

Design Challenge: Soaring Satellites

Design a satellite that will hover in our wind tubes!

Goal:

Design, build and test a satellite that can hover in our wind tubes for at least 5 seconds.

Time:

20 minutes for the activity, 10 minutes for set up and cleanup

Materials:

- Pipe cleaners
- Straws
- K'Nex axles
- Plastic disposable pipettes
- Wooden sticks
- Domed lids
- Paper cone cups
- Film canisters
- Fun foam shapes
- Cut pool noodles
- Plastic clips
- Laminated paper people or cargo
- Vertical wind tubes for testing

Design Cycle!

1 Ask/Imagine/Plan

What are the components of a satellite? Explore the materials available. Which materials are the heaviest or lightest? Examine the wind tubes. What is the source of the air? Brainstorm different combinations of materials you could use to design your satellite. Think of many different possible solutions and discuss them with your team or classmates. Think of things that hover. How are they shaped? 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.

2 Create

Construct your prototype with the materials you have selected.

3 Test

Ask Design Challenges staff to help you test your device. Record your results.

4 Improve

Try to improve your satellite by changing one variable. Test your new prototype. How long did you hover? Which design worked best? What did you learn from your tests? What other changes could you make to your design to make it more successful?

Soaring Satellites: Facilitation

Talking Points

- Can you identify objects that hover and are man-made?
- Can you identify things 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 weight to your invention?
- What do you predict would happen if you added more surface area to your invention?
- What do you predict would happen if you changed the speed of the fan?
- What is the Engineering Design Process?
- What are some of the variables you can change?
- Why is it important to try to change one variable at a time in your design?

References

- http://www.exhibitfiles.org/vertical_wind_tubes
- www.exploratorium.edu/pie/downloads/Wind_Tubes.pdf
- <http://www.grc.nasa.gov/WWW/K-12/airplane/lift1.html>
- http://en.wikipedia.org/wiki/Bird_flight
- <http://www.bodyflight.net/>