Department:	Science and Technology Education	Course:	PLTW Gateway to Technology (DSF)	Unit 9 Title:	Flight and Space History of Flight and Space	Grade Level(s):	7-8
Assessed Trimester:	Trimester 3	Pacing:	3 Days	Date Created:	6/15/2014	Last Revision Date:	6/15/2014

### **Course Understandings**: Students will understand that:

• The history of aerospace studies has influenced how people meet the challenges of traveling through the atmosphere or in space.

## DESIRED RESULTS (Stage 1) - WHAT WE WANT STUDENT TO KNOW AND BE ABLE TO DO?

### **Established Goals**

#### Science

Engineering Design

- MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. (MS.ETS1.1)
- Standard: 6.1.2.2: Engineering design is the process of devising products, processes and systems that address a need, capitalize on an opportunity, or solve a specific problem. Benchmark:

6.1.2.2.1: Applying a Design Process- Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system that solves a problem.

Standard: 8.1.3.3: Science and engineering operate in the context of society and both influence and are influenced by this context. Benchmark:

8.1.3.3.1: Role of Societal Expectations Explain how scientific laws and engineering principles, as well as economic, political, social, and ethical expectations, must be taken into account in designing engineering solutions or conducting scientific investigations.

- MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS.ETS1.2)
- Standard: 6.1.2.1: Engineers create, develop and manufacture machines, structures, processes and systems that impact society and may make humans more productive. • Benchmark:

6.1.2.1.2: Risks in Technologies- Recognize that there is no perfect design and that new technologies have consequences that may increase some risks and decrease others.

- **6.1.2.1.3:** Trade-offs in Technologies- Describe the trade-offs in using manufactured products in terms of features, performance, durability and cost.
- 6.1.2.1.4: Learning from Failures- Explain the importance of learning from past failures, in order to inform future designs of similar products or systems.

# Literacy in Science and Technical Subjects: Reading and Writing

# Reading

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. (AS.R.1) Benchmark:

**6.13.2.2:** Determine the central ideas or conclusions of a text; provide an accurate summary of the test distinct from prior knowledge or opinions.

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. (AS.R.4) Benchmark:

6.13.4.4: Determine the meaning of symbols, equations, graphical representations, tabular representations, 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.

6.13.5.5: Analyze the structure an author uses to organize a text, including how he major sections contribute to the whole and to an understanding of the topic. 6.13.66: Analyze the author's purpose in describing phenomena, providing an explanation, describing a procedure, or discussing/reporting an experiment in a text

#### Text Types and Purposes

#### Benchmark:

6.14.2.2: Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.

- a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
- b. Develop the topic with relevant, credible, sufficient, and well-chosen facts, definitions, concrete details, guotations, or other information and examples.
- c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
- d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
- e. Establish and maintain a formal style and objective tone.
- f. Provide a concluding statement or section that follows from and supports the information or explanation presented.

6.14.4.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience. 6.14.6.6: Use technology, including, but not limited to, the Internet, to produce and publish writing and multi-media texts, and present the relationships between information and ideas clearly. This technology may be used to efficiently interact and collaborate with others.

6.14.7.7: Conduct short research projects to answer a guestions (including a self-generated guestion) drawing on several sources and generating additional related, focused guestions that allow for multiple avenues of exploration.

6.14.10.10: Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

6.14.8.8: Gather relevant information from multiple data, print, physical (e.g., artifacts, objects, images), and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

## Comprehension and Collaboration

- 2. Integrate and evaluate information presented in diverse media and formats, including visually, guantitatively, and orally. (AS.SL.2)
- 4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience. (AS.SL.4)
- 5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations. (AS.SL.5)

## Conventions of Standard English

- 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. (AS.L.1)
- 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. (AS.L.2)
- 6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. (AS.L.6)

## Technological Literacy

- **Standard:** Students will develop an understanding of the influence of technology on history. Benchmark:
  - C. Many inventions and innovations have evolved using slow and methodical processes of tests and refinements. (7.6-8-C)
  - D. The specialization of function has been at the heart of many technological improvements. (7.6-8-D)
  - G. Most technological development has been evolutionary, the result of a series of refinements to a basic invention. (7.9-12.G)

Transfer

Students will be able to independently use their learning to: (product, high order reasoning) Students will be able to use historical data to influence a design and the production of lighter than air vehicle.

Meaning				
Unit Understanding(s): Students will understand that: • The aerospace industry uses engineers who specialize in many different types of engineering careers. • The history of aerospace studies has influenced how people meet the challenges of traveling through the atmosphere or in space. • Engineering designs in aerospace exploration evolve as they are developed. • Different types of vehicles result in different types of flight.	Essential Q Students will keep considering: • What engineering careers are specific to the aero • What are the various types of flight vehicles? • Why are different flight vehicles designed differen • What were the first technological advancements th • What is the difference between airplane flight and			
<ul> <li>Knowledge - Students will:         <ul> <li>Describe the roles and responsibilities of STEM professionals for high demand technological careers, especially in the aerospace industry.</li> <li>Describe the flight characteristics of kites, whirligigs, model airplanes, hot air balloons, and model rockets.</li> </ul> </li> <li>Reasoning - Students will:         <ul> <li>Apply their knowledge of research techniques to investigate an aerospace topic.</li> </ul> </li> </ul>	Skills - Students will be able to: Create a flying vehicle based on historical data.			
Common Misunderstandings     • That the Wright brothers were the first to fly.	Essential Vocabulary: • Aerodynamics • Aeronautics • Aerospace Engineer • Design • Airplane Airship Astronautics Drones • Helicopter • Hot Air Balloon • Launch Rocket Sailplane • Seaplane • Space Shuttle • Unmanned Aerospace Vehicle (UAV)			

# Question(s):

ospace industry?

ntly? that continue to lead to the advancement of flight? Id space flight?