SOUTHERN LEHIGH SCHOOL DISTRICT
STEM Essentials

Grade (4)	**(Subject) STEM**
	(Goal Area) Measuring Basics
	Pennsylvania Academic Standards: **M4.A.3.2.2:** Solve addition or subtraction problems with fractions with like denominators (denominators to 10, no simplifying necessary). **M4.B.2.1.1:** Use or read a ruler (provided) to measure to the nearest 1/4 inch or centimeter.
	Essential Understandings: Learning how to measure 1" and ½" increments. Learning how to measure with different measuring devices.
	Overarching and Essential Questions: Why do students have to measure? How often do we use measuring?
	Vocabulary: Measuring tape. Ruler. Yard Stick. Mile Marker.
	Assessments: Performance Tasks, Projects Demonstrate measuring performance by using measuring tools Measuring Quiz Measuring Hunt- moving about the lab measuring items listed on a worksheet.
	Assessments: Quizzes, Tests and Academic Prompts 1. Measuring Quiz 3. Teacher assistance 2. Enlarged view of an inch 4. Hands on application
	Assessments: Other Evidence (e.g., observations, work samples, dialogues) 1. Teacher observation. 2. Measuring Hunt worksheet.
	Assessments: Student Self-Assessment Students will use "Parts of an inch" reference page to check for accuracy Students will "self check" answers using "Parts of an inch" page.

	Students will need to know . . . (targeted understandings): Basic measuring skills down to ½" accuracy. How to use different measuring tools to adapt and use the one most useful in each case.
	Students will be able to do . . . (targeted skills): Identify the parts of an inch (down to ½") Measure accurately down to ½".
	Teaching and learning experiences: Cooperative learning environment- Students will feed off each others knowledge. Differentiated instruction through different measuring stations.
	Materials and Resources: Measuring tools—tape measure, rulers of varying types. Measuring worksheet- enlarged view of inch Measuring "HUNT" worksheet
	Accommodations: Teacher assistance as needed. Follow 504 plans and IEP requirements Adapted instruction Small group work Frequent feedback on progress Instruction clarification
	Enrichments: Challenge students to measure down to ¼" accuracy Additional challenging "inside" measurements. "Guess-timating" measuring without a measuring device
	Time: 4 days
	Teacher Name / Date curriculum was written **Scott Killino 6/10**

SOUTHERN LEHIGH SCHOOL DISTRICT
STEM Essentials

Grade (4)	**(Subject) STEM**
	(Goal Area) BASIC ELECTRICITY
	Pennsylvania Academic Standards: **S4.C.2.1.1:** Identify energy forms, energy transfer, and energy examples (e.g., light, heat, electrical). **S4.C.2.1.2:** Describe the flow of energy through an object or system (e.g., feeling radiant heat from a light bulb, eating food to get energy, using a battery to light a bulb or run a fan). **S4.C.2.1.3:** Recognize or illustrate simple direct current series and parallel circuits composed of batteries, light bulbs (or other common loads), wire, and on/off switches.
	Essential Understandings: Basic understanding of using laptop to research units. Cooperative learning environment.
	Overarching and Essential Questions: What role does electricity play in our world? How do we get electricity? How is electricity and magnetism related? How can we make a magnet?
	Vocabulary: Circuit, electrons, flow, open circuit, conductors, insulators, schematic symbols, series circuit, parallel circuit, light bulbs.
	Assessments: Performance Tasks, Projects Students will research units on computer to gain knowledge. Students will explain and wire simple circuits.
	Assessments: Quizzes, Tests and Academic Prompts 1. Work Ethic 3. Class participation 2. Worksheets on Series/Parallel circuits.
	Assessments: Other Evidence (e.g., observations, work samples, dialogues) 1. Teacher observation. 2. Simple circuit construction.
	Assessments: Student Self-Assessment Students will see if their circuit functions as expected.

	Students will need to know . . . (targeted understandings): How to use a laptop computer. How to work cooperatively in pairs.
	Students will be able to do . . . (targeted skills): Use the self guided tutorials to explore basic electricity. Wire simple electrical circuits. Explain the difference between insulators and conductors.
	Teaching and learning experiences: Cooperative learning environment- Students will feed off each others knowledge. Teacher will demonstrate proper circuit design. Differentiated instruction- allows students to work and explore at their own pace.
	Materials and Resources: Simple circuit supplies Laptop computer Teacher input and guidance. Series/Parallel worksheets
	Accommodations: Teacher assistance as needed. Follow 504 plans and IEP requirements Adapted instruction Small group work Frequent feedback on progress Instruction clarification
	Enrichments: Allow students to design and test their own circuits.
	Time: 10 days
	Teacher Name / Date curriculum was written **Scott Killino 6/10**

SOUTHERN LEHIGH SCHOOL DISTRICT
STEM Essentials

Grade (4)	**(Subject) STEM**
	(Goal Area) LEGO- ROBOT Mindstorms
	Pennsylvania Academic Standards: **S4.C.3.1.1:** Describe changes in motion caused by forces (e.g., magnetic, pushes or pulls, gravity, friction). **S4.C.2.1.1:** Identify energy forms, energy transfer, and energy examples (e.g., light, heat, electrical).
	Essential Understandings: BASIC understanding of Lego Mindstorm programming. Basic understanding of using laptop to program robots. Cooperative learning environment. Limitations of robots in our lab.
	Overarching and Essential Questions: What role do robots play in our society? How are our lives positively or negatively affected by robots? What can we do with our robots?
	Vocabulary: Basic turns, forward, reverse, sound activation, inputs/outputs, programming, laptop.
	Assessments: Performance Tasks, Projects Students will program the robot to follow a set string of commands by using L-R-Forward and Reverse inputs. Students will program robot to say a pre-programmed phrase. Students will employ basic input commands to explore robot's potential.
	Assessments: Quizzes, Tests and Academic Prompts 3. Work Ethic 3. Class participation 4. Quiz—programming robot to follow teacher set of instructions.
	Assessments: Other Evidence (e.g., observations, work samples, dialogues) 1. Teacher observation. 2. Sample program designs.
	Assessments: Student Self-Assessment Students will see if robot follows commands that are programmed.

	Students will need to know . . . (targeted understandings): How to program the robot. How to work cooperatively in pairs
	Students will be able to do . . . (targeted skills): Program the robot from a set of given commands. Program the robots using their own program desires. Explore the robot potential.
	Teaching and learning experiences: Cooperative learning environment- Students will feed off each others knowledge. Students will need to adhere to a timeline.
	Materials and Resources: Lego-Robots Teacher input and guidance Black-line Track. Laptop computer
	Accommodations: Teacher assistance as needed. Follow 504 plans and IEP requirements Adapted instruction Small group work Frequent feedback on progress Instruction clarification
	Enrichments: Allow students to explore and create challenging programs.
	Time: 10 days
	Teacher Name / Date curriculum was written **Scott Killino 6/10**

SOUTHERN LEHIGH SCHOOL DISTRICT
STEM Essentials

Grade (4)	**(Subject) STEM**
	(Goal Area) Homemade Battery
	Pennsylvania Academic Standards: . **S4.A.3.2.3:** Use appropriate, simple modeling tools and techniques to describe or illustrate a system (e.g., two cans and string to model a communications system, terrarium to model an ecosystem). **3.4.4.E3:** Identify types of energy and the importance of energy conservation **S4.A.1.1.2:** Identify and describe examples of common technological changes past to present in the community (e.g., energy production, transportation, communications, agriculture, packaging materials) that have either positive or negative impacts on society or the environment. **S4.A.2.2.1:** Identify appropriate tools or instruments for specific tasks and describe the information they can provide (e.g., measuring: length - ruler, mass - balance scale, volume - beaker, temperature - thermometer; making observations: hand lens, binoculars, telescope). **S4.C.2.1.2:** Describe the flow of energy through an object or system (e.g., feeling radiant heat from a light bulb, eating food to get energy, using a battery to light a bulb or run a fan). **S4.C.2.1.3:** Recognize or illustrate simple direct current series and parallel circuits composed of batteries, light bulbs (or other common loads), wire, and on/off switches.
	Essential Understandings: Learning how to build a battery using common household items.
	Overarching and Essential Questions: How do we benefit by building our own battery?
	Vocabulary: Electrons, flow, electrolyte, conductor
	Assessments: Performance Tasks, Projects Build a battery using materials provided
	Assessments: Quizzes, Tests and Academic Prompts 1. Build a battery 3. Teacher assistance 2. Hands on application
	Assessments: Other Evidence (e.g., observations, work samples, dialogues) 1. Teacher observation.
	Assessments: Student Self-Assessment Students will test voltage of their battery.

	Students will need to know . . . (targeted understandings): Basic circuit flow characteristics.
	Students will be able to do . . . (targeted skills): Build a battery, complete a circuit and light a bulb.
	Teaching and learning experiences: Cooperative learning environment- Students will feed off each others knowledge.
	Materials and Resources: Plastic cups, water, salt, copper wires, paper clips, brass strips, aluminum strips.
	Accommodations: Teacher assistance as needed. Follow 504 plans and IEP requirements Adapted instruction Small group work Frequent feedback on progress Instruction clarification
	Enrichments: Student can build extra large batteries and see if they produce a different voltage.
	Time: 3days
	Teacher Name / Date curriculum was written **Scott Killino 6/10**