

SOARING SATELLITES

Duration: 30 minutes

Institution: Museum of Science Boston

Skill level/Age Level: All Ages

Group size: 25-30 participants

INTRODUCTION

Working individually or in small teams, students try to build a satellite that can float for at least five seconds in the marked area of a vertical wind tube. Using simple materials, students explore the concepts of lift and weight as they test and redesign their prototype.

KEY CONCEPTS AND/OR SUBJECT AREA

- Aerospace engineering
- Lift
- Aerodynamics

MATERIALS AND TOOLS

Essential Materials:

- Pipe cleaners
- Straws
- K'NEX axles
- Disposable pipettes
- Small craft Sticks
- Domed lids
- Paper cone cups
- Mailing tubes lids
- Water cooler jug caps
- Fun foam shapes
- Cut mini pool noodles
- Film canisters
- Vertical wind tubes

HOW TO OR STEP-BY-STEP

1. What are the components of a satellite? Explore the materials available. Which materials are the heaviest or lightest?
2. Examine the wind tubes. What is the source of the air?
3. Think of things that hover. How are they shaped?
4. Think of many different possible solutions and discuss them with your team.

5. Choose a design idea that you would like to build and test. Determine which materials you will use and how you will connect them together.
6. Determine which materials you will use.
7. Construct your designs with the materials you have selected
8. Ask facilitators to help you test your design.
9. Be sure to test multiple designs and keep track of the results.
10. Try changing just one thing on your design and testing again, keeping track of what happened after each test.
11. Which design worked best? What did you learn from your tests? How could you make an even better satellite?
12. Plan your new design like before and then test it again. How did your new design work compared to the old?

PROMPTS AND QUESTIONS

- Can you identify objects that hover and are man-made?
- Can you identify objects that hover in the natural world?
- What is lift?
- What factors affect your ability to create lift?
- What do you predict would happen if you added more weight to your satellite?
- What do you predict would happen if you added more surface area to your satellite?
- What do you predict would happen if you changed the speed of the wind?
- What is the Engineering Design Process?
- What are some of the variables you can change?
- Why is it important to only change one variable at a time?

KEYWORDS

- Wind
- Airflow
- Wind tubes
- Lift
- Float
- Flying
- Aerodynamics