



**Artful Artsy Amy**  
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### Topics:

Sacred geometry, Islamic art, mandalas, drawing, sculpture, composition, engineering, & parallel circuits

### Materials:

- Chibitronics or 3mm LED
- Copper tape
- 3 volt button battery
- Electrical tape
- Clear paper protector
- Permanent markers
- Computer
- Printer paper
- Clear packing tape
- Scissors
- Cardboard box

### Nice to have:

- Black acrylic paint
- Metallic permanent markers

**Templates:** at the end of this document

**Grades:** 6-12

### Standards:

National Core Arts Standards

- Creating: 1, 2, 3,
- Presenting: 5
- Responding: 7, 8
- Connecting: 11

CA Social Studies Standards

- 7.2, 7.4, 7.6, 7.9,
- 10.1, 10.6, 10.10,
- 11.10

Next Generation Science Stan.

- MS-ETS1.1, MS
- ETS1.2, HS-PS3.3,
- HS-ETS1.1

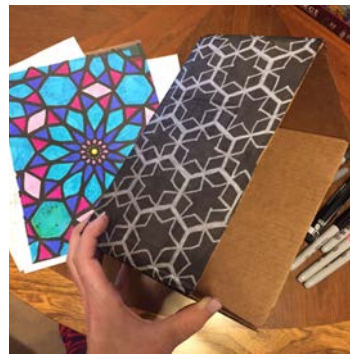
## Lesson Title: Illuminating Islamic Stained Glass

**Objective:** Students will synthesize understandings of sacred geometry and Islamic art by creating an illuminated lightbox using Chibitronic stickers.

### Overview:

- 1 - Introduce students to key elements of Islamic art emphasizing sacred geometry and stained glass. Mosque Nasir Al-Mulk in Shiraz, Iran is an excellent exemplar. Presentation available here: <https://goo.gl/dYSVhj>
- 2 - Examine variations of sacred geometry & mandalas in world religions; compare and contrast with Islamic examples.
- 3 - Digitally design (and print) an Islamic art-inspired sacred geometry mandala using the application, Mandala Maker: <http://mandalamaker.online/>
- 4 - Place printed mandala into a clear paper protector, trace, and color using permanent markers. Once finished coloring, remove print-out and cut the paper protector so that there is no longer a pocket. *Tip: Apply all color before using black to protect artwork from getting muddied with black ink.*
- 5 - Remove lid (if any) from box and color or paint it black. If desired, create an Islamic-art inspired geometric pattern on the box using metallic permanent markers.
- 6 - Push four holes into the back of the box using scissors. Apply copper tape, Chibitronic stickers or 3mm LED, and 3-volt button battery per the template directions. Test to ensure the parallel circuit works.
- 7 - Arrange and apply colored mandala to the front of the box using clear packing tape.
- 8 - Test, revise, and display completed Islamic-art inspired illuminated lightbox.

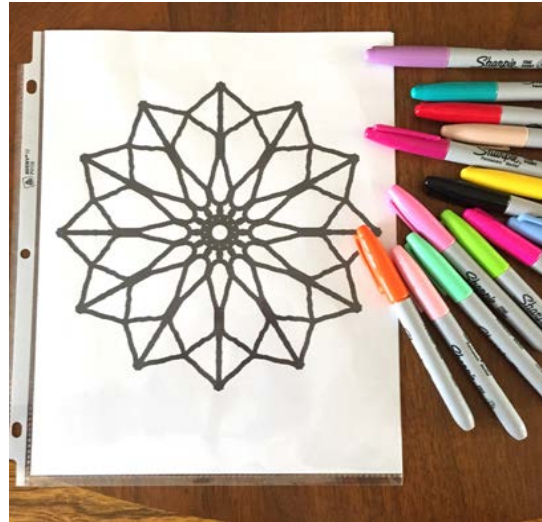
**View the following pages for images, detailed instructions, and tips on both circuitry and lightbox design and assembly.**





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**Image 1:** Digitally design (and print) an Islamic art-inspired sacred geometry mandala using the application, Mandala Maker (<http://mandalamaker.online/>). Place printed mandala into a clear paper protector.

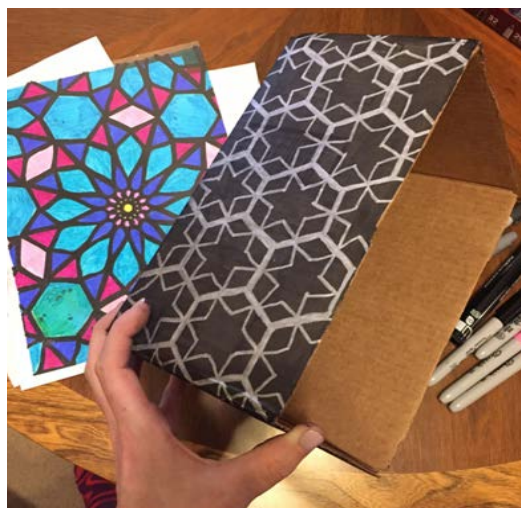


**Image 2:** Color mandala using permanent markers. If you want to cover the entire protector, you will have to move the mandala around and arrange it as desired.



**Tip:** Place a sheet of white paper under your hand as you color. This will protect your hand and prevent smearing as you color the mandala.

**Image 3:** Remove lid (if any) from box and color or paint it black. If desired, create an Islamic-art inspired geometric pattern on the box using metallic permanent markers.



**Tip:** If painting, use acrylic paint as other paints do not cooperate with pens and markers as well. You can substitute metallic permanent markers for white oil pastels or white colored pencils.



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**Image 4-6:** Push four holes into the back of the box using scissors. Apply copper tape, Chibitronic stickers, and 3-volt button battery per the template directions. Test to ensure the parallel circuit works.



**Tip:** View the templates at the end of this document for more detailed instructions regarding the parallel circuits.



**Tip:** If the circuit does not work, check to see if you have the 3-volt button battery flipped so positive matches positive and negative matches negative.







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**Image 7:** Cut the paper protector so that there is no longer a pocket. There should only be one sheet.



**Image 8:** Arrange and apply colored mandala to the front of the box using clear packing tape.

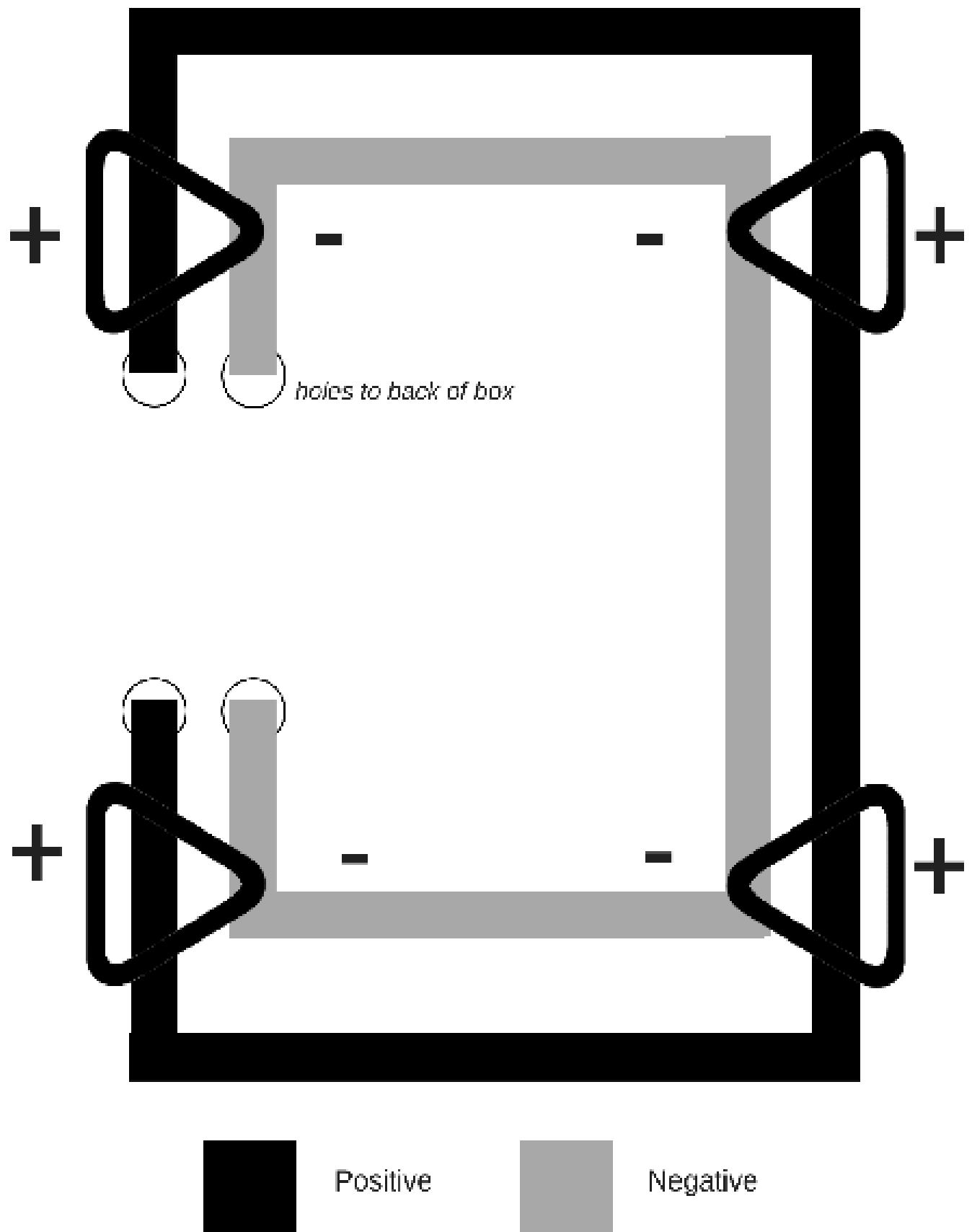


**Tip:** Put the colored-side of the page protector facing the inside of the box. This protects the coloring from smears, and ensures longevity.

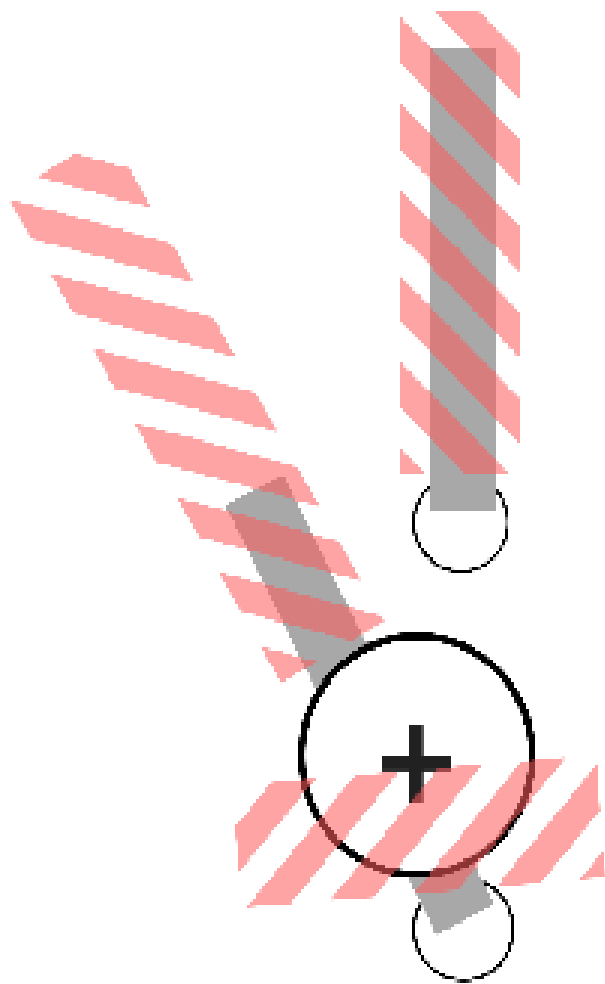
**Image 9:** Test, revise, and display completed Islamic-art inspired illuminated lightbox.



# Inside of Box Circuit Template



# Back of Box Circuit Template



*fold the copper tape  
back on itself to help  
make a switch*



*holes to inside of box*



Positive



Negative



Electrical Tape