Constellation Boxes and Displays

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

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

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