

EDUCATOR'S GUIDE

Building Intrepid

Preparation

Overview and Objectives

This lesson is geared toward students in grades 3–5.

Participants will learn about aircraft carriers, where they are built, and who is involved in building them.. Participants will be introduced to the engineering design process and take part in the process by building a paper tower. Using this model will guide them in creating their own sketch or an aircraft carrier with additional design elements.

This lesson includes a [slideshow](#) in which an instructor leads participants through activities and discussions about how Intrepid was built.

By the end of this lesson, participants will be to identify steps in the engineering design process and connect those steps to the process of building *Intrepid*.

Instructional Modalities

For **synchronous instruction**, we recommend a platform that allows both for whole class discussion and for students to interact in small groups.

For **asynchronous adaptations**, we provide suggestions for teachers to provide additional support for the activities and for students to share their work with each other.

Materials

- Scrap Paper
- Masking Tape
- Scissors
- Markers
- Pencils
- [Building Intrepid slideshow](#)

Standards

Next Generation Standards

3-5-ETS1-1 Engineering Design

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

Lesson

1. Introductory Activity

- Share a photograph of Intrepid and ask participants:
 - **What is an aircraft carrier?**
 - **What does an aircraft carrier have to be able to do?**
 - **What might be involved in building a ship like *Intrepid*?**
- Share [video](#): of who built ships like Intrepid

2. Core Activity

- Share that those that worked on the ship received a very specific set of instructions from engineers. Engineers use the engineering design process to plan major projects like building an aircraft carrier. Walk through the engineering design process with group
- Ask students:
 - **How do we use the engineering design process in our everyday lives?**
 - **How might the engineering design process be used to build a ship like *Intrepid*?**
- Let students know that they will take part in an engineering activity to go through the engineering design process
- Have students break-up into teams of 3 people. Participants can also work individually if they desire. Supply each team with a stack of scrap paper, a scissor, marking tape, chart paper, markers and a pencil.
- The goal is simple: have teams build the tallest or highest tower made of scrap paper, and tape.
- Give each team about 5 minutes to plan their tower and strategize.
- Then set the timer for 15 minutes or more for each team to construct their tower. About 3 students should build the tower while the other 2 students should use the chart paper to market the tower.
- The tower should have a purpose and reason for its construction, either for travel reasons, monument, tourist attraction, etc.
- Once time is up towers should not only be measured, but students should present their towers as well.
- Towers must remain standing and not fall.
- Discussion Questions:
 - **Who was successful? Ask, what were the specific methods used to accomplish this task, and ask others to add.**
 - **What was frustrating about this task?**

- **How did people feel in their roles? Do you think you would have done better in the other job role?**
 - If participants worked in groups: Reflect on communication—teams work more effectively when they communicated clearly (this includes planning, talking while building, and then appropriate critiques during the editing stage).
 - If participants worked individually: Reflect on how projects could have been different had they been working in a group to complete the project.
 - If time permits, allow participants to redesign and retest.
- 3. Design Challenge**
- Invite students to now put themselves in the shoes of a ship designer!
 - Their task is to draw a design for an aircraft carrier... that can do one of the following:
 - **Submerge underwater like a submarine**
 - **Blast off into space!**
 - **Drive onto land!**
 - Once their designs are completed, students can share their designs with a friend!
- 4. Reflect**
- Ask Participants:
 - What steps would have to be taken to make their plans a reality?
 - What similar issues could engineers have faced when building a ship like *Intrepid*?

Extension Activities

To deepen student engagement with this content, you may choose to add the following activities :

Switch up Materials

Have students take part in the tower activity another time with the choice of materials such as cardboard, pipe cleaners, marshmallows, rolled up newspapers, toothpicks, wooden dowels, rubber bands, and tape. Have participants create a plan for their tower, build it, and reflect on the process.

Additional Resources/ References

[Engineering Design Process](#)

[Historic Former U.S Naval Bases and Stations](#)

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