Gateway to Technology

Michigan Grades 9-12 Math Strands/Standards Linked

Automation and Robotics Unit						
Michigan Grades 9-12 Math Strands/Standards Linked	Students will develop an understanding of the various ways robots are used in today's world and the impact their use	Students will investigate an engineering career and determine the requirements for entering the field.	Students will investigate and understand various mechanisms to determine their purpose and applications.	Students will be able to apply their knowledge of mechanisms to solve a unique problem.	Students will understand and program open-loop and closed-loop systems.	Students will be able to troubleshoot a malfunction using a methodical approach.
MATH GRADES 9-12: http://www.michigan.gov/mde/0,1607,7-140-38924_41644_42668---,00.html						
STRAND 1: QUANTITATIVE LITERACY AND LOGIC						
STANDARD L3: MEASUREMENT AND PRECISION						
QSMP3.1 Measurement Units, Calculations, and Scales						
QSMP3.1.1 Convert units of measurement within and between systems; explain how arithmetic operations on measurements affect units, and carry units through calculations correctly.						
STANDARD L4: MATHEMATICAL REASONING, LOGIC, AND PROOF						
QSMRLP4.2 Language and Laws of Logic						
QSMRLP4.2.1 Know and use the terms of basic logic (e.g., proposition, negation, truth and falsity, implication, if and only if, contrapositive, and converse).						
STRAND 2: ALGEBRA AND FUNCTIONS						
STRAND 3: GEOMETRY AND TRIGONOMETRY						
STANDARD G1: FIGURES AND THEIR PROPERTIES						
GTFP1.1 Lines and Angles; Basic Euclidean and Coordinate Geometry						
GTFP1.1.5 Given a line segment in terms of its endpoints in the coordinate plane, determine its length and midpoint.						
GTFP1.4 Quadrilaterals and Their Properties						
GTFP1.4.2 Solve multi-step problems and construct proofs involving quadrilaterals (e.g., prove that the diagonals of a rhombus are perpendicular) using Euclidean methods or coordinate geometry.						
GTFP.1.7.1 Find an equation of a circle given its center and radius; given the equation of a circle, find its center and radius.						
GTFP1.7.2 Identify and distinguish among geometric representations of parabolas, circles, ellipses, and hyperbolas; describe their symmetries, and explain how they are related to cones.						
STANDARD G2: RELATIONSHIPS BETWEEN FIGURES						
GTRF2.2 Relationships Between Two-dimensional and Three-dimensional Representations						
GTRF2.2.1 Identify or sketch a possible 3-dimensional figure, given 2-dimensional views (e.g., nets, multiple views); create a 2-dimensional representation of a 3-dimensional figure.						
GTRF2.2.2 Identify or sketch cross-sections of 3-dimensional figures; identify or sketch solids formed by revolving 2-dimensional figures around lines.						
GTRF2.3 Congruence and Similarity						
GTRF2.3.2 Use theorems about congruent triangles to prove additional theorems and solve problems, with and without use of coordinates.						
GTRF2.3.4 Use theorems about similar triangles to solve problems with and without use of coordinates.						

Design & Modeling Unit																					
Michigan Grades 9-12 Math Strands/Standards Linked	Students will compare and contrast technology and science	Students will describe impacts that technology has had on society	Students will Explain the purpose and function of engineering notebooks	Students will describe the design process and how it is used to aid in problem solving.	Students will explain how to measure in different contexts.	Students will demonstrate ability to measure.	Students will describe the purpose and importance of working in a team.	Students will use the design process to solve a technical problem.	Students will recognize thumbnail sketches, isometric, orthographic, one- and two-point perspective drawings and acc	Students will communicate ideas for a design using various sketching methods, sketches, and different drafting views	Students will develop thumbnail sketches, orthographic drawings, and isometric drawings using manual and computer	Students will identify basic geometric relationships of shapes and solids.	Students will use coordinate system to express geometric relationships.	Students will create a three-dimensional (3D) model of an object.	Students will demonstrate the ability to produce various documentation drawings from a 3D model.	Students will produce the annotations to document various drawings made from a 3D model.	Students will interpret the relationship of orthographic and auxiliary views to their parent 3D model.	Students will identify what a prototype model is and how it is used	Students will create a three-dimensional (3D) prototype model of an object	Students will demonstrate the ability to produce various documentation drawings from a 3D model	Students will describe how a prototype model is used and how its fabrication aid in the design process
MATH GRADES 9-12: http://www.michigan.gov/mde/0,1607,7-140-38924_41644_42668---,00.html						X			X			X	X	X	X	X					
STRAND 1: QUANTITATIVE LITERACY AND LOGIC						X															
STANDARD L3: MEASUREMENT AND PRECISION						X															
QSMP3.1 Measurement Units, Calculations, and Scales						X															
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STRAND 3: GEOMETRY AND TRIGONOMETRY									X			X	X		X	X					
STANDARD G1: FIGURES AND THEIR PROPERTIES												X	X								
GTFP1.1 Lines and Angles; Basic Euclidean and Coordinate Geometry													X								
GTFP1.1.5 Given a line segment in terms of its endpoints in the coordinate plane, determine its length and midpoint.													X								
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GTRF2.3 Congruence and Similarity													X								
GTRF2.3.2 Use theorems about congruent triangles to prove additional theorems and solve problems, with and without use of coordinates.													X								
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The Magic of Electronics Unit																		
Michigan Grades 9-12 Math Strands/Standards Linked	Students will demonstrate the movement of electrons and electro negativity in atomic structure diagrams.	Students will explain the differences between static electricity and current electricity	Students will measure conductivity levels of various materials using a digital multimeter and classify them as conducto	Students will explain what part the electrons, protons, and neutrons of an atom play in the generation of electricity.	Students will explain the term electromotive force and the parts that make up a motor.	Students will demonstrate their knowledge of DC motor operation by explaining how electricity is generated.	Students will demonstrate the ability to follow directions in the assembly of a simple motor.	Students will assemble series, parallel, and combination series/parallel circuits.	Students will use schematic symbols to diagram electric and electronic circuits.	Students will test and prove the relationship between voltage, current, and resistance as stated in Ohm's Law.	Students will understand common electric and electronic load devices, their schematic symbols, and describe the func	Students will describe the use of a transistor and its use as a switch or amplifier.	Students will demonstrate the correct use of a digital multimeter.	Students will recognize and translate resistor color codes and resistor resistance metering.	Student will utilize reading comprehension techniques to discern important information from a passage on digital elect	Students will understand and apply their knowledge of truth tables and logic gates to solve digital electronics problems	Students will design and prototype solutions to digital electronics problems.	Students will understand inputs, outputs, and sensors and their uses in digital electronics.
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The Science of Technology Unit								
Michigan Grades 9-12 Math Strands/Standards Linked	Students will Be capable of comparing and contrasting kinetic and potential energy.	Students will be capable of identifying and explaining the function of systems and sub-systems	Students will correctly identify the six simple machines and explain their applications.	Students will identify a machine as something that helps use energy more efficiently.	Students will be able to classify energy sources as renewable and nonrenewable.	Students will be able to explain the environmental impact of future career opportunities within the energy field.	Students will be able to describe and follow the steps necessary to create a prototype.	Students will explain the importance of building a working prototype before beginning full scale fabrication of a produc
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