

Introduction to STEM	Scope and Sequence
Unit Lesson	Objectives
ON WHOSE SHOULDERS ARE WE STANDING?	
What is STEM Education?	
	Describe the field of STEM education.
	List the disciplines included in STEM education.
	Compare and contrast the different fields in STEM education.
	List some of the qualities of STEM education in high schools.
	Argue the importance of STEM education in the United States.
	Develop a profile of STEM students.
	Point out the significant role of females in the STEM field.
The Great Discoverers and Discoveries	
	Identify great discoveries and discoverers in the STEM field.
	Assemble information using a timeliner application as a tool.
Project: Timeline of Great Discoverers and Discoveries in the STEM Field	
Identify Careers in Science, Technology, Engineering, and Mathematics	
	Complete and analyze the career interest inventory.
	Describe the qualities of STEM workers.
	Itemize a list of potential careers in science, technology, engineering, and mathematics fields.
	Explain the important roles of several STEM careers.
	List global issues yet to be resolved by people working in STEM.
	Analyze global issues that will continue to require people in STEM fields to resolve.
	Propose ways in which students can address a current world challenge.

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	Project: Exploring Careers in the STEM Field	
	Get Organized: Outlines and Outliners!	
		Define and explain the uses of outlines and outliners.
		Explain the benefits of outlines and outliners in the STEM fields.
		Brainstorm and categorize ideas and concepts using outlines.
		Create outlines.
		Use different types of outliners.
		Demonstrate the application of outlines in managing a project.
		Devise a project plan using outlines and outliners.
	Project: Create a Google Website	
	Get Organized: Mind Maps and Mind Mapping!	
		Define and explain the uses of mind maps and mind mapping programs.
		Explain the benefits of mind maps and mind mapping programs in the STEM fields.
		Categorize ideas and concepts using mind maps.
		Create mind maps.
		Use different types of mind mapping programs.
		Demonstrate the application of mind maps in managing a project.
		Devise a project plan using mind maps and mind mapping programs.
		Compare and contrast the uses of outlines and mind maps.
	Education and Training in STEM	
		Evaluate whether students have the skills needed to be successful STEM students.

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		Explain the state of STEM degrees awarded in the US.
		Categorize the different STEM programs by education level.
		Research different STEM programs.
		Research and list educational institutions that offer STEM programs.
		Generate a personal educational and career plan using a mind map.
	Project: Mind Map of Personal STEM Education and Career Plan	
	Test	
A PICTURE IS WORTH A THOUSAND WORDS		
	A Picture is Worth a Thousand Words	
		Define and show the differences between quantitative and qualitative data.
		Discuss the relationship between data, information, and knowledge.
		Explain the use of images in communicating data.
		Assess one's surroundings and identify images that convey mathematical concepts.
	Project: Math is Everywhere	
	Seeing is Believing?	
		Identify the qualities of people in the creative imaging fields.
		Discuss ethical issues facing graphic designers.
		Describe the roles and duties of people in the graphic design, animation, and gaming fields.
		Compare and contrast the roles and duties of people in the graphic design, animation, and gaming fields.
		Explain the use of images and imaging technology in the graphic design, animation, and gaming fields.
		List the educational and training requirements for people in the graphic design, animation, and gaming fields.

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		Illustrate techniques used by graphic designers.
		Argue the importance of STEM education using images and imaging techniques.
	Project: STEM Campaign!	
	Images Saving Lives!	
		Identify the qualities of people in the medical imaging fields.
		Describe the roles and duties of radiologic technologists, medical equipment repairers, and nuclear medicine technologists.
		Compare and contrast the roles and duties of radiologic technologists, medical equipment repairers, and nuclear medicine technologists.
		Explain the use of images and imaging technology in medical imaging.
		List the educational and training requirements for radiologic technologists, medical equipment repairers, and nuclear medicine technologists.
		Argue the importance of medical imaging in saving lives.
	Satellite Imagery: Space and Beyond	
		Define natural and artificial satellites.
		Categorize satellites by their purpose and mission.
		Examine the benefits and uses of the data and images provided by artificial satellites to space exploration.
		Describe the roles and duties of aerospace engineers and astronomers.
		Compare and contrast the roles and duties of aerospace engineers and astronomers.
		Explain the contributions of aerospace engineers and astronomers to the field of space exploration.
		Argue the benefits of working in the space exploration field.
	Project: NASA Internship Application Paper	
	Satellite Imagery: Observing Earth	
		Examine the benefits and uses of the data and images provided by weather and Earth observing satellites

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		to our understanding of Earth's geography, atmosphere, and weather.
		Categorize satellites by their purpose and mission.
		Discuss how the data and images from weather and Earth observing satellites are important to understanding and preventing environmental concerns.
		Describe the roles and duties of atmospheric scientists and geographers.
		Compare and contrast the roles and duties of atmospheric scientists and geographers.
		Explain the contributions of atmospheric scientists and geographers to understanding Earth's geography, weather, and environment.
	Project: Saving the Planet	
		Create a presentation that uses satellite images to highlight some environmental issues.
	Satellite Imagery: The Eyes of the Military	
		Examine the benefits and uses of the data and images provided by military satellites.
		Discuss how the data and images from weather and Earth observing satellites are important to military success.
		Describe the roles and duties of space operations specialists, intelligence sailors, and intelligence officers.
		Compare and contrast the roles and duties of space operations specialists, intelligence sailors, and intelligence officers.
		Explain the contributions of space operations specialists, intelligence sailors, and intelligence officers to military success.
	Test	
HOW MUCH IS ENOUGH?		
	Terms of Measurement	
		Discuss the history of measurement and measurement tools.
		Explain U.S. customary unit of measurement.
		Explain measurement error and its importance in STEM.

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		Define systematic and random error.
		Compare and contrast systematic and random error.
		Estimate the age of trees.
	Project: Room Makeover	
	Measuring the Really Big	
		Examine the importance of measurement standards.
		Discuss the history of the International System of Units.
		Categorize and define the International System of Units.
		Explain the relationship between STEM and the International System of Units in the United States.
	Project: Metric Recipe	
	How Big are These?	
		Define metrology.
		Discuss the importance of metrology.
		Identify STEM industries that employ metrology workers.
		Describe the skills, training, and education of metrology workers.
	Term Review	
		Calculate scientific notation of large numbers.
		Identify and define the SI prefixes of large numbers.
		Describe the roles and duties of wildlife biologists, structural engineers, and geotechnical engineers.
		Explain the educational requirements, salaries, and career outlook for several careers.
	Project: Measuring Tall Structures	
	Small Things Need Measurement, Too	

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		Calculate the scientific notation of small numbers.
		Identify and define the SI prefixes of small numbers.
		Describe how small measurement devices like microscopes, micrometers, and aerodynamic particle sizers are used by STEM professionals.
		Explain the importance of the measurements and information obtained from these measuring devices.
		Describe the roles and duties of microbiologists, quality control inspectors, and environmental science and protection technicians.
		Explain the educational requirements, salaries, and outlook for microbiologists, quality control inspectors, and environmental science and protection technicians.
		Evaluate the levels of air quality of various cities and states, and the ways in which these affect the public.
	Project: Air Quality Index	
	Thinking about Measuring	
		Illustrate how the parallax system works.
		Explain the importance of calculating the measurements of star distances and earthquakes.
		Describe the roles and duties of astrophysicists and seismologists.
		Explain the educational requirements, salaries, and outlook of astrophysicists and seismologists.
	Test	
HOW TO BE A DETECTIVE		
	The Scientific Method	
		Describe the importance of the scientific method.
		List and explain the steps of the scientific method.
		Design an experiment using the scientific method.
		Identify real-life problems that can be addressed using the scientific method.
		Identify bias in an experiment and the importance of avoiding it.

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	Project: Scientific Method and STEM Career Exploration	
	Scientific Theory	
		Explain the importance of scientific theories.
		Explain the use of scientific laws to STEM careers.
		Describe the roles and duties of epidemiologists and health educators.
		Explain the educational requirements, salaries, and outlook for epidemiologists and health educators.
	Project: Scientific Laws and STEM Careers	
	Scientific Laws	
		Explain the importance of scientific laws.
		Compare and contrast scientific law and scientific theory.
		Explain the use of scientific laws in STEM careers.
		Apply the scientific laws to STEM careers.
		Examine the application of thermodynamic laws to the geothermal energy field.
		Describe the roles and duties of scientists, engineers, and drilling workers in the geothermal energy field.
		Explain the educational requirements, salaries, and outlook for scientists, engineers, and drilling workers in the geothermal energy field.
	Critical Thinking	
		Explain the application of critical thinking skills in STEM.
		List and explain the qualities and components of critical thinking.
		Apply critical thinking skills to solving problems.
		Identify STEM careers that use critical thinking skills.
		Describe the roles and duties of audiologists, logisticians, and anthropologists.

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		Explain the educational requirements, salaries, and outlook for audiologists, logisticians, and anthropologists.
	Thinking Like a Detective	<p>Explain the application of logic and problem-solving strategies in STEM.</p> <p>Describe and apply logic and problem-solving strategies.</p> <p>List and explain the different steps of problem-solving.</p> <p>Define and explain deductive and inductive reasoning.</p> <p>Identify and describe careers that utilize problem solving strategies and logic.</p>
	Project: Uncovering the World's Mysteries	
	Thinking Outside the Box	<p>Explain the application of pattern recognition and trial and error in STEM.</p> <p>Apply pattern recognition and trial and error in solving problems.</p> <p>Identify and describe examples of the Fibonacci sequence in nature.</p> <p>Identify and describe careers that utilize trial and error and pattern recognition.</p>
	Project: Fibonacci Sequence	
	Test	
STEM IS EVERYWHERE		
	STEM and Politics	<p>Articulate the integration of STEM in politics.</p> <p>Define and explain research surveys.</p> <p>Identify the different types of survey questions.</p> <p>Develop and create a survey.</p> <p>Describe the roles and duties of survey researchers and political scientists.</p>

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	Project: Develop and Conduct a Survey	
	STEM and Sports	<p>Articulate the use and the integration of STEM in sports.</p> <p>Apply elements of sports biometrics to running.</p> <p>Describe the roles and duties of exercise physiology, sports biomechanics, and athletic trainers.</p>
	Project: Running with Proper Biomechanics	
	STEM and Art	<p>Understand the integration of STEM in art.</p> <p>Identify careers that utilize elements of STEM and art.</p> <p>Describe the roles and duties of curators, conservators, craft artists, and fine artists.</p>
	STEM and Music	<p>Articulate the integration of STEM in music.</p> <p>Identify careers that utilize elements of STEM and music.</p> <p>Describe the roles and duties of sound engineering technicians and music editors.</p> <p>Conduct an experiment determining music used in different film scenes.</p>
	Project: Music Editing	
	STEM and Fashion	<p>Articulate the integration of STEM in fashion.</p> <p>Identify careers that utilize elements of STEM and fashion.</p> <p>Describe the roles and duties of fashion designers and materials scientists.</p>
	STEM and Law Enforcement	<p>Articulate the integration of STEM in law enforcement.</p>

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Identify careers that utilize elements of STEM and law enforcement.

Conduct a forensic experiment determining a person's height from a footprint.

Project: Forensic Footprinting

Test

COURSE PROJECT, REVIEW, AND EXAM

Course Review

Exam