

# **Ex Tech Special Area**

**6<sup>th</sup> Grade –**

**Elementary Engineering**

**7<sup>th</sup> Grade –**

**Crime Scene Investigations**

**8<sup>th</sup> Grade –**

**Chemistry of Cooking**

**Created by Tracy Reynolds**

**2012-2013 School Year**

MIDDLE TOWNSHIP PUBLIC SCHOOLS  
CAPE MAY COURT HOUSE, NJ 08210  
CURRICULUM GUIDE 2012

**DISCIPLINE: Ex Tech- Elementary Engineering GRADE LEVEL: 6**

Grade Level Standards		Content/ Cluster	Essential Questions	Time Frame	Activities and Differentiation	Cross Curricular Connections	Assessment/ Benchmark	Resources
Standard	Domain							
Science: 5.1A, 5.1B, 5.1C, 5.1 D, 5.2A, 5.2B, 5.2C, 5.2 D, & 5.2E		Engine- ering Process & Bridge Building	What is the engineering design process?	2 days	<u>Engineering Interest Survey</u> Discussion of Engineers <u>Engineering Design Process</u> <u>Power Point Communications</u> <u>Game</u> <u>Save Fred Lab</u>	Technology: 8.2A, 8.2B, 8.2D, & 8.2E STEM Cluster: 9.4.1 & 9.4.2	Lab Questions Paired- Questioning Ticket Out Quizzes Review Games	<u>Bridges: Kids Discover Magazines</u>  <u>Building Big Bridges Video</u>  <u>NOVA: Super Bridge</u>  <a href="http://www.pbs.org/wgbh/nova/bridge">http://www.pbs.org/wgbh/nova/bridge</a>  <u>Rutger's Engineering Project</u>
			What are the main types of bridges?	2-3 days	Human Bridge Demonstration <u>Building Big Bridges Video</u>			
			What are the forces that	1 days	<u>Basic Bridges Reading</u>			

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			<p>affect bridges?</p> <p>What are the strengths and weaknesses of each bridge type?</p>	7 days	<p>Demonstration with jump rope and student volunteers to model the forces</p> <p><u>Which Bridge?</u></p> <p>Sheet &amp; Web site Activity</p> <p>Bridge Blueprints &amp; measurements</p> <p>Construction of bridge and test of weight held</p> <p>Modifications and retest experiment</p> <p>Compare results and bridge types</p> <p>Multimedia presentation</p>			

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					sharing analysis			
Science: 5.1A, 5.1B, 5.1C, 5.1D, 5.2A, 5.2B, 5.2C, 5.2 D, & 5.2 E		Rocketry	What are Newton's Three Laws?  How is Newton's First Law involved with the	2 days  1 day	Balloon demonstration <u>Partner Lifting Challenge</u> Scale Demonstration of Weight Reading of <u>Rocketry Pop Can Hero Engine Lab</u>  <u>Heavy Lifting Lab</u> Design a Two-Stage Rocket	Technology: 8.2A, 8.2B, 8.2D, & 8.2E STEM Cluster: 9.4.1 & 9.4.2	Lab Questions Paired-Questioning Ticket Out Quizzes Review Games	<u>NASA: Rocketry Unit</u>  <u>Prentice Hall: Astronomy Books</u>

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			operation of balloon rockets?					
			How is Newton's Second Law involved with the operation of Newton Cars?	1 day	<u>Newton Car Lab</u>			
			How Newton's Third Law involved with the operation of rocket	2 days	<u>Rocket Races Lab</u> Calculate the speeds of rockets <u>Pop Rocket Lab-</u>			

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			powered cars and paper rockets?		Paper rockets			
Science: 5.1A, 5.1B, 5.1C, 5.1D, 5.2A, 5.2B, 5.2C, 5.2 D, & 5.2 E	Cars & Speed	What are the parts of a car and how do the parts work together to create movement?	2 days	Review engineering process Discussion of how a car moves Brainstorm list of supplies Draw a blueprint. Construct an edible car	Technology: 8.2A, 8.2B, 8.2D, & 8.2E STEM Cluster: 9.4.1 & 9.4.2	Lab Questions Paired-Questioning Ticket Out Quizzes Review Games	<u>Forces &amp; Motion:</u> <u>McDougall</u> <u>Littell Books</u>  <u>STEM Hand-book for Kids</u> by Illinois Valley Community College	
		How are velocity and speed related?	3 days	Race the cars Calculate speeds Create graphs Reevaluate designs				

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					and modify cars Retest and compare results			
Science: 5.1A, 5.1B, 5.1C, 5.1D, 5.2A, 5.2B, 5.2C, 5.2 D, & 5.2 E	Soda Geysers	What causes the carbonation in soda?	1 day	Scientific method discussion Discuss soda and carbonation Discuss reactants Introduce challenge activity <u>Part One: Soda Geysers Lab</u>	Technology: 8.2A, 8.2B, 8.2D, & 8.2E STEM Cluster: 9.4.1 & 9.4.2	Lab Questions Paired- Questioning Ticket Out Quizzes Review Games	<u>STEM Hand- book for Kids</u> by Illinois Valley Community College	
		How does the soda type and reactant affect	1 day	<u>Part Two: Soda Geysers Lab</u>				

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			the geyser strength and bubbling?					



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DISCIPLINE: Ex Tech- Crime Scene Investigations GRADE LEVEL: 7

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Standard	Domain							
Science: 5.1A, 5.1B, 5.1C, 5.1D, 5.2A, 5.2C, 5.2 D, 5.2E, 5.3B, & 5.3 D		Crime Scene & Eyewitn- ess Basics	What do crime scene labs do?	2 days	Crime Scene Witness Sheet Memory Match Game <u>United Streaming:</u> <u>Forensics</u> Eyewitness Notes	Technology: 8.2A, 8.2B, 8.2D, & 8.2E STEM Cluster: 9.4.1 & 9.4.2	Lab Questions Paired- Questioning Ticket Out Quizzes Review Games Daily Do Nows Solve Cases	<u>Science Spot</u>  <u>United</u> <u>Streaming</u>  <u>History</u> <u>Channel: FBI</u> <u>Crime Lab</u>  <u>Forensic Files</u>  <u>Detectives:</u> <u>Kids Discover</u> <u>Magazine</u>
			What skills do investigators need to solve crimes?	2 days	Crime Scene Notes <u>Art of Crime</u> <u>Detection Website</u> & Sheet Unit 1 Review A to Z Challenge			



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Grade Level Standards		Content/ Cluster	Essential Questions	Time Frame	Activities and Differentiation	Cross Curricular Connections	Assessment/ Benchmark	Resources
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			crimes?		Bite Mark Evidence Lab Bite Mark Challenge			
			What is the difference between fibers and natural hairs?	3 days	United Streaming: Value of Evidence Hair & Fibers Notes Hair & Fibers Lab Hair & Fibers Challenge Hair Detective Online Activity			
			How is chromatog- raphy useful in solving	1- 2 days	Chromatography Notes Sample Pen Chromatography			

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			crimes?		Lab Chromatography Challenge Physical Evidence Review			
Science: 5.1A, 5.1B, 5.1C, 5.1D, 5.2A, 5.2C, 5.2 D, 5.2E, 5.3B, & 5.3 D	Blood Basics	What are the different types of blood and how can they be identified?	2 days	Blood Basic Notes Ernie's Exit Lab Blood Basics Online Computer Lab	Technology: 8.2A, 8.2B, 8.2D, & 8.2E STEM Cluster: 9.4.1 & 9.4.2	Lab Questions Paired- Questioning Ticket Out Quizzes Review Games Daily Do News Solve Cases	<u>Science Spot</u> <u>United</u> <u>Streaming</u> <u>Forensic Files</u> <u>Detectives:</u> <u>Kids Discover</u> <u>Magazine</u>	
		How can one determine the height or angle of blood	3 days	Blood Splatter Labs Blood Splatter Review Blood Unit Review				

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Standard	Domain							
			splatter?					
Science: 5.1A, 5.1B, 5.1C, 5.1D, 5.2A, 5.2C, 5.2 D, 5.2E, 5.3B, & 5.3 D	Fire Safety	What are the patterns that fire investigators examine to determine if arson occurred?	4 days	Fire Science Notes <u>United Streaming:</u> <u>Science of Fire</u> <u>20/20 Burned</u> Guest Speaker Fire Unit Review	Technology: 8.2A, 8.2B, 8.2D, & 8.2E STEM Cluster: 9.4.1 & 9.4.2	Lab Questions Paired- Questioning Ticket Out Quizzes Review Games Daily Do News Solve Cases	<u>Science Spot</u> <u>United</u> <u>Streaming</u> <u>Forensic Files</u> <u>20/20 Burned</u> <u>Detectives:</u> <u>Kids Discover</u> <u>Magazine</u>	

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**DISCIPLINE: Ex Tech- Chemistry of Cooking GRADE LEVEL: 8**

Grade Level Standards		Content/ Cluster	Essential Questions	Time Frame	Activities and Differentiation	Cross Curricular Connections	Assessment/ Benchmark	Resources
Standard	Domain							
Science: 5.1A, 5.1B, 5.1C, 5.1 D, 5.2A, 5.2B, 5.2C, & 5.2 D		Matter & Its Phases & Effects of Thermal Energy	How much energy is required to change a solid apple to liquid applesauce?  What temperature or amount of gelatin will make the best stretching gummy worm?	3 days  2 days	T-chart Short reading and video clip on <u>States of Matter</u> <u>Melting Apples</u> <u>Lab</u> Graphing  Review of states of matter <u>Gummy</u> <u>Invertebrate Lab</u>	Technology: 8.2A, 8.2B, 8.2D, & 8.2E STEM Cluster: 9.4.1 & 9.4.2	Lab Questions Paired- Questioning Ticket Out Quizzes Review Games Final cooking and chem. project	<u>Gourmet Lab:</u> <u>The Scientific</u> <u>Principles</u> <u>Behind Your</u> <u>Favorite Foods</u>  <u>Science</u> <u>Experiments</u> <u>You Can Eat</u>  <u>Education</u> <u>World</u>  <u>Chef Alton</u> <u>Brown Video</u> <u>Clips</u>

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			What causes popcorn to pop and what if you poke holes in the popcorn kernels? Will that help the heat get inside and pop the corn more quickly?	1 day	Popcorn Experiments (rotate through five) Graphing			
			What happens to marshmallows when heated and why?	1 day	Marshmallow Experiment			

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Science: 5.1A, 5.1B, 5.1C, 5.1D, 5.2A, 5.2B, 5.2C, & 5.2 D		Solutions, Suspensions, Mixtures, & Colloids	<p>What are the parts to a mixture such as salad dressing?</p> <p>What makes crystals grow in rock candy?</p> <p>What makes candies different colors and can the colors be separated?</p>	<p>2-4 days</p> <p>3-5 days</p> <p>1-2 days</p>	<p>Examine food items Make homemade dressing Play categorization game</p> <p>Make rock candy</p> <p>Chromatography fill in notes Ink Chromatography lab Candy Chromatography lab</p>	<p>Technology: 8.2A, 8.2B, 8.2D, &amp; 8.2E STEM Cluster: 9.4.1 &amp; 9.4.2</p>	<p>Lab Questions Paired-Questioning Ticket Out Quizzes Review Games Final cooking and chem. project</p>	<p><a href="#"><u>Science Experiments You Can Eat</u></a></p> <p><a href="#"><u>Education World</u></a></p> <p><a href="#"><u>Chef Alton Brown Video Clips</u></a></p>



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			How can one determine if solutions are basic or acidic?	1-2 days	Make cabbage juice indicator Discussion of pool pH Test household items Shine dull pennies with acids			
Science: 5.1A, 5.1B, 5.1C, 5.1D, 5.2A, 5.2B, 5.2C, & 5.2 D	Carbohydrates, Starches, Fats and Iron	How can one test for the presence of starch in food?	1 day	<u>Soda Cracker Lab</u> Iodine test for starch	Technology: 8.2A, 8.2B, 8.2D, & 8.2E STEM Cluster: 9.4.1 & 9.4.2	Lab Questions Paired-Questioning Ticket Out Quizzes Review Games Final cooking and chem.		
		Is added sugar necessary for the formation of a firm jelly	1 day	Discuss pectin. Test for the effects of pectin and sugar on Jell-O making				

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			or can a pectin-acid combo do it alone?				project	
			How is the process of making butter utilizing the properties of fat?	1 day	Discussion of oils and fats Talk about milk vs. cream Make butter Around the World Game			
			How can supplemental iron be removed from a processed	1 day	Discussion of cereal boxes and nutrition labels Removal of Iron from Cereal Lab Test for iron in			

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			food for testing?		juices			
Science: 5.1A, 5.1B, 5.1C, 5.1D, 5.2A, 5.2B, 5.2C, & 5.2 D	Physical & Chemical Changes	<p>What is the difference between chemical changes and physical changes?</p> <p>Is there a way to stop or slow down enzymatic browning of</p>	<p>1-2 days</p> <p>1 day</p>	<p>Chemical and physical changes game</p> <p>Categorization Chart</p> <p>Make homemade ice cream</p> <p>Discuss browning and rusting</p> <p>Kivi Stopping Browning Lab</p>	<p>Technology: 8.2A, 8.2B, 8.2D, &amp; 8.2E</p> <p>STEM Cluster: 9.4.1 &amp; 9.4.2</p>	<p>Lab Questions</p> <p>Paired-Questioning Ticket Out</p> <p>Quizzes</p> <p>Review Games</p> <p>Final cooking and chem. project</p>	<p><u>Gourmet Lab: The Scientific Principles Behind Your Favorite Foods</u></p> <p><u>Science Experiments You Can Eat</u></p> <p><u>Education World</u></p> <p><u>Chef Alton Brown Video Clips</u></p>	

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			fruit?					
			How is yeast used to make pancakes?	6-7 days	Discuss yeast and its characteristics Grow homemade yeast Observe daily Make homemade pancakes			
			What is the process of fermentation and how is it used to make soda and pickles?	6-7 days	Make blueberry soda Observe changes daily			

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			What is the purpose of pulling salt water taffy and how does it affect the texture?	1-2 days	Make salt water taffy			