

<p>Grade, Subject/Course: 8th grade, Technology and Engineering</p>	
<p>Unit: Aviation</p>	<p><input checked="" type="checkbox"/> Essential <input type="checkbox"/> Important <input type="checkbox"/> Compact</p>
<p>Big Idea: How does an airplane fly?</p>	
<p>PA Core Content Standards/Anchors (or National Standards): 3.5.6-8.A Students who demonstrate understanding can research information from various sources to use and maintain technological products or systems. 3.5.6-8.F Students who demonstrate understanding can analyze examples of technologies that have changed the way people think, interact, live, and communicate. 3.5.6-8.J Students who demonstrate understanding can use tools, materials, and machines to safely diagnose, adjust, and repair systems. 3.5.6-8.L Students who demonstrate understanding can design methods to gather data about technological systems. 3.5.6-8.M Students who demonstrate understanding can develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. 3.5.6-8.N Students who demonstrate understanding can analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. 3.5.6-8.P Students who demonstrate understanding can evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. 3.5.6-8.Q Students who demonstrate understanding can apply a technology and engineering design thinking process. 3.5.6-8.S Students who demonstrate understanding can illustrate the benefits and opportunities associated with different approaches to design. 3.5.6-8.U Students who demonstrate understanding can evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design. 3.5.6-8.V Students who demonstrate understanding can refine design solutions to address criteria and constraints. 3.5.6-8.X Students who demonstrate understanding can defend decisions related to a design problem. 3.5.6-8.Y Students who demonstrate understanding can compare, contrast, and identify overlap between the contributions of science, technology, engineering, and mathematics in the development of technological systems.</p>	<p>Interdisciplinary Standards (if applicable):</p> <p>Math: CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools. CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations.</p> <p>Reading and Writing: CC.3.5.6-8.C. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. CC.3.5.6-8.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics. CC.3.6.6-8.G. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). CC.3.5.6-8.I Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. CC.3.6.6-8.H Draw evidence from informational texts to support analysis, reflection, and research.</p>

<p>3.5.6-8.BB Students who demonstrate understanding can demonstrate how knowledge gained from other content areas affects the development of technological products and systems.</p> <p>3.5.6-8.DD Students who demonstrate understanding can engage in a research and development process to simulate how inventions and innovations have evolved through systematic tests and refinements.</p> <p>3.5.6-8.II Students who demonstrate understanding can predict outcomes of a future product or system at the beginning of the design process.</p> <p>3.5.6-8.KK Students who demonstrate understanding can explain how technology and engineering are closely linked to creativity, which can result in both intended and unintended innovations</p> <p>3.5.6-8.JJ Students who demonstrate understanding can apply informed problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p>	
<p>Essential Questions:</p> <ul style="list-style-type: none"> • How do the wings change the flight of a plane? 	<p>Understandings:</p> <p>Students will understand that...</p> <ul style="list-style-type: none"> • Aviation has changed our society • How to apply the Engineering Design Process to solve a problem • Knowledge from Math, Science, and ELA affects the development of airplanes
<p>Knowledge:</p> <p>Students will know ...</p> <ul style="list-style-type: none"> • The changes that they make to their design impacts how the airplane flies. • How to design an airplane with the given parameters • Why an airplane flies 	<p>Do/Skills:</p> <p>Students will be able to...</p> <ul style="list-style-type: none"> • Gather information and research from various sources • Safely demonstrate how to use scroll saws, orbital sanders, and hand tools
<p>Vocabulary:</p> <p>Empathize, Define, Ideate, Prototype, Test, Assess</p> <p>Span, cord</p> <p>Aileron, flap, horizontal stabilizer, elevator, vertical stabilizer, rudder</p> <p>Center of lift, center of gravity</p>	<p>Core Resources:</p> <p>Aviation Lesson Plan</p> <p>Ring Wing Instructions</p> <p>What Design Should I Use?</p> <p>Why do Airplanes Fly?</p>

<p>Common Assessment(s): Ring Wing Results Glider Evaluation</p>	<p>Supplemental Resources: https://www.iteea.org/EbD.aspx</p>
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Elizabethtown Area School District Curriculum Guide

Date Adopted: Pending Board Approval

<p>Grade, Subject/Course: 8th grade, Technology and Engineering</p>	
<p>Unit: Automation</p>	<p><input checked="" type="checkbox"/> Essential <input type="checkbox"/> Important <input type="checkbox"/> Compact</p>
<p>Big Idea: How can electronic components be controlled to perform specific tasks?</p>	
<p>PA Core Content Standards/Anchors (or National Standards):</p> <ul style="list-style-type: none"> • 3.5.6-8.A Students who demonstrate understanding can research information from various sources to use and maintain technological products or systems. • 3.5.6-8.F Students who demonstrate understanding can analyze examples of technologies that have changed the way people think, interact, live, and communicate. • 3.5.6-8.J Students who demonstrate understanding can use tools, materials, and machines to safely diagnose, adjust, and repair systems. • 3.5.6-8.K Students who demonstrate understanding can use devices to control technological systems. • 3.5.6-8.N Students who demonstrate understanding can analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. • 3.5.6-8.V Students who demonstrate understanding can refine design solutions to address criteria and constraints. • 3.5.6-8.Y Students who demonstrate understanding can compare, contrast, and identify overlap between the contributions of science, 	<p>Interdisciplinary Standards (if applicable):</p> <p>Math: CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools. CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations.</p> <p>Reading and Writing: CC.3.5.6-8.C. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. CC.3.5.6-8.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics. CC.3.6.6-8.G. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). CC.3.5.6-8.I Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. CC.3.6.6-8.H Draw evidence from informational texts to support analysis, reflection, and research.</p>

<p>technology, engineering, and mathematics in the development of technological systems.</p> <ul style="list-style-type: none"> • 3.5.6-8.EE Students who demonstrate understanding can differentiate between inputs, processes, outputs, and feedback in technological systems. • 3.5.6-8.GG Students who demonstrate understanding can create an open-loop system that has no feedback path and requires human intervention. • 3.5.6-8.HH Students who demonstrate understanding can create a closed-loop system that has a feedback path and requires no human intervention. • 3.5.6-8.LL Students who demonstrate understanding can compare how different technologies involve different sets of processes. 	
<p>Essential Questions:</p> <ul style="list-style-type: none"> • How can the systems approach be applied to an electrical system to solve a problem? • How can the systems approach be used to troubleshoot an electrical system? 	<p>Understandings: Students will understand that...</p> <ul style="list-style-type: none"> • Information from various sources can be used to maintain technological systems • They can refine design solutions to address criteria and constraints. • They can compare, contrast, and identify overlap between the contributions of science, technology, engineering, and mathematics in the development of technological systems. • Different technologies involve different sets of processes.
<p>Knowledge: Students will know that...</p> <ul style="list-style-type: none"> • They can analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. • They can differentiate between inputs, processes, outputs, and feedback in technological systems. 	<p>Do/Skills: Students will be able to...</p> <ul style="list-style-type: none"> • Use tools, materials, and machines to safely diagnose, adjust, and repair systems. • Create an open-loop system that has no feedback path and requires human intervention. • Create a closed-loop system that has a feedback path and requires no human intervention.

<p><u>Vocabulary:</u> Empathize, Define, Ideate, Prototype, Test, Assess Automation, robotics, electronics Breadboard Input, process, output Sensor, resistor, servo motor Threshold</p>	<p><u>Core Resources:</u></p> <ul style="list-style-type: none">● Automation Lesson Plan● https://learn.sparkfun.com/tutorials/sparkfun-inventors-kit-experiment-guide---v41/introduction
<p><u>Common Assessment(s):</u></p> <ul style="list-style-type: none">● Sparkfun Inventor's Kit Checklist	<p><u>Supplemental Resources:</u></p> <ul style="list-style-type: none">● Resources and Going Further link on Sparkfun's page● Sparkfun - Robotics 101 - Video Series● Adventures in Science - YouTube channel for Arduino projects● TinkerCad Circuits