EDUCATOR'S GUIDE

Supersonic Flight

Preparation

Overview and Objectives
This lesson is geared toward students in grades 3–8.

The Intrepid Sea, Air & Space Museum is home to more than 27 aircraft in its collection, each designed to meet a certain need. This program focuses on two of these aircraft that can reach supersonic speeds and has participants explore design elements that allow them to go faster than the speed of sound.

Standards

NEXT GENERATION SCIENCE STANDARDS

3-PS2-1

3-5-ETS1-2

MS-ETS1-2

MS-PS2-2

This lesson includes a slideshow in which an instructor can lead participants through an exploration of two supersonic aircraft. The lesson culminates with participants creating an origami version of one of these aircraft that can fly!

Instructional Modalities

This activity was designed for both synchronous or asynchronous instruction.

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

- **Supersonic Flight Slideshow**
- **Coloring Pencils**
- **Supersonic Flight Worksheets (p.4-5)**

Lesson

1. **Introductory Activity**
    - Ask Participants:
        - **What are different modes of transportation?**
        - **What are some ways we can make those modes of transportation faster?**
        - **Why are some modes of transportation not as fast?**
    - Discuss the responses with the group.

2. **Core Activity**
    - Inform participants they will be learning about supersonic flight and what features of aircraft make supersonic flight possible. Supersonic means faster than the speed of sound, or faster than it takes the sound of someone's voice to reach your ears. Share video of how supersonic flight has changed over time.
    - Have participants watch the videos on the Concorde and A-12. As they watch, ask them to identify what design features help each aircraft reach such high speeds. Possible answers could include wing shape, afterburners, the engines, the shape of the aircraft, and shock cones.
    - Have participants share the features they identified with a friend.
        - **What design elements would you add to an aircraft if you wanted it to go four times the speed of sound?**
    - Have participants draw a design for an aircraft that can reach speeds of Mach 4. Once they are finished, have participants share their designs and the features that allow them to reach supersonic speeds to the group.
        - **What design features does your aircraft have that helps it reach supersonic speeds?**

Asynchronous Adaptation

Have participants go through the slideshow on their own. Using their worksheets, participants can identify design features of two supersonic aircraft and then sketch a design for their very own supersonic aircraft. Participants can then share their thoughts on how their origami aircraft flies on a Padlet or Google Doc.

Extension Activities

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

Create a 3D Model of Your Aircraft

Have participants create their own design for a supersonic aircraft keeping the elements of the Concorde and A-12 in mind. Participants can use model magic or a 3D modeling program such as Tinkercad to create their models.

Explore More Aircraft

Have participants watch more videos of aircraft in and out of *Intrepid*'s collection and identify what sets supersonic aircraft from subsonic aircraft

Additional Resources/ References

***Intrepid*'s Aircraft Collection:**
https://www.intrepidmuseum.org/AircraftCollection

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ACTIVITY 1: COMPARING SUPERSONIC AIRCRAFT

Directions:
Watch the videos on the Concorde and A-12 and identify design features that help each aircraft fly at supersonic speeds in the space provided.

Aircraft	Design Features

What design features do both aircraft have in common?

ACTIVITY 2: DESIGN YOUR OWN SUPERSONIC AIRCRAFT

Directions:
Reflect on the design features of the Concorde and A-12. In the space below, draw your own design for an aircraft that can travel Mach 4, or four times the speed of sound.

What design features does your aircraft have that helps it reach supersonic speeds?