe different soils from different locations in the school yard. They analyze the soil samples to determine how much humus and rock materials are in local soils.	trowel zip lock bags spoon	Unit Test

Unit:	Landforms
Big Ideas:	How and why is the Earth constantly changing?
Unit Essential Questions:	

Concept & Pacing	New Emphasis (Pa Core Standard)	Key Vocabulary	Essential Questions	Mini-Lessons/Activities	Instructional Materials	Assessments

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Erosion and Deposition	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	alluvial fan canyon delta deposition erosion floodplain	How do weathered rock pieces move from one place to another?	Students use stream tables to observe that water moves earth materials from one location to another. After running a volume of water through the stream table students shake a vial containing a sample of earth material mixed with water to observe the rate at which different particle sizes settle out.	stream table water ruler 1 liter container basin powdered clay sand plastic cups wood angles	science notebook entry
Stream Table Investigation	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	alluvial fan canyon delta deposition erosion floodplain	How does slope affect erosion and deposition? How do floods affect erosion and deposition?	Students continue to run stream tables to learn how environmental variables can affect erosion and deposition. They investigate the variables of slope and water volume.	stream table water ruler 1 liter container basin powdered clay sand plastic cups wood angles	performance assessment
Fossil Evidence	Identify evidence from patterns in rock formations and fossils in rock layers to	fossil cast mold imprint geologist superposition	How do fossils get in rocks and what can they tell us about the past?	Students think about what happens to and in sediments over long periods of time. Students watch a video, make models and read an	clay small shells plaster of paris containers spoon	science notebook entry Unit Test

	support an explanation for changes in a landscape over time.			article to learn about how sedimentation processes can result in fossils. They learn how fossils provide evidence of life and landscapes from the past.		

Unit:	Natural Resources
Big Ideas:	How do Earth's surface processes and human activities affect each other?
Unit Essential Questions:	

Concept & Pacing	New Emphasis (Pa Core Standard)	Key Vocabulary	Essential Questions	Mini-Lessons/Activities	Instructional Materials	Assessments

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Renewable & Nonrenewable resources	. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	energy nonrenewable resource fossil fuels coal oil natural gas solar energy wind energy geothermal hydroelectric tidal energy	What are natural resources and what is important to know about them?	Students discuss fossil fuel, coal, oil, and natural gas.	Foss Textbook	Science notebook entry performance assessment
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Unit:	Magnetism
Big Ideas:	Interactions between any two objects can cause changes in one or both.
Unit Essential Questions:	

Concept & Pacing	New Emphasis (Pa Core Standard)	Key Vocabulary	Essential Questions	Mini-Lessons/Activities	Instructional Materials	Assessments
magnets and magnetic fields	. 3.2.3.B1 3.2.3.B2 3.2.4.B1 3.2.4.B2 3.2.4.B4	magnet permanent magnet temporary magnet attract repel magnetic field steel iron	What happens when two or more magnets interact? What happens when a piece of iron comes close to or touches an permanent magnet?	Students used a variety of tools to test if they are magnetic or not.	materials various test objects	Science notebook entry performance assessment
electromagnet s	3.2.6.B4 3.2.4.B6 3.2.5.B3 3.2.5.B4	Attract Collision Magnets Repel	How can one explain and predict interactions between objects within systems?	Students will create an electromagnet using a steel core and insulated wire. Students will test the strength of the electromagnet using different variables.	insulated wire steel rivet battery steel washers	Science notebook entry performance assessment

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Unit:	Energy and Motion
Big Ideas:	Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.
Unit Essential Questions:	How is energy transferred and conserved?

Concept & Pacing	New Emphasis (Pa Core Standard)	Key Vocabulary	Essential Questions	Mini-Lessons/Activities	Instructional Materials	Assessments
Energy Transfer	. 3.2.4.B2 3.2.5.B.4	Energy Force Magnet Transfer	How is energy transferred and conserved?	Students observed various systems and identified energy sources and evidence of energy transfer. Students rolled steel balls down a ramp to discover if starting position on the ramp affects the speed of a ball. Students rolled another steel ball down a ramp to collide with another steel ball in order to observe energy transfer.	steels ramps yard stick	Notebook Entry Response sheet

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Forms of waves	3.4.4 B	Energy Information Motion Waves	How are waves used to transfer energy and information?	Students will take a basin filled with water and a ping pong ball and observe interactions of waves.	water basin ping pong ball	Notebook entry response sheet
Light Waves	3.4.4. B	Reflection Refraction	How are waves used to transfer energy and information?	Students will observe light waves and how mirrors work.(reflection/refraction)	flashlight mirror plastic cup water pencil	Notebook Entry Performance assessment
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