



FUTURE U.

Energy Team Classroom Visit

Aviation

Flying Paper

Overview

Student will create real paper airplanes designed by Boeing engineers. Using the materials provided, students will create a well-designed paper airplane unlike anything they have ever made before. Watch their amazement as they see how fast it flies!

What do you need before you visit the classroom?

- Aircraft Layout, one per student
- Flypaper Design Project, one per student
- Scissors, one per student
- Ruler, one per student

Preparation

- Copy the handouts in advance.
- It may be helpful to ask the classroom teacher about the best place to fly the students' paper airplanes.

What do you need to do when you get there?

- Introduce yourself to students once they arrive.
- Assist students in following the procedures listed on the Flypaper Design Project handout.

What can you do while students are working?

- Say hello! Ask them what excites them about STEM and what questions they may have about your career or aviation.
- Share a brief story! Students enjoy hearing stories about what you do for fun and what kinds of things you do at work.
- Be available for questions. Rotate around the room to help where needed.

Drone Activity

Overview

Through various activities, students will learn the magic of drones—from the different use cases to how they fly without a pilot. There are two activities included in the guide for students to investigate flight while being the one working directly with the drone.

What do you need before you visit the classroom? (All of these are also listed in the activity.)

- Device that can project
- Drone Employee PowerPoint
- Painter tape, one roll
- Challenge Cards, printed and cut
- Community Features, printed
- String, one six foot piece
- Drone
- Experimenting with Helicopters materials:
 - helicopter pattern
 - pencil
 - scissors
 - paper clips
 - crayons or markers (to decorate)
- Simon Says! Materials:
 - paper

Preparation

- It is recommended that employees experiment with the drone before sharing it with students. This will allow you to build your background knowledge and explore what students will experience so that you are better able to anticipate any troubleshooting.
- Check with the educator about projection capabilities. In some cases, it may be easiest for you to send the PPT file and activities to the educator in advance. In other cases, you may be able to easily connect your laptop.
- Connect with the educator ahead of time to decide which part(s) of the activity you will facilitate and copy all needed handouts.
- Take a moment to read through the lesson directions. Do not worry about following all directions precisely. If student engagement leads you briefly to another direction, that is fine.

What do you need to do when you get there?

- Setup the classroom or allocated space with the community features in a 6-foot x 6-foot area. You may want to take it off with the painter tape.
- Place the community features within the taped area. You will want to tape them down.
- Anchor the drone in the middle of the map with the 6 feet of string.

What can you do while students are working?

- Say hello! Ask them what excites them about STEM and what questions they may have about your career or aviation.
- Share a brief story! Students enjoy hearing stories about what you do for fun and what kinds of things you do at work.
- Be available for questions. Rotate around the room to help where needed.

Unbreakable Ice: Composite Basics

Overview

In this activity, students will learn that a composite material is the combination of two or more separate materials used to create a structural unit. The combination of materials can provide more strength and even less weight than a single material. A composite structure can be broken down into two main components: the matrix and the reinforcement. Both are common in many industries, including the automotive and airline industry. Students will then be challenged to work together to create their own composite with ice as the matrix and the material of their choosing serving as the reinforcement. They will test the strength of their composite and compare the various designs to see which withstands breaking the most effectively.

What do you need before you visit the classroom? (All of these are also listed in the activity.)

- Device to play videos or project images to the class
- Aluminum baking pans or any other containers you have on hand that can hold water (2 per group of 3–4 students)
- Water
- Assorted materials for composite, paper towels, straws, paper streamers, straw, sawdust, shredded paper, pencils, rice, toothpicks, spaghetti, etc. (1 item per design/experiment)
- Access to a freezer or method to freeze each composite model
- Hammer
- Safety glasses (1 per student)
- Tarp or material to place composites on for testing
- Curious Composites handout (1 per student)
- Composite Design Challenge handout (1 per group)

Preparation

- Review composites using the material provided and select possible materials to use.
- Check with the classroom teacher about projection capabilities. In some cases, it may be easiest for you to send the videos and images to the teacher in advance. In other cases, you may be able to easily connect your laptop.
- Copy handouts.
- This lesson requires a variety of materials. Try to organize the materials in advance.
- Speak with the educator about where and when to best test their composites.

What do you need to do when you get there?

- Set up the materials before students' arrival.
- Introduce yourself to students once they arrive.
- Follow the procedures listed.

What can you do while students are working?

- Say hello! Ask them what excites them about STEM and what questions they may have about your career or chemistry.
- Share a brief story! Students enjoy hearing stories about what you do for fun and what kinds of things you do at work.
- Be available for questions. Rotate to help where needed.