



printbot

LEARN



Design and Print A Glowie Shape

OVERVIEW

The goal of the project is to introduce students to 3D modeling and printing by making an object with a cavity that can hold a 20mm (diameter) 3V coin cell and a 5mm LED. Students will create their objects in 123D Design, subtract the shape of the cavity (provided), add support material if necessary, and print it with clear filament. With a little tape and some bending of LED leads, a colorful, oddly shaped star is born.

GRADE LEVELS

This project would be appropriate for students in elementary grades and early middle school (7 – 12 years old). But could be used by students either older or younger depending on the electronics background you expect students to have.

STEPS TO COMPLETION

1. Introduce the 123D Design interface: how to create primitive shapes, transform them, and merge them.
2. Create a shape. It could be as simple as a box. Students are encouraged of course to think outside the box. More creative shapes are welcome, as long as they are printable and will have room for the LED and battery.
3. Import the shape of the cavity using the “Insert” button in the main menu.
4. Use the snap tool (on the top toolbar) to snap the bottom of the cavity shape to the bottom of the shape you made. Then ungroup the two objects by clicking one and clicking the “Ungroup all” button at the bottom.
5. Flip the cavity shape by pressing the spacebar and subtract the cavity from the shape you made using the “Subtract” tool under “Combine” on the toolbar. This should create the appropriate cavity in the middle of the shape.
6. Students may experiment with adding supports manually or using the automatic support generation feature in Slic3r.

7. Print out the object and follow the pictorial instructions provided to fit the LED and battery inside it.

FOLLOW UP

3D printing and electronics projects can come together in many different places. Investigating other projects such as those based on Arduino would be a natural follow up and the next step after this first project.

EXTENSION QUESTIONS

Can you modify the cavity shape or create your own to house a different size LED and/or battery?

How does the shape of an object influence its printability?

How many (or how few) supports does an overhang need in order to come out properly?

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