FUTURE U.

Topic Series: Flight Path

Objectives

Students will be able to:

- Further **investigate** the complexities of the manufacturing process
- **Create** a podcast that explains the manufacturing process and the reasoning behind its many steps

Episode 4

Manufacturing and delivery—What does it take to build and deliver aircraft?

Materials:

- Student groups' selected airplane model from Activity 3
- Fabrication video to project
- Manufacturing and Delivery handout, one per student
- One of the following for each group (each group is consisted of four students):
    - Boeing Podcast Series handout
    - Lined paper and pencils or devices with word capabilities
    - Devices that can record audio and upload files to the Internet

Timing

60 minutes

National Standards

Next Generation Science Standards
Engineering Design

- MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, considering relevant scientific principles, potential impacts on people, and the natural environment that may limit possible solutions.
- Disciplinary Core Idea:
    - ETS1.C: Optimizing the Design Solution: The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (MS-ETS1-4)

ITEEA Standards for Technological Literacy

Standard 11: Apply the Design Process

As part of learning how to apply design processes, students should be able to:

- L. Make a product or system and document the solution.

Standard 18: Transportation Technologies

In order to select, use, and understand transportation technologies, students should learn that:

- G. Transportation vehicles are made up of subsystems, such as structural propulsion, suspension, guidance, control, and support that must function together for a system to work effectively.

Engage

- Begin by asking students to answer with a head shake or nod: Once Boeing has tested its prototypes and selected one to manufacture, would you guess that testing is complete?
- Go on to confirm and/or explain that planes must be continually tested before, during, and after the production process.
- Ask students to turn to a partner and brainstorm: What types of testing may Boeing still need to perform once it has selected a prototype and has moved into the manufacturing phase? Invite students to share what they have discussed before moving on.

Investigate & View

- Explain that students are about to watch a video that details what it takes to safely build an aircraft.
- Encourage them to focus on the video's main ideas as they watch, and play the Fabrication video once.
- Pass out the Manufacturing & Delivery handout then, review the instructions provided Next, play the video a second time. As they watch this time, students should jot the steps that are important in a plane's manufacturing and delivery process in the puzzle pieces.
- When the video ends, allow students a couple of minutes to finish recording their notes. Then encourage students to share their notes with a partner. Instruct them to explain how each idea that they have recorded plays an important role in a plane's manufacturing and/or delivery. Challenge students to collaborate in order to combine and edit their ideas, so partners wind up with similar puzzles.
- Then encourage students to share their ideas with the class, and record students' thoughts on the board. As students share similar ideas, mark the idea with a checkmark. After several students have shared, review the ideas that the class agrees are the most important parts of the manufacturing and delivery process.

Apply

- Now, students have seen the scope of the work—and the number of people—that it takes to safely construct one plane, challenge students to connect what they learned back to their own prototype. Tell the class that they are about to write a script for a podcast that announces this new plane to the public and educates them about its development process.
- Instruct students to find their group members. Then distribute one Boeing Podcast Series handout to each student and review the directions provided. Reiterate that students must work with their group members to write their script and record their podcast. Groups should write their script on a separate

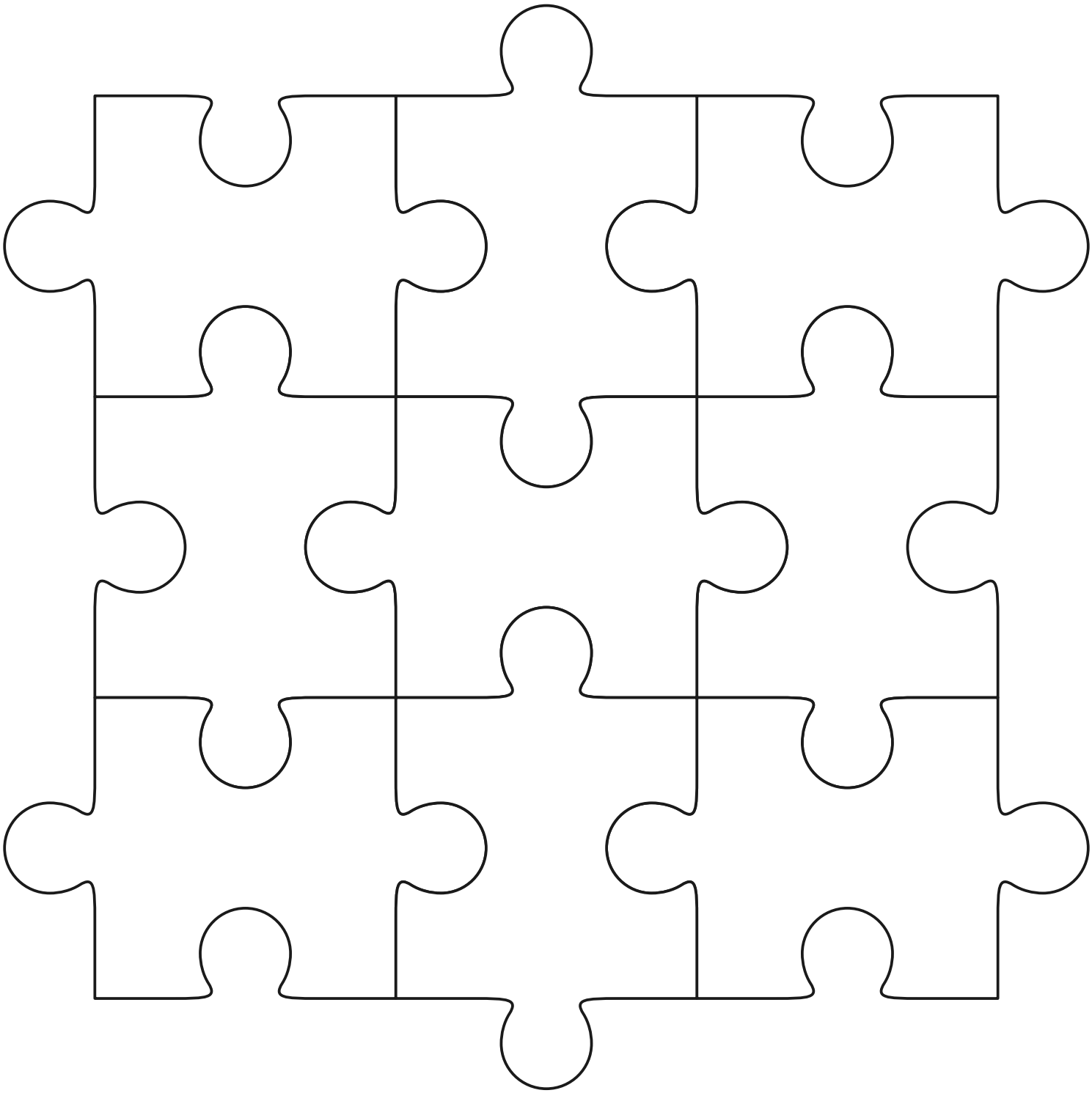
piece of paper first, being sure to address all of the requirements. After deciding what role each group member will take in the actual production, they should then use a device to record their podcast.

Note: Depending on the time and materials available, you may also encourage students to be creative during the recording process and include elements like music, sound effects, etc.

- As students are working, create a virtual shared folder where students can upload their completed audio files. Once students have saved and uploaded their files, conclude the session by encouraging groups to share a 20–30 second clip!

Manufacturing and Delivery

Directions: There are many different steps in the aircraft manufacturing process that work together and depend on each other. Each step is important. Without just one of these parts, the entire system could fall apart! As you watch the video, consider what the most important parts of the process include and record each one in a separate puzzle piece below.



Boeing Podcast Series

Directions: Boeing would like to start a podcast series that informs and entertains the public with news and stories about aerospace and innovations. Its first podcast will be a news story that informs the public about the development of your plane!

Your job is to create a podcast that explains this process. You must first collaborate with your group to write the script. Once your script is complete, your group should record the podcast.

Your podcast must include:

- A brief introduction and a creative name for the podcast series
- Why a new plane is being developed and what problem it is seeking to solve
- How the plane solves this problem, including details about its design
- Steps in the manufacturing process, including the following:
    - Structural testing
    - Rapid prototyping
    - VR production lines
- The importance of communication and collaboration throughout the development process
- Quotes from and/or brief interviews with several fictional Boeing employees about the role they played in the development of the plane
- Any other facts that may be interesting to listeners