

SciGirls Activity 5

Luge



Icebreaker

Create an uplifting experience with this balloon hovercraft!



You'll need:

- an empty thread spool
- a 4-inch square of cardboard
- white glue, or hot melt glue gun
- a sharpened pencil
- a balloon (12 inch, when inflated)

SciGirls Skill: Experimenting

Guide your girls as they

- 1) Glue the bottom of the empty spool to the center of the cardboard square.
- 2) Use your sharpened pencil to punch a hole in the cardboard that lines up with the center of the spool.
- 3) Take a huge breath and blow up the balloon. Hold the bottom, but don't tie it.
- 4) Ask someone to hold the spool for you. While pinching the neck of the balloon, stretch the bottom of the balloon over the top of the spool, release the neck, and lift off! Watch your hovercraft hover!
- 5) Experiment with different sizes and shapes of cardboard to get the best hover out of your balloon hovercraft. Give your hovercraft a shove along a smooth table top, and see how far it goes before coming to a stop.



SciGirls Suggestion: The materials required for this activity are simple enough that each girl should be able to build her own.



Go to pbskids.org/dragonflytv/superdoit/balloon_hovercraft.html for more information.

Investigation

Marble Run!

We're Emily and Jenn, and when winter comes, we don't just go sledding, we LUGE! Luge is one of the fastest sports on ice. We're always looking to improve our race times. We started thinking more about how to improve when we visited the New York Hall of Science. They have a pair of slides at their outdoor Playground Science exhibit. Going down the slides made us wonder: Can we improve our start times by paddling more with our hands?

We train at Lake Placid, where the 1980 Winter Olympics were held. We recorded our start times for several kinds of starts, including no paddling, paddling once, paddling twice, and paddling five times. We did at least three trials for each kind of start, and calculated our average time.

If you can't luge where you live, try this marble activity instead.



You'll need:

- a plank or shelf, 12-16 inches wide and 4 feet long
- books to prop up the plank
- construction paper
- tape
- a marble
- a stopwatch or timer



To learn more about this investigation, go to pbskidsgo.org/dragonflytv/show/luge.html. Then surf to pbskidsgo.org/dragonflytv/contact/index.html to tell us what you learned!



Check out this investigation on the SciGirls DVD. Select "Luge" from the main menu.



SciGirls Want to Know

How can we make a marble course that takes 12 seconds to complete?

Guide your girls as they

- 1) Investigate how the angle of the ramp relates to the time it takes the marble to roll down it. The smaller the angle, the slower the marble will travel. Provide the students with an inquiry-based challenge to discover on their own. For example, does the marble take twice as long to roll down the ramp at a 15 degree tilt as it does at a 30 degree tilt?
- 2) Use construction paper to fashion bumpers, guides, walls, chutes, and other objects or shapes that either redirect the marble, slow it down, or otherwise alter its motion as it rolls down the ramp. For example, you might fashion a series of bumpers that make the marble follow a zig-zag path. Tape the bumpers or other guides securely to the ramp surface.
- 3) Challenge students to make their marble roll down the ramp in 12 seconds. Continue to modify the surface of the ramp and re-test the time it takes the marble to complete the run, with 12 seconds as the goal. You may find you have to raise the ramp angle more than you first think.



SciGirls Secret

This is a great activity for developing team-building skills. Group kids into teams of three, and observe the teams to make sure that each member is contributing. You can assign roles such as “idea generator” (proposes a solution), “handy person” (fashions the ramp modifications, makes them work), or “quality control supervisor” (keeps the group on task, and verifies that the work is progressing towards the goal).



SciGirls Synthesize Data and Analysis

One way a team can analyze its progress is for them to time the marble through various stages of the marble run course's development. A bar chart where each bar represents the next design version of the track will show the team's progress as it gets closer to achieving its time goal. Arrange the bars, left to right, as "version 1," "version 2," etc., with the height of each bar representing the marble's time.



SciGirls Suggestion: If you have several teams working, add a layer of challenge to the task by awarding points to the team with the most creative or artistic design, or to the team who meets the 12-second goal with the ramp at the steepest angle.

Keep Exploring!

If you have several teams working on the Marble Run activity, give them further challenge by having them combine their ramp designs. That is, help them set up the ramps so that after a marble completes the first ramp, it rolls right on to the next one.