

SciGirls Activity 13

Lift Off!



Icebreaker:
Create a burst of science
(and root beer!) with this
Soda Geyser.



You'll need:

- 20-ounce bottle of soda (not sugar-free, but something with lots of syrup content), one per pair of girls
- sugar candies or mints, a handful for each pair of girls

SciGirls Skill: Questioning

Guide your girls as they:

- 1) Open a fresh bottle of soda.
- 2) Drop in a handful of sugar candies. Step back and watch!
- 3) What other kinds of candies make for a great geyser? Select a variety of sugar candies, and see which ones make the highest geysers!



SciGirls Suggestion: Whoa, this investigation is messy! Since it creates such a large visual (and literal) splash, the whole group can enjoy this investigation together. You may want to have multiple soda bottles on hand if you want to try the effects of different sugar candies.



For more bubbly information, go to http://pbskids.org/dragonflytv/superdoit/soda_geyser.html

Investigation:

Lift Off!

Blast off with this NASA-inspired experiment.

We're Jennifer, Megan, Monica and Emilia, and we've all been to NASA's Space Camp. Back home, we entered a rocket-building contest where the challenge was to build a rocket with devices attached that could measure or detect other planets' environments. Our SciGirls question: **How can we make good sensors for our rocket?**



For each group of three girls, you'll need:

- model rockets, motors, and launch pad/starter (The DragonflyTV girls used Estes Easy-to-build model Chrome Dome - Gold, with a B4-4 motor, available from your local hobby shop). Each pair of girls can work with one rocket, and one launch pad can serve your entire group.
- aquarium thermometers (various types, such as liquid crystal or red petroleum-filled)
- craft materials, such as balsa wood, construction paper, glitter, from which girls can craft wind vanes and other devices
- white glue, or a hot glue gun



For more uplifting information, go to <http://pbskids.org/dragonflytv/show/modelrockets.html>. Then surf to pbskids.org/dragonflytv/contact/index.html to tell us what you learned!



Check out this investigation on Tape 2, Segment 13.



SciGirls Want to Know: What kind of weather sensors can be deployed with a model rocket?

Guide your girls as they:

- 1) Identify the nature of the sensor to be designed. Jennifer and her group chose to develop sensors to monitor three weather-related properties: air temperature; wind direction; wind speed.
- 2) Design and construct (or simply purchase) simple devices to measure (or merely indicate) the three selected properties. Use your imagination. Sensors must be mountable on or in the rocket body, and must function upon landing.
- 3) Prepare rockets for launch. (Follow all local ordinances for rocket safety.) Launch rockets, then go to landing site and determine whether the sensor successfully functions.
- 4) Modify sensors as necessary, in case of initial malfunction. Re-launch rocket with modified sensors, and re-evaluate.



SciGirls Secret:

"I wanna be an astronaut!" is a common career goal for little boys, but how many little girls express this aspiration? Model this goal for your girls by talking about and researching not only pioneers like Sally Ride, but the female scientists "on the ground" who make Sally's voyages safe and possible! To blast off, go to http://womens-history.about.com/library/pic/bl_p_astronauts_women.htm. This site features cool biographical information and great photos of women in space!





SciGirls Synthesize: Data and Analysis

Here is the team's process. You can use their format to guide your own data analysis.

Rocket 1

- **temperature:** taped glass aquarium thermometer to rocket body
- **wind direction:** loaded rocket body with glitter, to scatter in the direction of the wind upon landing
- **wind speed:** constructed a paper wind monitor; the more it bends in the wind, the stronger the wind, mounted on the rocket body

Rocket 2

- **temperature:** taped liquid crystal aquarium thermometer to rocket body
- **wind direction:** constructed a balsa wind vane, mounted on the rocket body, to blow in the wind
- **wind speed:** built a balsa anemometer

Conclusion:

The DFTV girls found that sometimes simple devices can be very effective. Using redundant systems (i.e., having duplicate sensors on the same rocket) increases the chances of at least one sensor working properly. This is a technique that NASA employs, both for safety and for scientific success. What did you find?

Keep Exploring!

Try designing a new landing mechanism. Some model rockets use parachutes, some use streamers. Design a new type of landing mechanism, perhaps one that always has your rocket land standing up. Do a test launch and see how it works!