SOUTHERN LEHIGH SCHOOL DISTRICT
STEM Essentials

Grade (5)	**(Subject) STEM**
	(Goal Area) Measuring Basics
	Pennsylvania Academic Standards: **M5.B.2.1.1:** Use a ruler to measure to the nearest 1/8 inch or centimeter. **M5.A.2.1.2:** Solve problems involving addition and subtraction of fractions (through 16ths – like and unlike denominators – for unlike denominators, the LCD must be one of the given denominators).
	Essential Understandings: Review how to measure 1" and ½" increments. Review how to measure with different measuring devices. Measure down to ¼" accuracy
	Overarching and Essential Questions: Why do students have to measure? How often do we use measuring? Why do we need to measure smaller?
	Vocabulary: Measuring tape. Ruler. Yard Stick. Mile Marker. Micrometer
	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 1/4" 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 to1/4") Measure accurately down to 1/4".
	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 (5)	**(Subject) STEM**
	(Goal Area) Laser- Basic Intro
	Pennsylvania Academic Standards: **3.4.5.A1:** Explain how people use tools and techniques to help them do things. **3.4.5.A3:** Describe how **technologies** are often combined. **3.4.5.B1:** Explain how the use of **technology** can have unintended consequences. **3.4.5.B4:** Identify how the way people live and work has changed history in terms of technology **3.4.5.D3:** Determine if the human use of a product or system creates positive or negative results **3.2.5.B2:** Examine how energy can be transferred from one form to another. **3.2.5.B4:** Demonstrate how electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced. Demonstrate how electromagnets can be made and used.
	Essential Understandings: Basic understanding of what a laser is. Basic understanding of computer control over a printer (or a laser in this case).
	Overarching and Essential Questions: Why is safety so important? What is LASER? What can a laser do to different materials?
	Vocabulary: LASER, Etching, Vector, Raster.
	Assessments: Performance Tasks, Projects Students will demonstrate knowledge of general safety rules. Students will program their name into computer to allow laser to etch name on wood.
	Assessments: Quizzes, Tests and Academic Prompts 1. Work Ethic 3. Class participation 2. Cooperative group experience.
	Assessments: Other Evidence (e.g., observations, work samples, dialogues) 1. Teacher observation.
	Assessments: Student Self-Assessment Students will see their name etched on a piece of material (wood).

	Students will need to know . . . (targeted understandings): How to demonstrate safety procedures and awareness. How to work cooperatively in a group setting.
	Students will be able to do . . . (targeted skills): Demonstrate applicable safety practices. Successfully enter their name and output it to the laser engraver.
	Teaching and learning experiences: Cooperative learning environment- Students will feed off each others knowledge. Students will need to adhere to safety rules.
	Materials and Resources: Epilog Laser Teacher input and guidance Safety glasses
	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 create their own logo. Allow students to etch their own property (phone case, I-pod, book, etc.)
	Time: 3 days
	Teacher Name / Date curriculum was written **Scott Killino 6/10**

SOUTHERN LEHIGH SCHOOL DISTRICT
STEM Essentials

Grade (5)	**(Subject) STEM**
	(Goal Area) MAG LEV CAR
	Pennsylvania Academic Standards: **M5.B.2.1.1:** Use a ruler to measure to the nearest 1/8 inch or centimeter. **3.4.5.A1:** Explain how people use tools and techniques to help them do things. **3.4.5.A3:** Describe how **technologies** are often combined. **3.4.5.B3:** Describe how community concerns support or limit technological developments **3.4.5.C1:** Explain how the **design** process is a purposeful method of planning practical solutions to problems. **3.4.5.D1:** Identify ways to improve a design solution. **3.4.5.E4:** Describe how the use of symbols, measurements, and drawings promotes clear communication by providing a common language to express ideas
	Essential Understandings: Basic understanding of design process and blueprint creation. Limitation of material used for car construction. Working knowledge of measuring tools. Safe and cooperative work ethics.
	Overarching and Essential Questions: What info is needed to create a blueprint or plan? What is the relationship of form and function? How does design affect the aerodynamics of an object. How does best design get beat out by best looks?
	Vocabulary: Aerodynamic design. Slipstream. Magnetic Levitation. Wind resistance.
	Assessments: Performance Tasks, Projects Sketches- Students will sketch basic car designs on paper. Plans- Students pick best design and draw detailed 3-d view on paper. Final Product- Students use plans to guide them through car build..
	Assessments: Quizzes, Tests and Academic Prompts 3. Work Ethic 4. Final Product- to be graded by guidelines presented (overall design, performance, practical application)
	Assessments: Other Evidence (e.g., observations, work samples, dialogues) 1. Teacher observation. 2. Final car design
	Assessments: Student Self-Assessment Students will use blueprints to guide them through car shaping and building.

	Students will need to know . . . (targeted understandings): How to solve problems related to design process. How to use tools to solve problems. How to work together with others in a lab environment.
	Students will be able to do . . . (targeted skills): Build a foam car from a basic drawing or plan. Use tools to shape and build a maglev foam car.
	Teaching and learning experiences: Cooperative learning environment- Students will feed off each others knowledge. Differentiated instruction through the use of mini-lessons.
	Materials and Resources: Measuring tools. Maglev Track Basic blueprint guide worksheet 2" Building foam (6"x2"x2" block) Sandpaper Hot Glue Hot-wire cutter. Paint Markers
	Accommodations: Teacher assistance as needed. Follow 504 plans and IEP requirements Adapted instruction Small group work Frequent feedback on progress Instruction clarification
	Enrichments: Use of LASER or Vinyl cutter to brighten up car design.
	Time: 10 days
	Teacher Name / Date curriculum was written **Scott Killino 6/10**

SOUTHERN LEHIGH SCHOOL DISTRICT
STEM Essentials

Grade (5)	**(Subject) STEM**
	(Goal Area) House Wiring Basics
	Pennsylvania Academic Standards: **3.4.5.A1:** Explain how people use tools and techniques to help them do things. **3.4.5.A3:** Describe how **technologies** are often combined. **3.4.5.B1:** Explain how the use of **technology** can have unintended consequences. **3.4.5.B4:** Identify how the way people live and work has changed history in terms of technology **3.4.5.D3:** Determine if the human use of a product or system creates positive or negative results **3.4.5.A2:** Understand that a **subsystem** is a **system** that operates as part of a larger **system.**
	Essential Understandings: Basic understanding of electricity and how it is created. Basic understanding of simple house wiring.. Basic safety of working with electricity.
	Overarching and Essential Questions: Why is safety so important? How is electricity created? How is a simple light and outlet wired in a house?
	Vocabulary: Power plant, transmission towers, transformers, short circuit, overloads, outlet, breaker, fuses.
	Assessments: Performance Tasks, Projects Students will demonstrate knowledge of general safety rules. Students will wire an outlet, light, and switch.
	Assessments: Quizzes, Tests and Academic Prompts 5. Work Ethic 3. Class participation 6. Quiz—wiring ,in groups of 2, an electrical trainer. (outlet, switch, light)
	Assessments: Other Evidence (e.g., observations, work samples, dialogues) 1. Teacher observation. 2. Testing of student wired trainer.
	Assessments: Student Self-Assessment Students will see their wiring is correct by testing.

	Students will need to know . . . (targeted understandings): How to demonstrate safety procedures and awareness. How to work cooperatively in a group setting.
	Students will be able to do . . . (targeted skills): Demonstrate applicable safety practices. Successfully wire an electrical trainer.
	Teaching and learning experiences: Cooperative learning environment- Students will feed off each others knowledge. Students will need to adhere to safety rules.
	Materials and Resources: Electrical trainers Teacher input and guidance Safety glasses
	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 create their own wiring scenarios.
	Time: 6 days
	Teacher Name / Date curriculum was written **Scott Killino 6/10**

SOUTHERN LEHIGH SCHOOL DISTRICT
STEM Essentials

Grade (5)	**(Subject) STEM**
	(Goal Area) LEGO- ROBOT Mindstorms
	Pennsylvania Academic Standards: **3.4.5.A1:** Explain how people use tools and techniques to help them do things. **3.4.5.A3:** Describe how **technologies** are often combined. **3.4.5.B1:** Explain how the use of **technology** can have unintended consequences. **3.4.5.B4:** Identify how the way people live and work has changed history in terms of technology
	Essential Understandings: Advanced understanding of Lego Mindstorm programming. 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?
	Vocabulary: Degrees, sound activation, inputs/outputs, programming, memory, active inputs.
	Assessments: Performance Tasks, Projects Students will program the robot to follow a set string of commands. Students will employ advanced auxiliary input commands to explore robot's potential.
	Assessments: Quizzes, Tests and Academic Prompts 7. Work Ethic 3. Class participation 8. 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): Review basic commands: L-R-For.-Rev., rotation, optical sensor Program the robot from a set of given commands. Program the robots using their own program desires. Explore the robot potential. **Students projected to do…** Their own programs by following a set of guidelines. Obstacle course, proximity sensors, and distance travel in 7th grade Teaching to their peers and sharing their knowledge.
	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.
	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: 6 days
	Teacher Name / Date curriculum was written **Scott Killino 6/10**