

## Carter County NGSS Science Curriculum

Unit Title/Topic: Experimental Design and Graphing Skills	Grade: 9th	Time: 6 weeks
<p>HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.</p> <p>HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.</p> <p>HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.</p> <p><b>Common Core State Standards Connections:</b></p> <p><b>ELA/Literacy –</b>  RST.11-12.7 <b>Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-ETS1-1),(HS-ETS1-3)</b>  RST.11-12.8 <b>Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ETS1-1),(HS-ETS1-3)</b>  RST.11-12.9 <b>Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (HS-ETS1-1),(HS-ETS1-3)</b></p> <p><b>Mathematics –</b>  MP.2 <b>Reason abstractly and quantitatively. (HS-ETS1-1),(HS-ETS1-3),(HS-ETS1-4)</b>  MP.4 <b>Model with mathematics. (HS-ETS1-1),(HS-ETS1-2),(HS-ETS1-3),(HS-ETS1-4)</b></p> <p>HSN-Q.A.1 <b>Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-PS1-2),(HS-PS1-4),(HS-PS1-5),(HS-PS1-7)</b></p>		
<p><b>Learning Targets/I Cans:</b></p> <p><b>I can understand and use necessary science skills and explain how they relate to daily life.</b></p> <p><b>I can understand and use appropriate experimental variables and explain their importance to experimental design.</b></p> <p><b>I can gather and/or use data to demonstrate appropriate graphing techniques.</b></p> <p><b>I can analyze and interpret graphs/tables and draw conclusions.</b></p>		
<p><b>Science and Engineering Practices</b></p> <p>Planning and Carrying Out Investigations  <b>Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.</b></p> <ul style="list-style-type: none"> <li>Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS1-3)</li> <li>Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats</li> </ul>	<p><b>Disciplinary Core Ideas</b></p>	<p><b>Crosscutting Concepts</b></p> <p><b>Connection to Engineering, Technology, and Applications of Science</b>  <b>Interdependence of Science, Engineering, and Technology</b></p> <ul style="list-style-type: none"> <li>Science and engineering complement each other in the cycle known as research and development (R&amp;D). Many R&amp;D projects may involve scientists, engineers, and others with wide ranges of expertise. (HSESS1-2),(HS-ESS1-4)</li> </ul> <p><b>Influence of Science, Engineering, and Technology on Society and the Natural World</b></p> <ul style="list-style-type: none"> <li>New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (HS-ETS1-1) (HSETS1-3)</li> </ul>

<p>(including orally, graphically, textually, and mathematically). (HS-PS2-6)</p> <ul style="list-style-type: none"> <li>Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS3-4)</li> <li>Communicate technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HSPS4-5)</li> <li>Communicate scientific ideas (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-ESS1-3)</li> </ul>		
<p><b>Critical Content Vocabulary:</b>  <b>Hypothesis</b>  <b>Analyze</b>  <b>Inverse relationship</b>  <b>Direct relationship</b>  <b>Positive correlation</b>  <b>Negative correlation</b></p>		
<p><b>Resources:</b></p>		