

Constellation Box with Lights

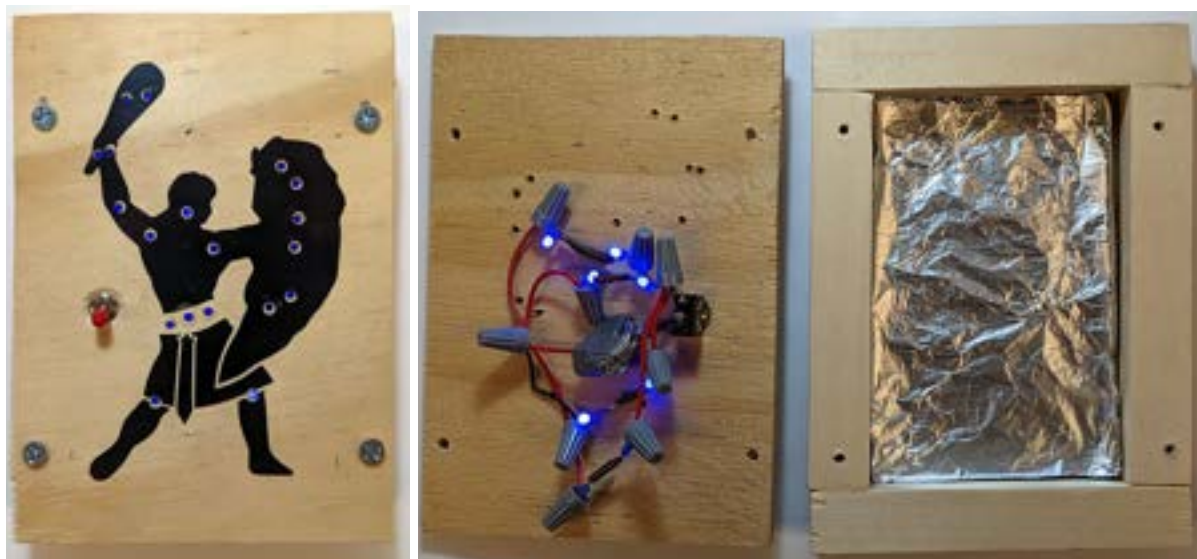
Shared by: K-12 Maker at MIT Edgerton Center

Specialized tools and materials used:	Experience level required:
Electronics: simple circuitry, switches, and wire connections	Intermediate
Laser Cutter	beginner
Vinyl Cutter	beginner

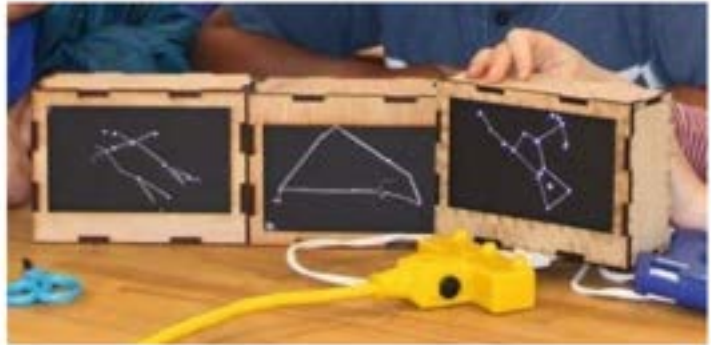
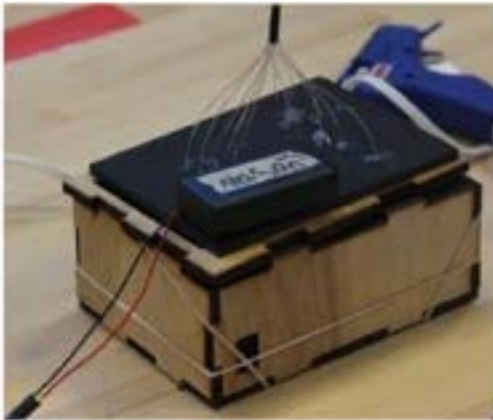
Grade Level and Subject: 6-12

Topic/Content Standards: Astronomy, Mythology

Students chose a constellation and designed a display box that lights up to reveal its star pattern. Two versions of the box were created; one version with the structure of the box made of wooden strips held together by screws, and another version made up of laser cut panels that were glued together. Students mapped out constellation patterns with a series of holes and set up simple circuitry so the box would light up at the desired locations. They then used vinyl cutters and other craft materials to create an image of the constellation for the top face of the box.



Constellation box made from wooden dowels



Laser Cut Constellation Box

Inside the box

Students wired LED lights and a toggle switch in parallel and powered it using a 3V coin cell battery. Reflective material, such as tin foil, was also used to enhance the brightness of the light emitted. In one version, the stars of the constellations are lit from one light source (a bundle of LEDs assembled with wire nuts - no soldering), in the other each star has its own LED element.

Suggested resources (optional)

- Constellation Ideas: <https://naturenoon.com/star-constellations-names-meanings>
- Parallel circuit: <https://pressbooks.bccampus.ca/basicelectricity/chapter/ground/>
- Butt joint (hand tool version): <http://www.ultimatehandyman.co.uk/how-to/woodworking/butt-joint>

Possible Content explorations

- create light boxes for the graphs of equations
- map the plot of a story, historic event, etc
- create a geographic map for a story, historic event, etc