Take Flight Curriculum Standards

Name of Activity	Mission 3 - Mapping Airspace
ISTE Student Standards **Link [here]()**	**1.1 Empowered Learner** Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences. 1.1.a: Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes. 1.1.d: Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies. **1.4 Innovative Designer** Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions. 1.4.a: Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems. 1.4.d: Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems. **1.5 Computational Thinker** Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. 1.5.a: Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions. 1.5.c: Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving. 1.5.d: Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions. **1.6 Creative Communicator** Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals. 1.6.c: Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations. **1.7 Global Collaborator**

	Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally. 1.7.d: Students explore local and global issues and use collaborative technologies to work with others to investigate solutions.
Common Core State Standards Mathematical Principles **Link here**	The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. MP.1 Make sense of problems and persevere in solving them MP.4 Model with mathematics, MP.6 Attend to precision
Science & Engineering Practices **Link here**	**Asking Questions & Defining Problems** A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world(s) works and which can be empirically tested. Engineering questions clarify problems to determine criteria for successful solutions and identify constraints to solve problems about the designed world. ● Ask questions that require sufficient and appropriate empirical evidence to answer. ● Ask questions to identify and/or clarify evidence and/or the premise(s) of an argument. ● Ask questions to clarify and/or refine a model, an explanation, or an engineering problem. ● Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. **Developing and Using Models** A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations. ● Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed. ● Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena. **Planning and Carrying Out Investigations** Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters. Engineering investigations identify the effectiveness, efficiency, and durability of designs under different conditions.

- Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how much data is needed to support a claim.

Analyzing and Interpreting Data
Scientific investigations produce data that must be analyzed in order to derive meaning.

- Construct, analyze, and/or interpret graphical displays of data and/or large data sets to identify linear and nonlinear relationships.
- Use graphical displays (e.g., maps, charts, graphs, and/or tables) of large data sets to identify temporal and spatial relationships.

Using Mathematics and Computational Thinking
In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; solving equations exactly or approximately; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions.

- Use mathematical representations to describe and/or support scientific conclusions and design solutions.
- Use digital tools and/or mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem.

Constructing Explanations and Designing Solutions
The end-products of science are explanations and the end-products of engineering are solutions. The goal of science is the construction of theories that provide explanatory accounts of the world. A theory becomes accepted when it has multiple lines of empirical evidence and greater explanatory power of phenomena than previous theories. The goal of engineering design is to find a systematic solution to problems that is based on scientific knowledge and models of the material world.

- Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints.

Obtaining, Evaluating, and Communicating Information
Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations as well as orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to obtain information that is used to evaluate the merit and validity of claims, methods, and designs.

- Communicate scientific and/or technical information (e.g. about a proposed object, tool, process, system) in writing and/or through oral presentations.

AASL Standards **Link here**	**I. INQUIRE** Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems. Learners display curiosity and initiative by: I.B.1 Using evidence to investigate questions. I.C.2 Providing constructive feedback. I.C.3 Acting on feedback to improve. I.C.4 Sharing products with an authentic audience. I.D.4 Using reflection to guide informed decisions. **II. INCLUDE** Demonstrate an understanding of and commitment to inclusiveness and respect for diversity in the learning community. Learners contribute a balanced perspective when participating in a learning community by: II.D.3 Reflecting on their own place within the global learning community. **III. COLLABORATE** Work effectively with others to broaden perspectives and work toward common goals. Learners identify collaborative opportunities by: III.A.1 Demonstrating their desire to broaden and deepen understanding. III.A.2 Developing new understandings through engagement in a learning group. III.A.3 Deciding to solve problems informed by group interaction. III.C.1 Soliciting and responding to feedback from others. III.D.1 Actively contributing to group discussions. III.D.2 Recognizing learning as a social responsibility. **V. EXPLORE** Discover and innovate in a growth mindset developed through experience and reflection. Learners develop and satisfy personal curiosity by: V.C.2 Co-constructing innovative means of investigation. V.D.1 Iteratively responding to challenges. V.D.2 Recognizing capabilities and skills that can be developed, improved, and expanded. V.D.3 Open-mindedly accepting feedback for positive and constructive growth.