FUTURE U.

Boeing 360 Experience Companion

Objectives

Students will:

- **Reflect** on the life and work of Aprille Joy Ericsson
- **Identify, define,** and **research** a problem related to aerospace
- **Brainstorm** innovative solutions for the problem they identified
- **Create** a plan for working toward one of the solutions

Aprille Joy Ericsson

Overview

In this interactive session, students will kick off the engineering design process as they follow in Aprille Ericsson's footsteps and seek to solve an aerospace problem.

Standards

ITEA Standards for Technological Literacy

- Standard 1: Scope of Technology
    - F: New products and systems can be developed to solve problems or to help do things that could not be done without the help of technology.
    - G. The development of technology is a human activity and is the result of individual or collective needs and the ability to be creative.
    - H. Technology is closely linked to creativity, which has resulted in innovation.

NGSS Standards

- 3-5 Engineering Design
    - 3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
    - 3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- MS 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.

Materials

- Device with projection capabilities, one for the educator
- Devices with internet access, enough for half the class
- Inspiration: Space handout, one per student

Connect

- Remind students that they recently learned about Dr. Aprille Ericsson—a scientist who has played a pivotal role in many NASA projects and who has worked on several multi-million-dollar space initiatives.
- Guide students into a quick discussion ABOUT this scientist, with questions such as:
    - What aerospace engineering initiatives has she contributed to?
    - What details about her work did you find most interesting?
    - In what ways can Dr. Ericsson's life and/or work serve as an inspiration to others?

Be Inspired

- Explain that the class is about to be challenged to join Dr. Ericsson in contributing to space initiatives.
- Ask students to visit nasa.gov/hrp/5-hazards-of-human-spaceflight or pass out one copy of the article to each student.
- Read the webpage's headers aloud, and explain that today the class is going to follow in Dr. Ericsson's footsteps as they take their own first steps toward contributing to the world of aerospace.
- Then divide students into groups of three or four, and pass out one Inspiration: Space handout to each student. Review the directions for each step together and be sure students understand that they will be kicking off the engineering design process as they *ask*, *research*, *imagine*, and *plan*.

Reflect

Bring the students back together near the end of the class session and guide students in reflecting on the following questions in small groups or all together as a full class:

- Dr. Ericsson has contributed to many huge space initiatives and worked on developing new technologies that aerospace engineers only dreamed of before. What kind of technology do you envision could be developed to solve your problem?
- If aerospace engineers were to actually work on developing your solution, what may be some of the biggest challenges they would have to overcome?

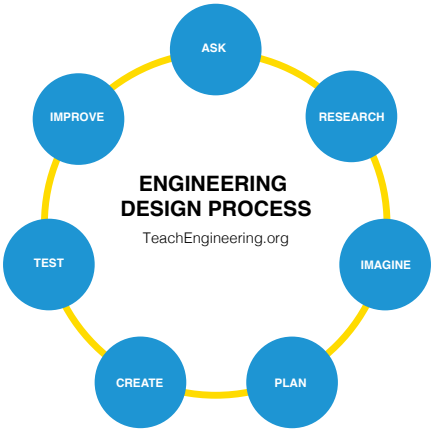
Look forward

Developing groundbreaking technology requires a deep understanding of a given problem, as well as innovation and creativity. Encourage students to practice their own problem-solving skills by:

- Placing chart paper or notepads around your classroom where students can jot problems they would like to solve or note innovative solutions that they develop
- Creating a maker space in your classroom with a variety of tools readily available for hands-on learning
- Providing time each week for independent projects and explorations

Inspiration: Space

Directions: Use Dr. Ericsson as an inspiration as you work to contribute to the field of aerospace engineering. Following the engineering design process, you will ask, research, imagine, and plan in pursuit of a solution for one of the hazards of modern-day space flight.



ASK

- Visit nasa.gov/hrp/5-hazards-of-human-spaceflight and read about the five hazards that NASA has identified for human space travel.
- Select one hazard to pursue and record it here:

_____

- Reread the article section about this hazard. Then develop questions that will help you work toward a solution.
    - ? –
    - ? –
    - ? –
    - ? –
    - ? –

RESEARCH

Use the internet to research answers to your questions. Be sure to learn more about the needs of the astronauts as well as the constraints (limits or restrictions) that exist. Jot notes from your research below.

Inspiration: Space

IMAGINE

Collaborate with your group members to brainstorm as many solutions as possible. Be creative and assume any kind of technology can be developed to bring your ideas to life. As you brainstorm, take notes on your ideas below.

PLAN

Now look back at the research that you completed (including the needs and constraints) and narrow down your ideas until you select one solution that your group believes is best. Record the idea below, as well as what you believe would be the very first steps toward actually developing this solution.

- Solution selected:

  _____

  _____

- Initial steps toward this solution:
  - Step 1:
  - Step 2:
  - Step 3: