

# Do Space Summer 2021

## TAKE & MAKE: FIREWORKS IN A JAR



### INTRODUCTION

In America, on July 4th, we celebrate the signing of the Declaration of Independence. This holiday, known as Independence Day, or the 4th of July, is usually celebrated by getting together with friends and family to eat yummy food and either watch displays of fireworks or maybe even set some off yourself. In this fun activity, we're going to make a fun lamp that reminds us of fireworks, but it's safe to keep in the house and use all year round.

### WHAT YOU'LL NEED:

Here's what you'll find in the kit:

- Wide Mouth Jar
- 1 Multicolored LED
- Conductive Thread and a Needle
- 1 Battery
- 1 Battery Holder
- Tissue Paper
- 1 Switch

You'll also need:

- Glue
- 1 Paint or Foam Brush
- Tape

### Subjects:

- Energy
- Engineering
- Art
- Social Studies

### Standards:

- PS3.D
- ETS1.A
- ETS1.C

[nextgenscience.org](http://nextgenscience.org)

### Maker

### Capacities:

- Tinker to Explore
- Finding Opportunities

[agencybydesign.org](http://agencybydesign.org)

### Key Terms

- Circuit
- LED
- Conductive

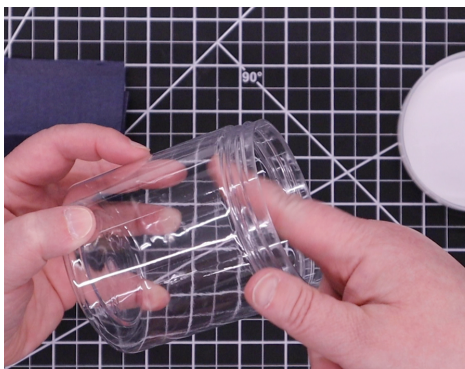
# Let's Make This!

**Start by pulling out all of the pieces of the kit and checking to make sure they are all there.**

Remember if you're missing a piece you can email Do Space at [programs@dospace.org](mailto:programs@dospace.org) and we'll get you a replacement part.

**Next, clear your workspace, and add a quarter-sized dollop of glue to the jar. Then use your brush to cover the inside of the jar with glue.**

You want to cover the bottom and the sides up to the top edge of the jar just before the rim.



**Then use the tissue paper and cover the inside of the jar. Once done set it aside to dry for 24 hours.**

The tissue paper may crinkle or tear. That's okay, it will make your jar look even better. Just keep layering in tissue paper until you have most of the inside of the jar covered.



## Why does it work?

There are many reasons that our Fireworks in a Jar resemble the night sky. First we're using tissue paper to make the jar darker. Tissue paper is very thin, and translucent. That means that it allows light to pass through something, but you can't see through it.

We're also using a special LED (Light emitting diode) that flashes various colors.

Together it looks a bit like fireworks.

## Mix-it up!

Want to mix this up a bit? Try different colors of tissue paper. Mix glitter into your glue, or try painting or adding stickers to the outside of the jar.



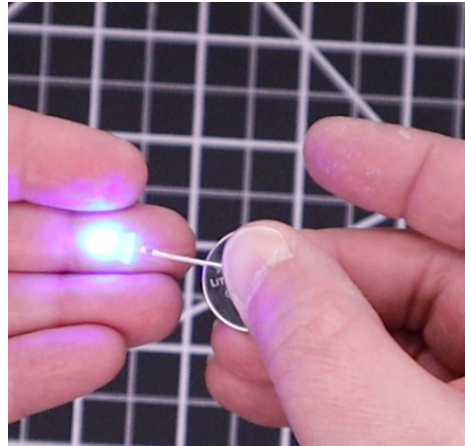
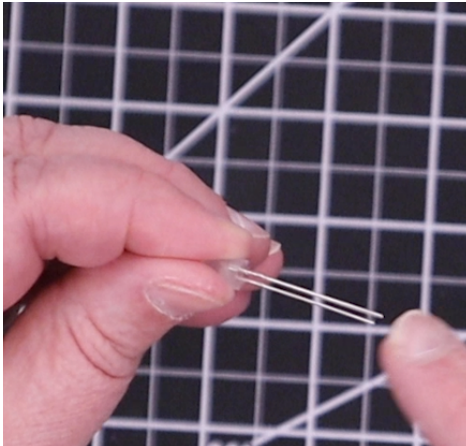
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# Let's Make This!

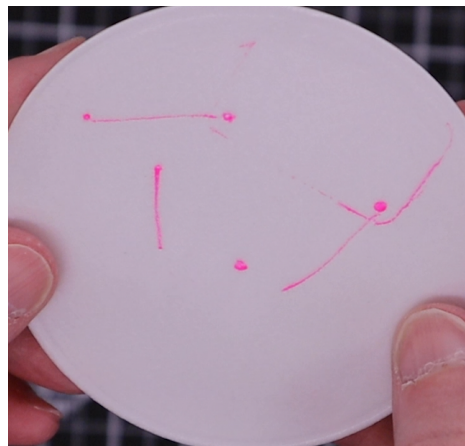
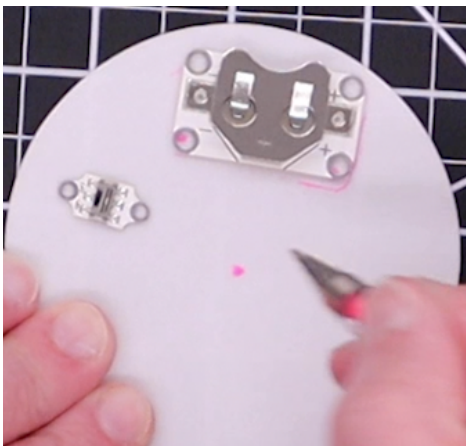
**Now that our jar is dry, it's time to assemble the circuit. Start by testing the battery and the LED.**

Both the battery and the LED have a positive and negative side. On the battery, the positive side is marked with a plus. On the LED, the positive side is the longer of the two leads. Place the two positive sides together to complete the circuit and make the LED light up.



**Next, it's time to map the circuit. Start by pulling the foam circle out of the lid.**

We'll be using conductive thread to create our circuit. Gather up the battery holder, switch, and LED and use an ink pen to mark the position of these components on the foam circle. We're going to go from the positive side of the battery holder (marked with a plus) to the LED. And from the negative side of the battery holder (marked with a minus) to the switch and from the switch to the LED.



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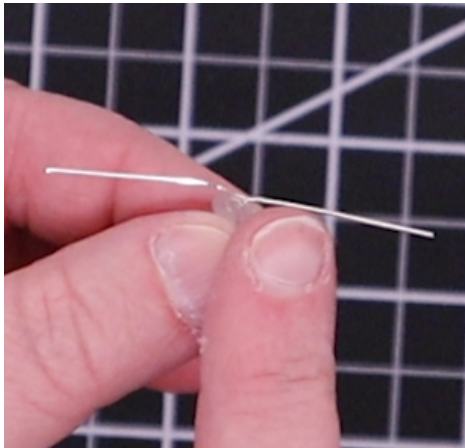




# Let's Make This!

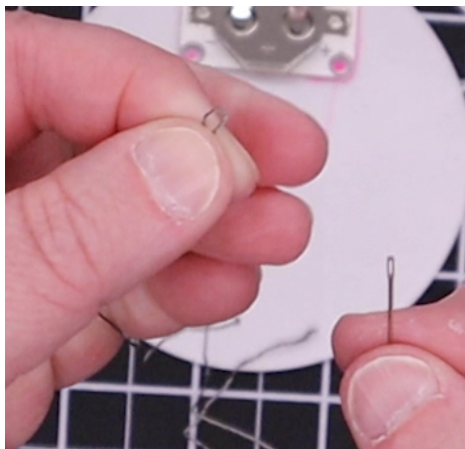
**Now prep the LED. Bend the legs so that they sit flat. And then curl up each of the ends.**

It's really important that you don't lose track of which leg is positive and which leg is negative during this step. I set my LED down so the negative leg is pointing to the left and the positive leg is pointing towards the right. If you have a marker, you could mark one leg with color to help you remember. Typically when looking at electrical components a black wire or lead is negative and a red wire or lead is positive.



**It's time to sew our circuit. First, thread the needle.**

Bend your thread into a loop, and then hold it by the very top of the loop so that it's very small. Place the eye of the needle over the little loop of thread and gently rub it until the thread slips into the eye of the needle and you can carefully pull it through.



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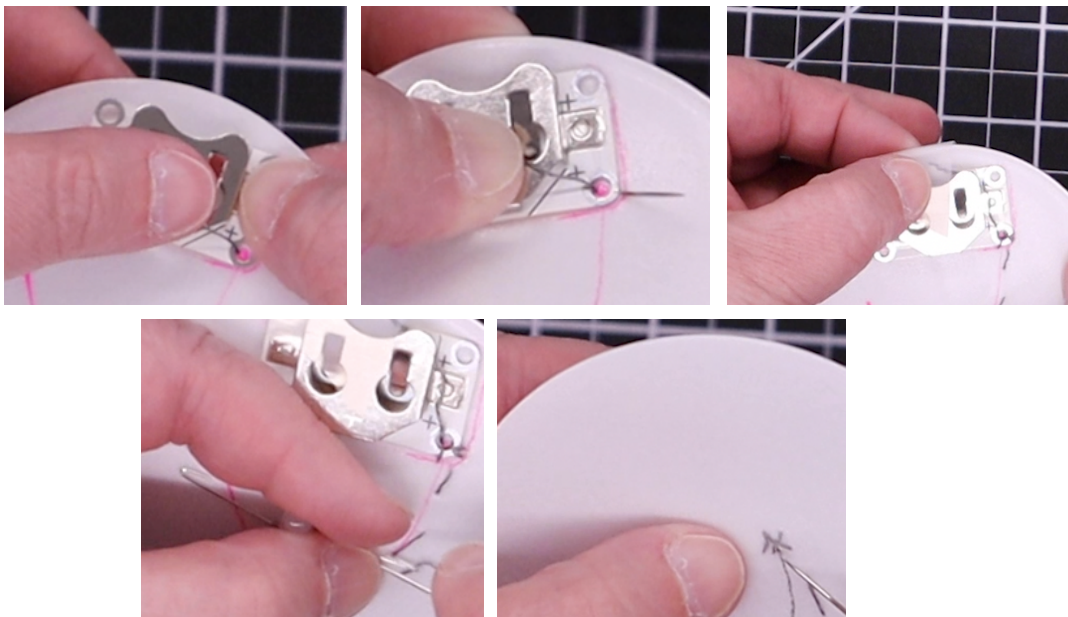




# Let's Make This!

**Now put your battery holder in position and hold it with your thumb. Push the needle into the hole on the positive side of the battery holder.**

Hold the tail of your thread with your thumb and take several stitches into the hole of the battery holder to anchor it in place. Then use a little bit of tape to help stabilize it while you sew your circuit. Once you're done, take two stitches to get to the position of the LED and take several stitches around the positive side of the LED to anchor it in place as well. Make sure to sew into the little hook you made. When you're completely done, slip your needle into one of your stitches, create a loop, and then pull your thread through to create a knot. Put a little tape on the knot to anchor it in place.



**Do the same steps for the negative side. First, go from the battery holder to the switch and then from the switch to the LED.**

Make sure to tie off after each part of the circuit. If everything is connected the switch won't work. When you're done trim all ends and put tape on all of your knots.



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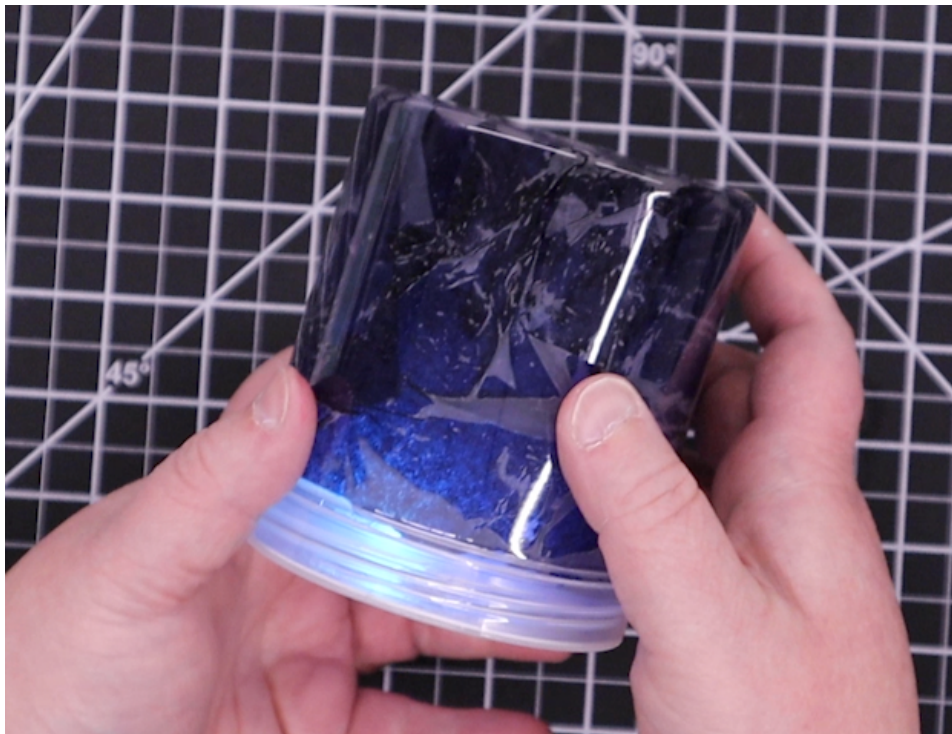


# Let's Make This!

**Take the tape off the battery holder and slide your battery in, with the positive side facing up.**

Turn it on and test your circuit. If your LED doesn't turn on make sure that the positive leg of the LED is connected to the positive side of the battery and the negative side is connected to the negative side. If you need more thread let us know. We can provide more.

**Once you've tested your circuit carefully put the foam circle back into the lid of your jar and screw it onto the jar!**



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