

Curriculum Map for Science Research

Content Area: Science

Course: Science Research

Grade Level: HS 10/11/12

Unit 1: Ideation Phase	<p>Long-Term Outcomes/Transfer Goals: <i>Students will be able to independently use their learning to:</i></p> <p>District Transfer Goals (Global Competencies):</p> <ul style="list-style-type: none"> CT.2: Students will be able to reflect on their own thinking when presented with alternative points of view, and revise and/or reconsider their thinking. CI: Students will be able to exhibit curiosity, imagination, flexibility, and perseverance in order to innovate and make valuable contributions to the community. <p>District Science Transfer Goals:</p> <ul style="list-style-type: none"> ST.1: Students will be able to actively seek and analyze new scientific information and perspectives to make sense of phenomena. ST.2: Students will be able to scientifically evaluate information to make informed decisions and/or design solutions. 		
Focus & Timeframe Approximately 1 ½ months	<p>Standards</p> <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> Practice 1- Asking Questions and Defining Problems Practice 8- Obtaining, evaluating, and communicating information 	<p>Conceptual Overview</p> <p>UNDERSTANDINGS <i>Students will understand that...</i></p> <ul style="list-style-type: none"> scientists present their research and findings in journals/articles that can be reviewed by peers. scientific research on a topic starts with a thorough review of the current literature on the topic 	<p>Rationale</p> <p><i>Students need to understand that scientists read published research conducted by other scientists in their field. Many ideas for research come from the synthesis of numerous ideas as well as identifying gaps in the current research. Researchers of all types often create an annotated bibliography to help organize the literature they have reviewed.</i></p>
Unit 2: Research Plan	<p>Long-Term Outcomes/Transfer Goals: <i>Students will be able to independently use their learning to:</i></p> <p>District Transfer Goals (Global Competencies):</p> <ul style="list-style-type: none"> CT.2: Students will be able to reflect on their own thinking when presented with alternative points of view, and revise and/or reconsider their thinking. CI: Students will be able to exhibit curiosity, imagination, flexibility, and perseverance in order to innovate and make valuable contributions to the community. <p>District Science Transfer Goals:</p> <ul style="list-style-type: none"> ST.1: Students will be able to actively seek and analyze new scientific information and perspectives to make sense of phenomena. ST.2: Students will be able to scientifically evaluate information to make informed decisions and/or design solutions. 		

	Standards	Conceptual Overview	Rationale
Focus & Timeframe: Approximately 1 ½ months	Science and Engineering Practices: <ul style="list-style-type: none"> ● Practice 1- Asking Questions and Defining Problems ● Practice 3-Planning and Carrying Out Investigations ● Practice 8- Obtaining, evaluating, and communicating information 	<i>Students will understand that...</i> <ul style="list-style-type: none"> ● scientists often generate testable questions based upon gaps identified in current research ● scientists use a systematic approach where variables are isolated as much as possible in order to test their hypothesis. 	<i>Students need to understand that good science research requires a solid understanding of the content and studies already conducted by scientists on the topic of interest. Prior to starting research, scientists develop a research plan which outlines the steps required to complete their study.</i>
Unit 3: Experimentation /Design Build	Long-Term Outcomes/Transfer Goals: <i>Students will be able to independently use their learning to:</i> District Transfer Goals (Global Competencies): <ul style="list-style-type: none"> ● CT.2: Students will be able to reflect on their own thinking when presented with alternative points of view, and revise and/or reconsider their thinking. ● CI:Students will be able to exhibit curiosity, imagination, flexibility, and perseverance in order to innovate and make valuable contributions to the community. District Science Transfer Goals: <ul style="list-style-type: none"> ● ST.1: Students will be able to actively seek and analyze new scientific information and perspectives to make sense of phenomena. ● ST.2: Students will be able to scientifically evaluate information to make informed decisions and/or design solutions. 		
	Standards	Conceptual Overview	Rationale
Focus & Timeframe Approximately 1 ½ months	Science and Engineering Practices: <i>Research Project Students:</i> <ul style="list-style-type: none"> ● Practice 3-Planning and Carrying Out Investigations <i>Engineering Project Students:</i> <ul style="list-style-type: none"> ● Practice 2-Developing and Using Models ● Practice 6-Constructing Explanations and Designing Solutions 	<i>Students will understand that...</i> <ul style="list-style-type: none"> ● even the best plans don't always work out the way they are expected. Adjustments and revisions are a normal part of the scientific and engineering process. ● all data should be collected in a neat and organized manner. 	<i>Students need to know that in science/engineering like life, unforeseen obstacles arise that at times cannot be avoided. Scientists/engineers make adjustments to their plan to compensate for setbacks and at times have to make radical changes to the original plan. These changes are normal and are part of the scientific method or engineering process.</i>

Unit 4: Analysis and Conclusions	Long-Term Outcomes/Transfer Goals: <i>Students will be able to independently use their learning to:</i> District Transfer Goals (Global Competencies): <ul style="list-style-type: none"> CT.1: Students will be able to analyze and evaluate evidence, arguments, claims and beliefs to draw conclusions, make informed decisions, and solve problems. District Science Transfer Goals: <ul style="list-style-type: none"> ST.2: Students will be able to scientifically evaluate information to make informed decisions and/or design solutions. 		
	Standards	Conceptual Overview	Rationale
Focus & Timeframe 2 Weeks	Science and Engineering Practices: Practice 4- Analyzing and Interpreting Data Practice 5-Using Mathematics and Computational Thinking Practice 6-Constructing Explanations and Designing Solutions	<i>Students will understand that...</i> <ul style="list-style-type: none"> scientists/engineers organize data in a manner that allows them to make sense of it through the use of graphs and statistical analysis conclusions drawn must be based upon strong statistical calculations otherwise the conclusions are not valid. all scientific studies have limitations which should be understood by the experimenter. 	<i>Students need to know that once collected, data must be presented in a form that can reveal patterns and relationships and allows results to be communicated to others. Because raw data as such have limited meaning, a major practice of scientists is to organize and interpret data through tabulating, graphing, or statistical analysis. Such analysis can bring out the meaning of data—and their relevance—so that they may be used as evidence to support conclusions.</i>
Unit 5: Communicating Information	Long-Term Outcomes/Transfer Goals: <i>Students will be able to independently use their learning to:</i> District Transfer Goals (Global Competencies): <ul style="list-style-type: none"> CI: Students will be able to exhibit curiosity, imagination, flexibility, and perseverance in order to innovate and make valuable contributions to the community. District Science Transfer Goals: <ul style="list-style-type: none"> ST.3: Students will be able to engage in public discourse on science-related issues, using scientific reasoning and empirical evidence. 		
	Standards	Conceptual Overview	Rationale
Focus & Timeframe 6 Weeks	Science and Engineering Practices: <ul style="list-style-type: none"> Practice 8- Obtaining, evaluating, and communicating information 	<i>Students will understand that...</i> <ul style="list-style-type: none"> the ability to communicate findings in a manner which is understandable is as important as conducting the study. it is important for scientists to make a 	<i>Students should know that the ability to produce scientific and technical text are fundamental practices of science and engineering, as is the ability to communicate clearly and persuasively.</i>

		connection of relevance to the intended audience.	
Unit 6: Refinement	<p>Long-Term Outcomes/Transfer Goals: <i>Students will be able to independently use their learning to:</i> District Transfer Goals (Global Competencies):</p> <ul style="list-style-type: none"> CT.2: Students will be able to reflect on their own thinking when presented with alternative points of view, and revise and/or reconsider their thinking. CI: Students will be able to exhibit curiosity, imagination, flexibility, and perseverance in order to innovate and make valuable contributions to the community. <p>District Science Transfer Goals:</p> <ul style="list-style-type: none"> ST.1: Students will be able to actively seek and analyze new scientific information and perspectives to make sense of phenomena. ST.2: Students will be able to scientifically evaluate information to make informed decisions and/or design solutions. 		
	Standards	Conceptual Overview	Rationale
Focus & Timeframe 4 Weeks	Science and Engineering Practices: <ul style="list-style-type: none"> Practice 1- Asking Questions and Defining Problems Practice 3-Planning and Carrying Out Investigations Practice 8- Obtaining, evaluating, and communicating information 	<i>Students will understand that...</i> <ul style="list-style-type: none"> The scientific method and engineering cycle are continuous processes and after initial ideas have been tested, scientists and engineers often make changes and try new approaches. 	<i>Students need to know that science and engineering are ongoing processes that don't have a definitive end. Science and engineering will constantly build upon future studies or designs to gain additional insight or to make a design better.</i>