

Constellation Boxes and Displays

Specialized tools/technology used:	Experience level required:
laser cutter (optional)	beginner
soldering equipment (optional)	beginner, but intermediate recommended
circuitry: wires, wire cutters, battery, LEDs, crimps or other connectors, etc.	beginner

Grade Level (of this example): 4-12

Topic/Content Standards (for this example):

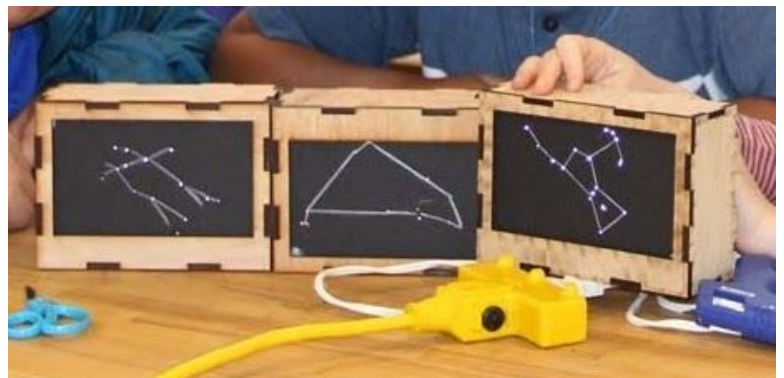
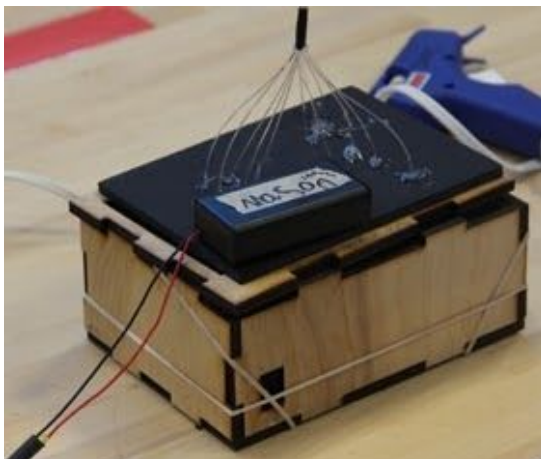
STEM - astronomy

ELA/Social Studies - mythology and civilization

See **Possible Content Explorations**, below

Summary of Project:

Students will use software that is compatible with a laser cutter to create a constellation box that meet design criteria designated by the teacher. They will then map out a pattern and set up simple circuitry so the box will light in desired locations. They can work individually or in a group to complete the project, and later present to the class along with other supporting deliverables. Note: if laser cutter technology is not available, the box can be constructed using craft materials such as foam board.





Possible Content Explorations / Expansions

ELA / Social Studies

- Mythology, Ancient Civilizations, Storytelling, Literary symbolism: - as a component of commonly taught “create a country/civilization” projects, have students regroup existing stars to form and name constellations unique to their fictional civilization. Students create a story about their constellation and link it to cultural practice, important symbols/beliefs, etc.

STEM

- Astronomy, Algebra: Have students use star maps to design a constellation matrix in a large light-sealed box or room, so that it only appears in the shape we see from Earth when viewed from the correct angle. (See [this online 3D Constellation lesson from the Astronomical Society of the Pacific](#) for inspiration.) Have students use the star distance table (as in lesson) to scale the model appropriately.
- Classes or groups might choose to create one multi-constellation matrix in a large black-out room for a community event, with multiple stars
- Astronomy, electric circuits: Design a circuit that accurately represents the relative brightness of each star in the given constellation

Ideas for advanced builders and high school students:

- rigging a collection of constellation boxes to a class-created book of myths or astrological facts - when a reader turns the page to info about the relevant constellation, it's the only thing that lights up
- make a “[Lite Brite](#)” display case with interchangeable bulbs
- larger-scale project using scrounged lamp parts
- create a puzzle-map of the night sky with 3 selectable difficulty levels -
 - each constellation lights up as it's placed in the correct location
 - constellations light up only once all are placed in the correct location
 - constellations light up only once all are placed in the correct location and orientation