FUTURE U.

Virtual Site Tours Guide

FUTURE U offers interactive and real-life learning experiences to help students in grades 6–12 embrace their potential and inspire them to make an impact through problem solving, and to innovate for the future.

About the Video Series

Boeing's Virtual Site Tours—a five-part video Topic Series—takes students on behind-the-scenes tours of unique Boeing facilities across the country. At each site, students learn about the people and products that contribute to the future of air and space travel, and they are introduced to a variety of ideas and processes that contribute to the success of Boeing's fleet.

Students are given a first-hand look at the following locations as they learn about the innovations that occur at each one:

- The Spectrolab in California, where solar cells that power spacecraft are created;
- The Miami Flight Training Center, where pilots and crews are trained on maintenance and safety;
- The Saint Louis campus in Missouri, which focuses on drone development;
- Philadelphia's Vertical Lift Division, where helicopters are produced; and
- The 737-airplane factory at Boeing's Renton site in the state of Washington.

Classroom Use

Each video in this Topic Series is accompanied by a classroom activity. While the videos and their corresponding activities work together to help students dive into many different aspects of innovation, they may be used independently and in any order.

Every activity consists of a hands-on challenge connected to one of the Boeing site tours. Apart from an initial introduction for the educator, each challenge is written as a student-led project-based learning experience and is designed to be completed in approximately 30 minutes.

Challenge Activities

Each activity contains the following sections:

- An **Overview**, **Educator Prep**, and **Classroom Set-up** section, which prepare the educator to lead the activity
- A **Student Introduction** for the educator to read aloud in order to introduce their students to the challenge
- A list of **Team Roles and Salaries** to help student groups delegate responsibilities—including a finance manager, materials manager, engineer, and more

- **Team Role One-Pagers** to provide each team member with the necessary background information and ensure they understand what is expected of them
- An **Engineering Design Planning Guide** leads groups through the Engineering Design Process as they collaborate to complete the challenge
- A **Judging/Scoring Guide** supports educators in assessing and/or judging each group's work
- A **Final Discussion Question Guide** helps the class reflect on the Challenge upon completion

Videos

Each video and accompanying activity focuses on the following subjects:

- **Video & Activity: Ice Racing**

  After visiting the Spectrolab in California, student teams will harness the power of the sun as they experiment with how to efficiently transfer heat from solar energy and melt ice cubes more quickly than their classmates.

- **Video & Activity: Smooth Sailing**

  After touring the Miami Flight Training Center, student teams will use their understanding of the forces of flight to build hoop gliders. They will compete to see who can create a hoop glider that flies the longest distance, and they will participate in a class discussion around the science behind their creations.

- **Video & Activity: Operation Refuel**

  After learning about the MQ25 Drone developed at Boeing's St. Louis site, students will simulate aerial refueling. They will create two drones that can travel on ziplines while connected to each other, and they will discuss how the ability to refuel in midair could affect the future of aviation.

- **Video & Activity: Design Challenge**

  After touring the Philadelphia site's Vertical Lift Division for helicopter production, students will create helicopters designed to fly up in the air and hover. They will compete to see which design can stay up for the longest amount of time and which design can carry the most weight, and they will discuss how they could change their helicopters in order to be even more powerful.

- **Video & Activity: Zero Waste Challenge**

  After learning about Boeing's 737 factory at the Renton, Washington site, students will explore how waste is reduced in additive manufacturing. They will build a model airplane while producing as little waste as possible—using additive (*not* subtractive) manufacturing. Any waste that they create will be weighed and subtracted from their score!