Unit 5: Exploring Flight

Content Area: **Technology**
Course(s):
Time Period: **October**
Length: **2 weeks**
Status: **Published**

Enduring Understandings

- Developments in aviation have progressed with time.
- Aerodynamics is the study of forces and the resulting motion of objects through the air.
- An object's ability to fly is dependant on four main forces of flight.
- Propulsion is the act of moving or pushing an object forward.

Essential Questions

- What were the major advancements in aviation history?
- How do Newton's Law's of Motion affect flight?
- What are the forces of flight?
- What are their directions?
- How do the forces of flight affect an object's ability to fly?
- What happens if the forces of flight are not balanced?

Content

Skills

- Students will be able to identify and explain the forces of flight: weight, thrust, drag and lift.
- Students will be able to create an airplane or rocket and evaluate the performance of their aircraft.
- Students will be able to explain major advancements in the history of aviation.

Suggested Activities: Zipline Challenge (exploring propulsion) Air/Water Powered Rocket Build Airplane Construction

Resources

Resources:

1. PC or Laptops with internet access, able to run TinkerCAD (or similar program) and the various 3D printer software platforms.

2. TinkerCAD (or other equivalent solid modeling program). TinkerCAD is a free, web-based 3D modelling application which

allows users to create objects utilizing constructive solid geometry applications.

3. 3D Printers allow students to realize their designs by producing physical objects from their three-dimensional digital models.

4. Engineers scales allow students to measure items graphically depicted within technical drawings and physical objects according to a set scale.

5. AutoCAD is a computer-aided design (CAD) and drafting program used for producing 2-D and 3-D technical drawings.. AutoCAD is considered an industry standard and was developed and marketed by Autodesk Inc. A free version is available for education.

6. Autodesk Design Academy https://academy.autodesk.com/ , supports educators by providing free, authentic project based learning guides and supporting videos.

7. Monmouth County Executive Airport locally positioned in Wall Township, New Jersey, is a potential location for an authentic learning experience through a field trip, supporting the Exploring Flight unit.

8. Consumable Materials such as bass and balsa wood, foam, hot glue, project kits, aluminum foil, wax paper, balloons, fishing line, cups and other materials are needed to support project based learning. Suggested projects include building a model architectural structure, room or facility, bridge, tower, aircraft and more.

9. Personal protection equipment such as safety goggles and gloves are required when students are at risk of injuring themselves while creating projects or utilizing tools and/or machinery.

10. Hand Tools various hand tools such as easy cutters, craft knives, hot glue guns and hot wire cutting machine will be utilized within the classroom. Safety precautions and training will be taken and provided at all times.

Standards

TECH.8.2.8.A.1	Research a product that was designed for a specific demand and identify how the product has changed to meet new demands (i.e., telephone for communication - smart phone for mobility needs).
TECH.8.2.8.C.6	Collaborate to examine a malfunctioning system and identify the step-by-step process used to troubleshoot, evaluate and test options to repair the product, presenting the better solution.
TECH.8.2.8.C.8	Develop a proposal for a chosen solution that include models (physical, graphical or mathematical) to communicate the solution to peers.
TECH.8.2.8.D.3	Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution.