



Glassboro School District

Gifted and Talented Program

Curriculum Outline for Grades 4 & 5

*Special Project: *Click on the link below for more information on our upcoming project with Grade 4 (from October - December):*

[A Greener Glassboro: Urban Planning Project with Rowan University](#)

Below, you will find the Flight Unit of Study for Grades 4 (Starting in January) and for Grade 5 (starting in October)

Objective

Students will be able to increase their proficiency in the usage and application of various tech tools, while integrating these tools into a learning environment.

Students will become more scientifically literate individuals who can effectively explain and promote the engineering process by:

- Asking Questions and Defining Problems
- Planning and Carrying Out
- Analyzing and Interpreting Data

- Developing and Using Models
- Constructing Explanations and Designing Solutions
- Engaging in Argument from Evidence
- Using Mathematics and Computational Thinking
- Obtaining, Evaluating, and Communicating Information

Standards

Integration of 21st Century Skills and Themes and Interdisciplinary Connections:

21st Century Themes and Skills (N.J.A.C. 6A:8-3.1(c)2)

- [2020 NJSLS-S K-5](#)

English Language Arts: CCSS.ELA-LITERACY.SL.1.5; CCSS.ELA-LITERACY.RI.1.2; CCSS.ELA-LITERACY.RI.2.1; CCSS.ELA-LITERACY.RI.2.2; CCSS.ELA-LITERACY.RI.4.7; CCSS.ELA-LITERACY.RI.4.10

Activities:

Students will be exposed to a variety of technology, (both hardware and software). Students will be challenged on how they will use these tech tools to share new knowledge or existing knowledge in different content areas of their choice.

Students will be able to manipulate and challenge themselves and each other with learning about a specific tech tool. Then, students will work on a project of their choice that will be shared within the group.

Technology	Project Examples
<i>PowerPoint and/or Google Slides iMovie and/or Movie Maker</i>	<ul style="list-style-type: none"> · Create an awareness campaign · Create a presentation on a National Park · Create a presentation on US Symbols · Other: Passion Project
<i>Ozobot and/or Photon (coding)</i>	Design a game simulation Intro Slideshow

<i>Green Screen</i>	Create a puppet show for kindergarteners at Rodgers School that teaches a character pillar. These video shorts will be uploaded onto YouTube and the links will be shared with teachers at Rodgers for classroom use.
<i>Lego Robots</i>	Students will construct a Lego robot and create different challenges for the robot to face.
<i>Circuits and/or Solar Panels</i>	Students will manipulate various circuits and create a simulation after a natural disaster has wiped out the electric grid. Students will become urban planners and rebuild a city together.

Additional Partnership:

In collaboration with [Project E-Ignite, Project ExCEL and George Mason University](#), students will be given simulated situations they have to problem solve together. Situations will emulate real-life occurrences to promote development of critical thinking skills and the ability to use technology to solve a problem. In addition, students will learn to manipulate various tech tools, ie: coding Photon robots, drones, green screen, etc. they can use to problem solve.

Fourth and Fifth Graders Take Flight

Grades 4 & 5 Gifted and Talented Program

Thematic Unit

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Synopsis

Fourth and Fifth Graders Take Flight is a thematic unit of study that uses a cross-disciplinary approach for gifted learners to soar into the fundamentals of flight. Students will dive into this exploratory unit that will challenge and develop their critical thinking skills. Students will be presented with problem-solving scenarios to help students develop their practical real-world application skills. An array of resources will be used, including interactions with experts in the field, and a trip to the Wildwood Naval Air Station, and a partnership with Civil Air Patrol (CAP). This unit will conclude with Flight Day, which will provide students with the opportunity to share their learning experiences with their peers and community. Students will be provided with feedback and multiple opportunities to reflect on their personal growth and development as individuals.

Overarching Scope

This interdisciplinary unit integrates STEAM and writing to provide students with an array of opportunities to explore their creative thinking and expressions. Students will begin with the four fundamental forces of flight and fly into a plethora of domains to promote exploratory learning. Students will become familiar with the scientific method as they design their own paper airplanes. Students will launch into independent investigations as they manipulate air pressure and resistance to promote the engineering process. Providing students with opportunities to address their questions with an expert in the field will deepen their knowledge further. The overarching scope of this unit is to use concepts of flight to drive instruction while targeting academic standards and promoting the social development of gifted students as a holistic approach.

Assessment

Students' effort will be assessed throughout the unit. While a letter grade is not given for GT, anecdotal records will be noted regarding completion of assignments, data recording, questioning techniques, and the feedback they provide to their peers. This instructional design uses multiple projects and activities as opportunities for students to further develop their gifts and talents, while promoting the development of interpersonal skills.

Students will have voice and choice throughout the unit to display their learning. Students will have the ability to creatively design their flight model, as well as integrate components onto the visual timeline. Using multiple projects and activities as opportunities for students will allow students to further develop their gifts and talents, while promoting the development of interpersonal skills. Students will be asked to keep a Flight Portfolio throughout the Unit of Study, which will document their learning and overall talent development.

Unit Overview

UNIT OVERARCHING CONCEPT

Flight 101

Components of this unit will allow for independent exploration for students to self-pace and govern aspects of their learning while grasping concepts related to flight. This unit will target various overarching concepts that include inquiry, problem solving skills, questioning techniques, the scientific method, the engineering method, and the development of interpersonal skills. Specifically, students will learn how to collect and analyze qualitative and quantitative data, examine and make predictions, justify reasoning, and write lab reports. Students will do so while they learn about energy, force and motion, air pressure and resistance, thrust and gravity, and lift.

UNIT GENERALIZATIONS

- ***Thrust, Lift, Drag and Weight:*** How do things fly? What are the basic principles of flight?
- ***Justifying Reasoning Through the Evolution of Flight:*** How did humans go from looking at birds in the sky, to flying alongside them?
- ***Research:*** Who are iconic figures in aviation? (Wright Brothers, Tuskegee Airmen, Amelia Earhart, Charles Lindbergh, Bessie Coleman, etc.)
- ***Questioning Skills:*** What career opportunities are there in aviation? (pilots, fighter pilots, rescue pilots, mechanics, engineers, flight attendants, air traffic control, etc.)
- ***STEAM Timeline:*** Technological Advancements in Aviation (from the birth of flight to students' futuristic visions)
- ***The Engineering Method:*** How can you create a model that flies? How can you improve your design?
- ***Talent Development and Interpersonal Skills via FLIGHT DAY:*** Culminating Exhibit to highlight students' work

Unit Generalizations

Standards

Content

<p>Essential Understandings: Using Engineering Design and the Scientific Method, students will explore the evolution of flight. Students will use an investigative approach when they create a prototype and improve their design for their paper airplane. Possible solutions will allow for the collection of data. Students will use critical thinking and be asked to answer open-ended questions as they discuss and examine reasonings behind various designs in flight.</p> <p>Science: Developing and Using Models</p>	<p>ETS1: Engineering Design • ETS1.A: Defining and Delimiting Engineering Problems • ETS1.B: Developing Possible Solutions • ETS1.C: Optimizing the Design Solution</p> <ul style="list-style-type: none"> ● Apply scientific thinking, skills, and understanding to real-world phenomena and problems; ● Engage in systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned; ● Conduct investigations, solve problems, and engage in discussions; ● Discuss open-ended questions that focus on the strength of the evidence used to generate claims; ● Read and evaluate multiple sources, including science-related magazine and journal articles and web-based resources to gain knowledge about current and past science problems and solutions and develop well-reasoned claims; and ● Communicate ideas through journal articles, reports, posters, and media presentations that explain and argue.
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<p>Essential Understandings: Students will develop their communication and inquiry skills as they use ELA to research and share their findings when conducting with peers. Students will have a portfolio that will have compiled activities completed throughout the unit.</p> <p>ELA: Cross-Curricular Thematic Unit</p>	<p>Reading (NJSLA.R): Text complexity and the growth of comprehension; Writing (NJSLA.W): Text types, responding to reading, and research; Speaking and Listening (NJSLA.SL): Flexible communication and collaboration; Language (NJSLA.L): Conventions, effective use, and vocabulary.</p> <ul style="list-style-type: none"> ● Literature and informational (nonfiction) text are important for our students and should maintain their rightful place in our classrooms; ● Background knowledge and motivation are critical to the success of students when learning to read and when accessing complex text; ● Research by students provides the opportunity to learn more about a subject, but equally as important, provides students the opportunity to look beyond their research to questions left unanswered (new avenues for student research); ● Using evidence remains a critical skill, interspersed throughout the standards, allowing students to ground their thinking in the work of authors and experts in literature and in the content areas; ● Literacy must be recognized and guided in content areas so that students recognize the academic vocabulary, media representations, and power of language inherent in the work of scholars and experts; and ● The importance of foundational skills in the early grades, as students learn to read, cannot be overstated and calls for targeted, sustained intervention at any point of struggle for a student.
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Flight Lessons Table of Contents

- ***Thrust, Lift, Drag and Weight: The Evolution of Aviation***
 - The Evolution of Aviation will be an interactive timeline that will have an array of different information in the form of words, illustrations, digital media, etc.
- ***Justifying Reasoning Through the Evolution of Flight***
 - Students will use a Socratic seminar set-up to share their ideas, thought and wonders of flight. Students will document their questions and justifications accordingly.
- ***Research***
 - Students will learn about iconic figures in aviation, ie: Wright Brothers, Tuskegee Airmen, Amelia Earhart, Charles Lindbergh, Bessie Coleman, etc. [Resource Link](#)
- ***Questioning Skills:***
 - Students will have a better understanding of various career opportunities in aviation? (pilots, fighter pilots, rescue pilots, mechanics, engineers, flight attendants, air traffic control, etc.) In addition, students will Zoom with an air traffic controller to ask questions and gather responses.
- ***Flight S.T.E.A.M. Timeline:***
 - Technological Advancements in Aviation (from the birth of flight to students' futuristic visions). Students will create an interactive timeline that will depict their learning as an exhibit for the school community.
- ***The Engineering Method:***
 - How can you create a model that flies? How can you improve your design? Students will create their own paper airplanes and conduct a challenge with their peers. Students will share the process they underwent to create a prototype and how they improved their overall design.

Lesson Plans

Lesson Overview and Key Concepts	Lesson Description: Focus and Learning Activity
<p><i>Thrust, Lift, Drag and Weight: The Evolution of Aviation:</i> The Evolution of Aviation will be an interactive timeline that will have an array of different information in the form of words, illustrations, digital media, etc.</p> <p>Timeframe: 2 sessions</p>	<p>Objective: Students will build background knowledge and begin KWL Chart; timeline will be a visual display throughout the entire unit.</p> <p>Essential Questions:</p> <p>How did an idea and wonder become a concept? How did this transition become a reality? What are the four principles of flight? How do these principles work together?</p> <p>The Evolution of Aviation will be an interactive timeline that will have an array of different information in the form of words, illustrations, digital media, etc. Students will work collaboratively to design and create a timeline that depicts their learning in a creative way. As students learn new concepts, they will be given the option to document their learning on the timeline as they choose. This timeline will be worked on throughout the entire unit of study and will be displayed on flight day as part of a visual exhibit 4 the learning community to learn from. This timeline can have QR codes, drawings, 3-D model figurines, podcasts links, etc.</p>

<p>Iconic Figures: <i>Justifying Reasoning Through the Evolution of Flight:</i> Students will use a Socratic seminar set-up to share their ideas, thoughts and wonders of flight. Students will document their questions and justifications accordingly.</p> <p>Timeframe: 2 weeks</p>	<p>Objective: Students will have a choice on how they share their learning on an iconic figure for the exhibit.</p> <p>Essential Questions:</p> <p>What drove the curiosity of these iconic figures have? What character traits do they possess? Commonalities? Differences?</p> <p>Students will learn about iconic figures in aviation. These culturally relevant figures will vary in contribution to aviation. Students will have the opportunity to decide how to share their learning. Students can opt to dress up, create a commercial using a green screen, create a digital storyboard, write a song or essay.</p> <p><i>Research:</i> Students will learn about iconic figures in aviation, ie: Wright Brothers, Tuskegee Airmen, Amelia Earhart, Charles Lindbergh, Bessie Coleman, etc.</p>
<p>Careers in Aviation <i>Questioning Skills:</i> Students will have an opportunity to question experts in the field for a deeper understanding.</p> <p>Ongoing throughout the unit, as opportunities arise</p>	<p>Objective: Students will develop their questioning and data collection skills via interviews.</p> <p>Essential Questions: What careers are there in Aviation?</p> <p>Zoom calls will be set up with people who have careers in aviation. Guests will receive the questions prepared by students in advance. Guests will have the option to pre-record their presentation or provide a live interview during class. Providing an option allows guests to have flexibility for maximize participation.</p>

**Technological
Advancements:**

Students will create an interactive timeline that will depict their learning as an exhibit for the school community.

**Timeframe: 2
weeks**

Objective: Students will be asked to conduct research to share the technological advancements that have taken place throughout aviation. Students will be able to share their findings with one another using FlipGrid.

Essential Questions: How has technology improved the overall design of planes? What approaches are taking place now to improve aviation? What wonders do you have about aviation and flight in general?

Trip: Wildwood Naval Museum

Further Research: For this portion of the unit, this platform will allow students to have ongoing interaction with one another using multimedia means. Students can record themselves, reply to one another, ask each other questions, and use technology to transfer knowledge amongst one another. This platform will allow students to own their learning while the teacher provide support through facilitation. Topics and links will be provided to students in advance in a menu/choice board forum.

Models & More:

The Engineering Method:

Students will create their own paper airplanes and conduct a challenge with their peers. Students will share the process they underwent to create a prototype and how they improved their overall design.

Timeframe: 3 weeks

Objective: Students will be able to create various aviation models.

This portion of the unit will focus on engineering.

LINK:

file:///C:/Users/Acastro/Downloads/PaperAirplaneExperimentandWritingActivities-1.pdf

Essential Questions:

Using the Paper Airplane Challenge, how can you create a model that flies? How can you improve your design?

Students will be asked to create a paper airplane. Students will familiarize themselves with the engineering process as they document their ideas and design a prototype. Once a prototype is created, they will be asked to take practice flight sessions. This will allow students to jot down their observations and use the data to improve their design elements. Students will be able to provide feedback to one another as well. All students will document suggestions and conduct further research. Students will have the opportunity to implement improvements to their overall design and be asked to share their new and improved design with the group. For this part of the activity a challenge will be held for students to compete with one another.

Fly Challenge: (optional extension)

Students will also be asked to create “something that flies” using household items. There will be various awards given for different categories. Award titles and descriptions will be selected and determined by students. Engineering Process will be followed for this activity as well.

<p>FLIGHT DAY</p> <p>Timeframe: 4 weeks to prepare final exhibit</p>	<p>Objective: Students will develop their gifts and talents through creative and imaginative expressions to be shared with school community.</p> <p>Essential Questions: How can you share your new knowledge about flight with others?</p> <p>As a culminating activity, Flight Day will take place at the end of the unit. Flight Day will unveil everything students have learned throughout the unit. The timeline that students began at the beginning of the unit will be completed at this point. This timeline will be displayed as an interactive portion of the exhibit. The autobiographies/biographies students created for the Iconic Figures domain will also be on display. The Careers in Aviation portion will have the Q&A sessions recordings for guests. Our partnership with CAP will be highlighted during Flight Day. Students will have an opportunity to engage with a flight simulator that has been provided by CAP.</p>
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