AOPA 10th Grade Aviation STEM Curriculum Standard Alignment

Overview: This course will introduce students to basic aircraft and UAS structures and their major components, principles of flight, and the fundamental physical laws affecting flight. Students will learn about basic aerodynamics and forces that act on aircraft in flight. This course will also introduce the main systems found on large and small airplanes and UAS.

Introduction to Flight, Semester 1

Unit 1 Getting to Know Aircraft

Description:
Students will explore the types of aircraft operating in today's aviation environment, including traditional manned aircraft and remote piloted aircraft, or drones. They'll learn how the FAA categorizes aircraft and how to recognize aircraft of different types. Students will then investigate some of the factors affecting aircraft design, including how the aircraft will be used. This unit will give students a framework on which to build a deeper understanding of the variations in aircraft.

Next Generation Science Standards

Three-dimensional Learning

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.

- Science and Engineering Practices
  - Asking Questions and Defining Problems
  - Constructing Explanations and Designing Solutions
- Disciplinary Core Ideas
  - ETS1.A: Defining and Delimiting Engineering Problems
- Crosscutting Concepts
  - None
  - ETS1.C: Optimizing the Design Solution

HS-ETS1-3 - Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

- Science and Engineering Practices
  - Constructing Explanations and Designing Solutions
- Disciplinary Core Ideas
  - ETS1.B: Developing Possible Solutions
- Crosscutting Concepts

○ None
Common Core State Standards
MP.2: Reason abstractly and quantitatively.
MP.3: Construct viable arguments and critique the reasoning of others.
MP.7: Look for and make use of structure.
RI.9-10.1: Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
RI.9-10.2: Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.
RI.9-10.4: Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).
RST.9-10.2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
RST.9-10.4 - 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 9-10 texts and topics.
SL.9-10.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
W.9-10.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
W.9-10.6: Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
W.9-10.7: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
W.9-10.8: Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
W.9-10.9: Draw evidence from literary or informational texts to support analysis, reflection, and research.
WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research.

Unit 2 How Aircraft Are Made

Description:

Students will begin this unit by learning to identify the various parts of an aircraft, including the common and distinguishing features of airplanes, helicopters, unmanned aircraft, and some less common aircraft types. They will go on to look at aircraft construction with an emphasis on the materials used and the safety features of various aircraft types.

Next Generation Science Standards

Three-dimensional Learning

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.

- Science and Engineering Practices
  - Asking Questions and Defining Problems
  - Constructing Explanations and Designing Solutions
- Disciplinary Core Ideas
  - ETS1.A: Defining and Delimiting Engineering Problems
  - ETS1.B: Developing Possible Solutions
- Crosscutting Concepts
  - None

HS-ETS1-3 - Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

- Science and Engineering Practices
  - Constructing Explanations and Designing Solutions
  - Asking Questions and Defining Problems
- Disciplinary Core Ideas
  - ETS1.A: Defining and Delimiting Engineering Problems
  - ETS1.B: Developing Possible Solutions
- Connections to Engineering, Technology, and Applications of Science
  - Influence of Science, Engineering, and Technology on Society and the Natural World: 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, HS-ETS1-3)
- Crosscutting Concepts
  - None

Common Core State Standards

MP.2: Reason abstractly and quantitatively.
MP.5: Use appropriate tools strategically.
MP.7: Look for and make use of structure.
RI.9-10.4: 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 9-10 texts and topics.
RST.9-10.2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
RST.9-10.4 - 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 9-10 texts and topics.
W.9-10.2: Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
W.9-10.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WHST.9-10.6 - Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
WHST.9-10.8 - Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research.

Unit 3 Understanding Air

Description:

To understand flight, students must understand the medium in which aircraft operate. This unit will focus on the role air plays in flight, including its behavior as a fluid and the importance of air pressure. Students will also learn why the density of air is important, how it changes, and how to measure it. The concept of density altitude will be introduced.

Next Generation Science Standards

Three-dimensional Learning

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HS-PS2-1 - Analyze data to support the claim that Newton's second law of motion described the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.
• Science and Engineering Practices
  ○ Analyzing and Interpreting data
  ○ Obtaining, evaluating, and communicating information
  ○ Constructing explanations and designing solutions
• Disciplinary Core Ideas
  ○ PS1.A: Structure and properties of matter
  ○ PS2.A: Forces and motion
• Crosscutting Concepts
  ○ Cause and effect
  ○ System and system models
  ○ Structure and function

HS-PS2-2 - Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.
• Science and Engineering Practices
  ○ Using Mathematics and Computational Thinking
• Disciplinary Core Ideas
  ○ PS2.A: Forces and Motion
• Crosscutting Concepts
  ○ Systems and System Models

HS-PS3-1- Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
• Science and Engineering Practices
  ○ Using Mathematics and Computational Thinking
• Disciplinary Core Ideas
  ○ PS3.A Definitions of Energy
  ○ PS3.B Conservation of Energy and Energy Transfer
• Crosscutting Concepts
  ○ Systems and System Models

HS-PS3-2 - Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).
• Science and Engineering Practices
  ○ Developing and Using Models
  ○ Planning and Carrying Out Investigations
• Disciplinary Core Ideas
  ○ PS3.A Definitions of Energy
• Crosscutting Concepts
  ○ Energy and Matter

Common Core State Standards
MP.2 Reason abstractly and quantitatively.
MP.4 Model with mathematics.
HSA.SSE.A.1 Interpret expressions that represent a quantity in terms of its context.
HSN.Q.A.1 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 displays.
HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.
HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
RST.9-10.7 - Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
RST.11-12.7 - 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.
WHST.9-10.1 - Write arguments focused on discipline-specific content.
WHST.9-10.8 - Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
WHST.11-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
WHST.9-12.7 - Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
WHST.9-12.9 - Draw evidence from informational texts to support analysis, reflection, and research.

Unit 4 Forces of Flight

Description:

This unit takes an in-depth look into the forces affecting aircraft in motion, including the four forces of flight—lift, weight, thrust, and drag. Students will start by gaining an understanding of how aircraft move above the surface of the Earth, including how the flight path is affected by forces such as wind. They will go on to explore how lift is produced, the role of airfoil design, how to calculate lift, and the meaning and significance of an aerodynamic stall. They will also learn how to determine weight and balance for an aircraft and how faulty weight and balance affect flight characteristics. Students will examine how the power developed by an aircraft engine is converted into thrust and how various types of drag affect aircraft performance.

Next Generation Science Standards

Three-dimensional Learning

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.

- Science and Engineering Practices
  - Asking Questions and Defining Problems
  - Constructing Explanations and Designing Solutions
- Disciplinary Core Ideas
  - ETS1.A: Defining and Delimiting Engineering Problems
- Crosscutting Concepts
  - None

HS-ETS1-3 - Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

- Science and Engineering Practices
  - Constructing Explanations and Designing Solutions
- Disciplinary Core Ideas
  - ETS1.B: Developing Possible Solutions
- Crosscutting Concepts
  - None

HS-ETS1-4 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

- Science and Engineering Practices
  - Constructing Explanations and Designing Solutions

• Disciplinary Core Ideas
  ○ ETS1.C: Optimizing the Design Solution
• Crosscutting Concepts
  ○ None

HS-PS2-1 - Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.
• Science and Engineering Practices
  ○ Analyzing and Interpreting Data
  ○ Constructing Explanations and Designing Solutions
  ○ Obtaining, Evaluating, and Communicating Information
  ○ Using Mathematics and Computational Thinking
• Disciplinary Core Ideas
  ○ PS2.A: Forces and Motion
  ○ PS2.B: Types of Interactions
• Crosscutting Concepts
  ○ Cause and Effect

HS-PS2-2 - Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.
• Science and Engineering Practices
  ○ Analyzing and Interpreting Data
  ○ Using Mathematics and Computational Thinking
• Disciplinary Core Ideas
  ○ PS2.A Forces and Motion
  ○ PS2.B Types of Interactions
• Crosscutting Concepts
  ○ Cause and Effect

HS-PS2-3 - Apply scientific and engineering ideas to design, evaluate and refine a device that minimizes the force on a macroscopic object during a collision.
• Science and Engineering Practices
  ○ Constructing explanations and Designing Solutions
• Disciplinary Core Ideas
  ○ PS2.A Forces and Motion
• Crosscutting Concepts
  ○ Cause and Effect

HS-PS2-4. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. • Science and Engineering Practices   ○ Analyzing and Interpreting Data

○ Using Mathematics and Computational Thinking ○ Obtaining, Evaluating, and Communicating Information • Disciplinary Core Ideas ○ PS2.A Forces and Motion ○ PS2.B Types of Interactions • Crosscutting Concepts ○ Cause and Effect
HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. • Science and Engineering Practices ○ **Analyzing and Interpreting Data** Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. ○ **Obtaining, Evaluating, and Communicating Information** 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 (including orally, graphically, textually, and mathematically) • Disciplinary Core Ideas ○ PS2.B1: Types of Interactions Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects • Crosscutting Concepts ○ Cause and Effect Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.
Common Core State Standards
MP.2 - Reason abstractly and quantitatively.
MP.4 - Model with mathematics. (HS-ETS1-2)
HSA.CED.A.1 - Create equations and inequalities in one variable and use them to solve problems.
HSA.CED.A.2 - Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
HSN.Q.A.1 - Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin in graphs and data displays.
HSN.Q.A.2 - Define appropriate quantities for the purpose of descriptive modeling.
HSN.Q.A.3 - Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

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HSN.VM.A.1 - Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v, |v|, ||v||, v).
HSN.VM.A.2 - Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.
HSN.VM.A.3 - Solve problems involving velocity and other quantities that can be represented by vectors.
HSS-IS.A.1 - Represent data with plots on the real number line (dot plots, histograms, and box plots).
RST.9-10.1 - Cite specific textual evidence to support analysis of science and technical texts attending to the precise details of explanations and descriptions.
RST.9-10.2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
RST.9-10.4 - 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 9-10 texts and topics.
RST.11-12.1 - Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the authors makes and to any gaps or inconsistencies in the account.
RST.11-12.7 - 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.
SL.9-10.2 - Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
SL.9-10.4 - Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.
W.9-10.1.B - Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge.
W.9-10.2 - Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
WHST.9-10.2 - Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
WHST.9-10.4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WHST.9-10.6 - Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
WHST.9-10.8 - Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research

question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research.
WHST.11-12.2 - Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
WHST.11-12.9 - Draw evidence from informational texts to support analysis, reflection, and research.

Unit 5 Aircraft Stability and Control

Description:

In this unit, students will learn how aircraft are controlled and the role stability plays in aircraft performance. Students will first look at how stability, and instability, are designed into aircraft. They will also look at both primary and secondary flight controls and how they are used to manage pitch, roll, and yaw. Students will also explore flight controls for unmanned aircraft.

Students will learn how an airplane turns during flight, with an emphasis on how airplanes make coordinated turns. The act of maneuvering an aircraft creates stresses that can affect the aircraft's performance and even its structural integrity. In this unit, students will also learn about the types of structural loads aircraft encounter during flight as well as the role of aircraft design in determining load limits. Finally, they will explore how the loads placed on an aircraft affect aerodynamic stalls and how flying in rough air can affect the loads on an aircraft.

Next Generation Science Standards

Three-dimensional Learning

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.

- Science and Engineering Practices
  - Asking Questions and Defining Problems
  - Constructing Explanations and Designing Solutions
- Disciplinary Core Ideas
  - ETS1.A: Defining and Delimiting Engineering Problems
- Crosscutting Concepts
  - None

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HS-ETS1-3 - Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.
• Science and Engineering Practices
  ○ Constructing Explanations and Designing Solutions
• Disciplinary Core Ideas
  ○ ETS1.B: Developing Possible Solutions
• Crosscutting Concepts
  ○ None

HS-ETS1-4 - Evaluate a solution to a complex real-world problem based on prioritized criteria and trade offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.
• Science and Engineering Principles
  ○ Asking questions and Defining Problems
• Disciplinary Core Ideas
  ○ ETS1.B Developing Possible Solutions
• Crosscutting concepts
  ○ None

HS-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, it mass, and its acceleration
• Science and Engineering Practices
  ○ Analyzing and Interpreting data
  ○ Constructing explanations and designing solutions
• Disciplinary Core Ideas
  ○ PS2.A: Forces in Motion
  ○ PS2.B: Types of Interactions
  ○ ETS1.A: Defining and Delimiting an Engineering Problem
• Cross Cutting Concepts
  ○ Cause and Effect
  ○ Structure and Function

HS-PS2-2 - Use mathematical representations to support the claim that total momentum of a system of objects is conserved when there is no net force on the system.
• Science and Engineering Principles
  ○ Analyzing and Interpreting Data
  ○ Using Mathematical and Computational Thinking

○ Obtaining, Evaluating, and Communicating Information ○ Planning and Carrying out Investigations • Disciplinary Core Ideas ○ PS2.A Forces and Motion ○ PS2.B Types of Interactions • Crosscutting Concepts ○ Cause and Effect ○ Structure and Function
HS-PS2-4 - Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. • Science and Engineering Practices ○ Analyzing and Interpreting Data ○ Obtaining, Evaluating, and Communicating Information • Disciplinary Core Ideas ○ PS2.A Forces and Motion ○ PS2.B Types of Interactions • Crosscutting Concepts ○ Cause and Effect
Common Core State Standards
MP.2 - Reason abstractly and quantitatively.
MP.4 - Model with Mathematics.
RST.9-10.1 - Cite specific textual evidence to support analysis of science and technical texts attending to the precise details of explanations and descriptions.
RST.9-10.2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
RST.9-10.3 - Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
RST.9-10.4 - 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 9-10 texts and topics.
RST.9-10.7 - Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically, (e.g., in an equation) into words.
WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research.
W.9-10.2 - Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

W.9-10.2E - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
W.9-10.2F Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic)
W.9-10.4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
W.9-10.8 - Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
WHST.9-10.6 - Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
WHST.9-10.8 - Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research.

Unit 6 Career Skills

Description:

Students will continue planning for a career in aviation and aerospace. Students will work on practical skills for presenting themselves to potential employers, including developing an elevator speech, completing a job application, and developing a resume. Students will go on to learn what a career portfolio is, how it can be used to develop their career, and prepare or revise their own personalized career portfolio.

Common Core State Standards

L.9-10.1 - Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
L.9-10.1A - Use parallel structure
L.9-10.1B - Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.

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SL.9-10.1C - Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.
SL.9-10.1D - Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding, and make new connections in light of the evidence and reasoning presented.
RST.9-10.2 - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
WHST.9-10.1D - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
WHST.9-10.2 - Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
WHST.9-10.2A - Introduce a topic; organize complex ideas, concepts and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
WHST.9-10.2C - Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among the complex ideas and concepts.
WHST.9-10.2D - Use precise language and domain-specific vocabulary to manage the complexity of the topic.
WHST.9-10.4 - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WHST.9-10.5 - Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
WHST.9-10.6 - Use technology, including the Internet to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link other information and to display information flexibly and dynamically.
WHST.9-10.7 - Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
WHST.9-10.8 - Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
WHST.9-10.9 - Draw evidence from informational texts to support analysis, reflection, and research.