

The following learning targets represent the major concepts studied and assessed in this course. Updated 2022 - 2023

## Semester

### **Unit 1: Flight**

- Work in a team to solve an instant design challenge.
- Use the steps in the design process to design, build, test, and modify a paper airplane glider so that it lands accurately on a target.
- Explore how flight is possible.
- Investigate Newton's three laws of motion, and how they apply to flight.
- Examine the four forces of flight: weight, lift, drag, and thrust.
- Examine the directions of airplane motion: pitch, yaw, roll.
- Design and test airfoils on a model jet.
- Propose modifications to improve the accuracy of a model jet's flight path.
- Explore examples of cutting-edge aircraft and ways drones are used in society.
- Use symbols and visual cues to read a map.
- Explore sectional aeronautical charts.
- Work in a team to create a flight path, including determining the distance traveled, the fuel necessary, and time the trip will take.
- Investigate the construction and uses of Gantt charts.
- Use Gantt charts to solve complex problems.
- Collaborate with a teammate on the use of schedules and charts to handle events at airports.
- Apply knowledge and skills learned in this lesson to design and build a prototype of an aircraft
- Create a flight plan, including a navigation route, and a crew schedule.

### **Unit 2: Space**

- Explore the history of flight and space flight and travel.
- Investigate what is currently happening in space flight and travel.
- Explore liftoff.
- Investigate propulsion systems.
- Determine how the amount of fuel a rocket uses impacts its travel distance.
- Compare how different types of fuel affect the distance a spacecraft travels.
- Examine the balance of forces needed for a spacecraft to orbit a body and escape to space.
- Examine the layers of Earth's atmosphere, including where most human-made satellites orbit.
- Explore the phases of the Apollo 11 mission.
- Describe techniques for landing a spacecraft.
- Learn the fundamentals of healthy eating during spaceflight and at a future off-Earth colony.
- Use the astronaut process of food rehydration.

- Review plant growth data to plan for gardening off-Earth.
- Learn fundamentals of fitness and rest during spaceflight and at a future off-Earth colony
- Simulate exercise in space
- Identify health and hazards in space
- Explore systems that help recycle resources and maintain a healthy environment in space.
- Examine the Sabatier System and the electrolysis of water as part of the spacecraft's environmental control system.
- Create and test a water filtration system.
- Apply knowledge and skills learned in this lesson to design and build an improved balloon rocket or water treatment system.

### **Unit 3: Destination to Mars**

- Work in teams to solve a multi-faceted problem.
- Apply the knowledge and skills acquired in the unit.
- Engage in problem solving and use creativity when developing solutions.