

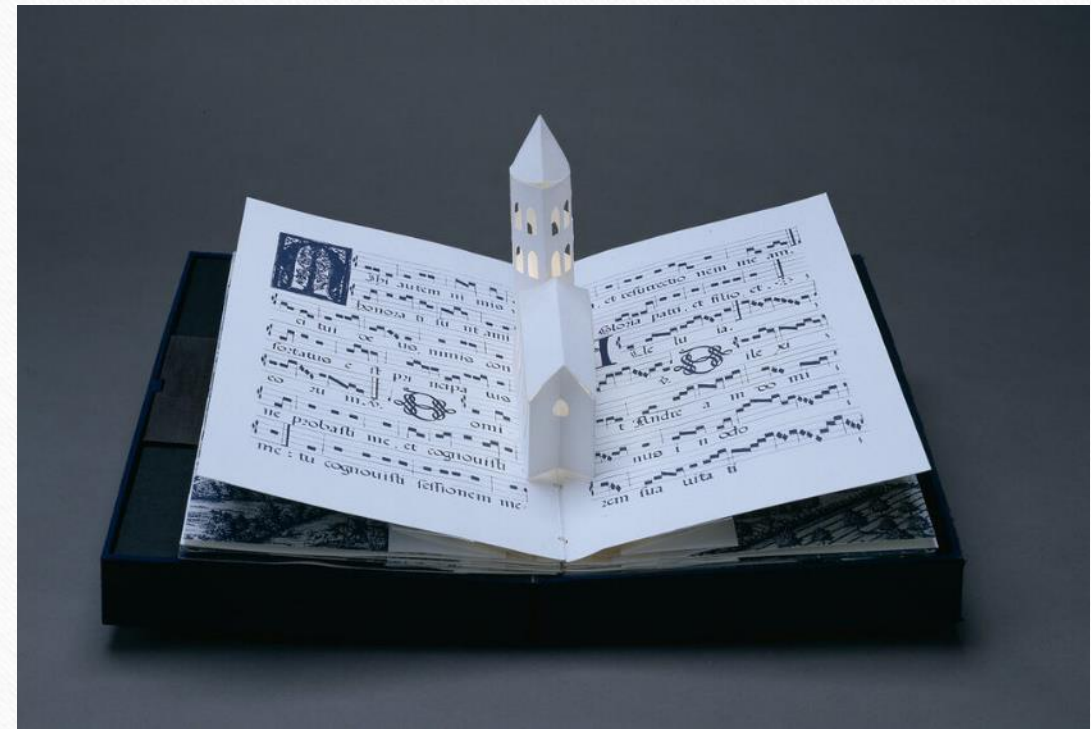
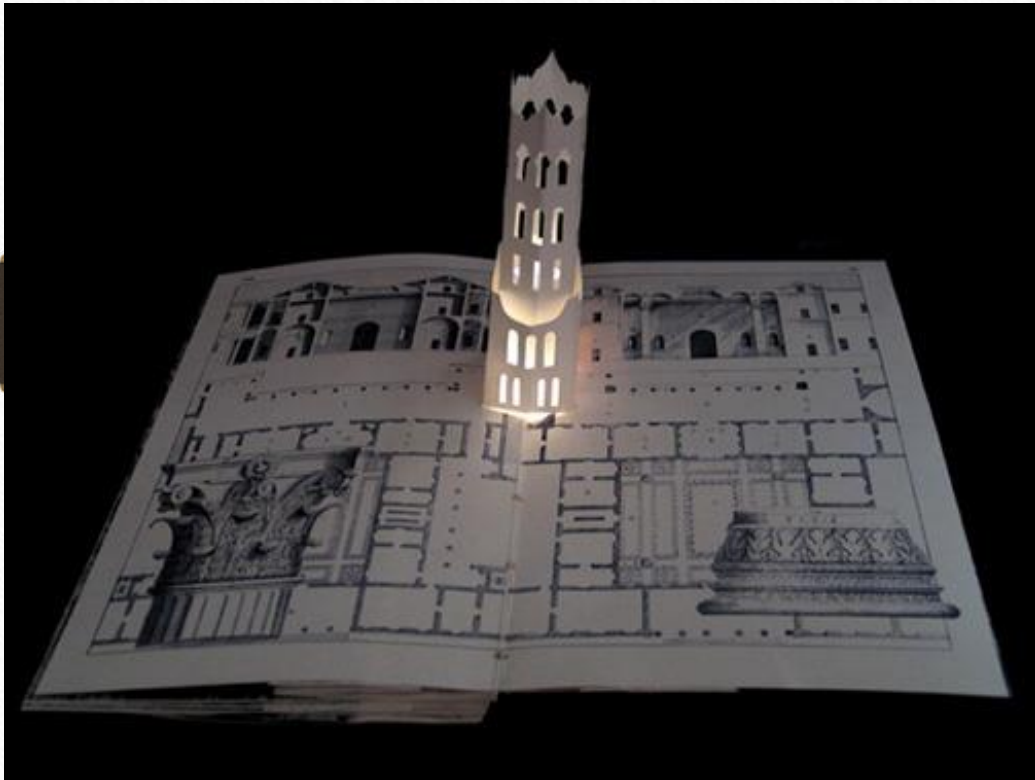
Electronics for Books

Adding Light and Sound to your Pages

We'll cover...

- Examples of Light and Sound
- Basic Electronics
- Adding the electronics to your book... simple solutions
- Resources

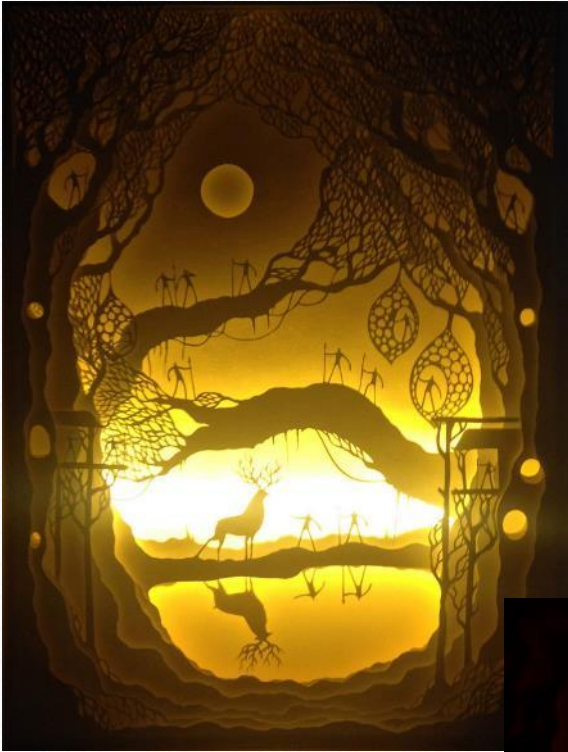
Carol Barton



Shelby Arnold



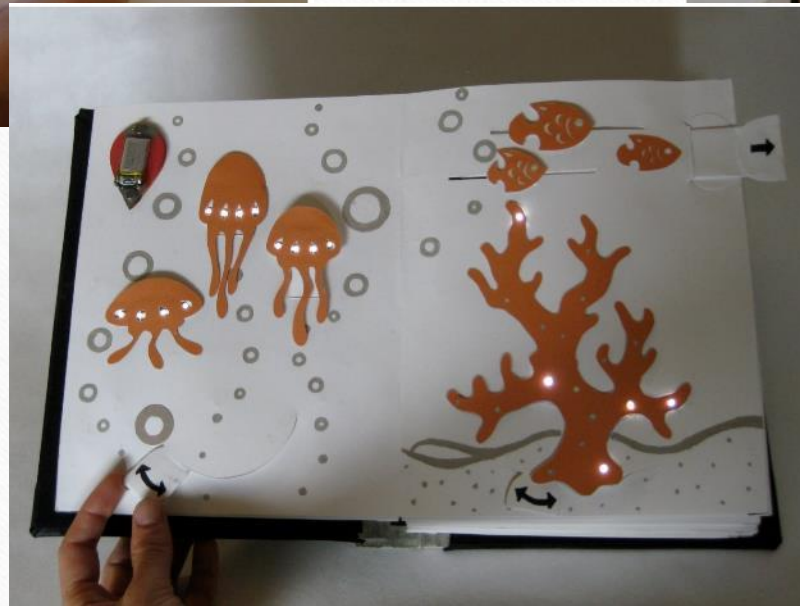
Hari and Deepti



Matthew Reinhart Star Wars



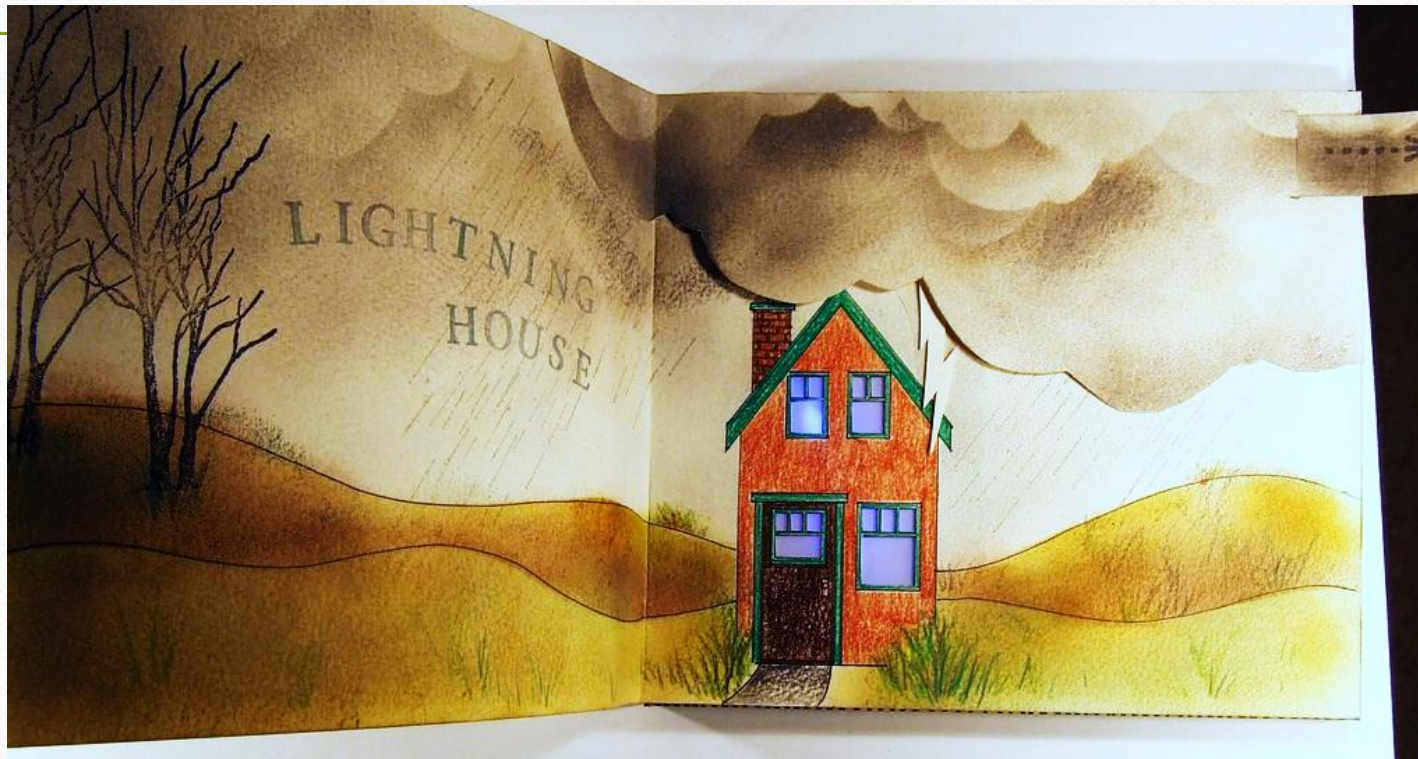
Jie Qi



Mare Blocker

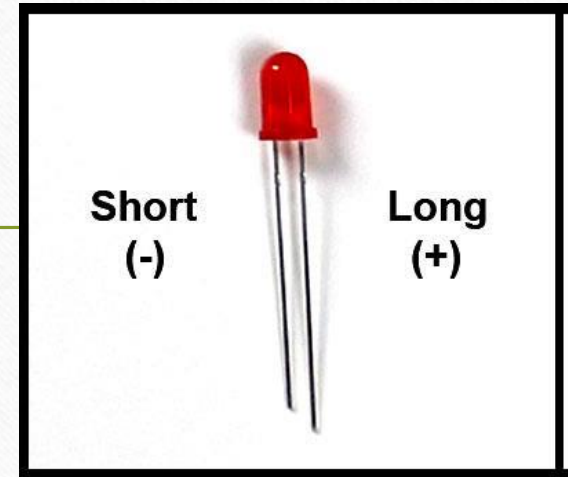
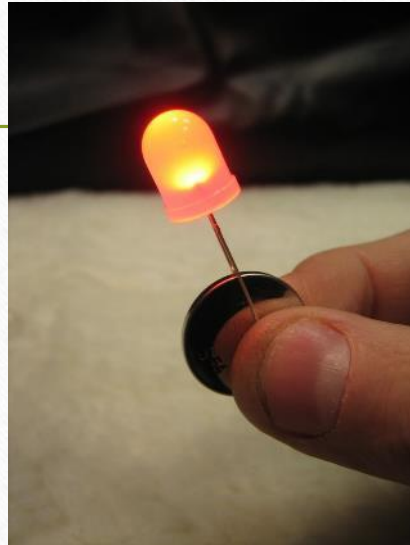


MJ Linford... Disaster Houses II



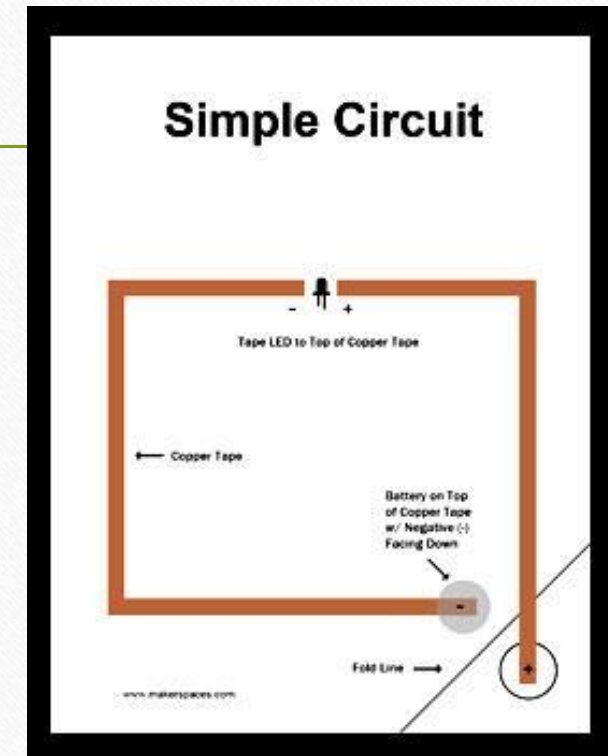
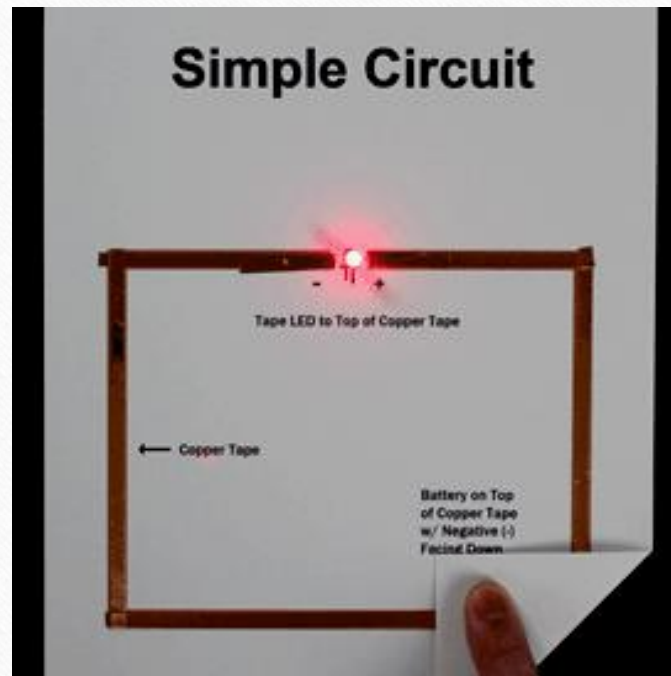
The basic concept

- LED and
- Coin cell battery



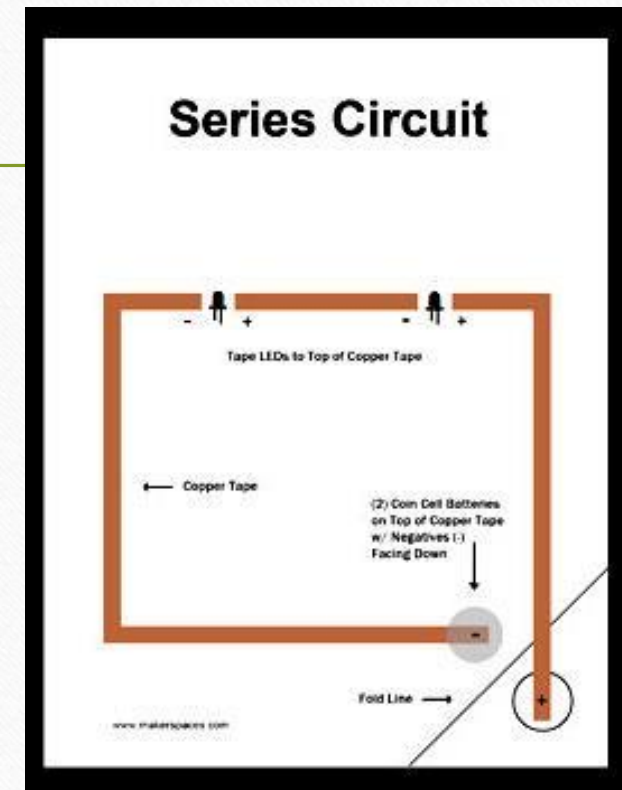
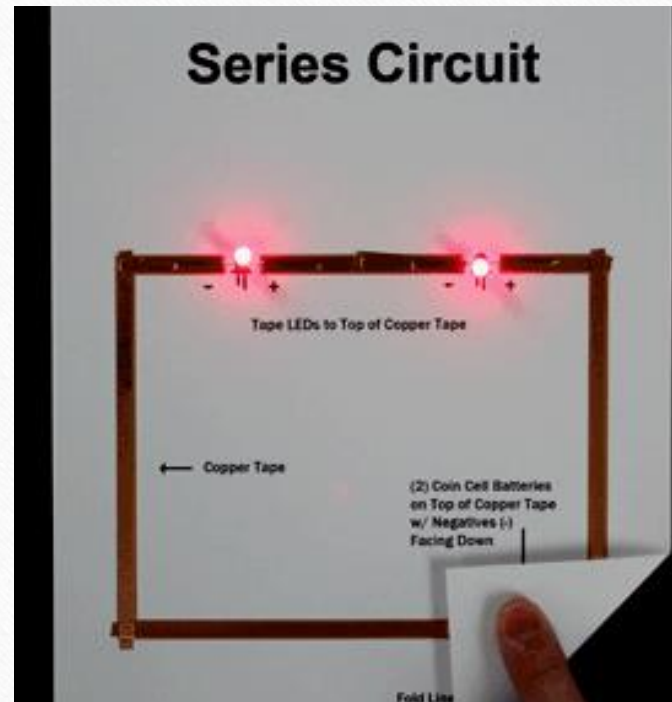
The basic concept: simple circuit

- Simple Circuit
- LED
- Coin cell battery
- Copper tape



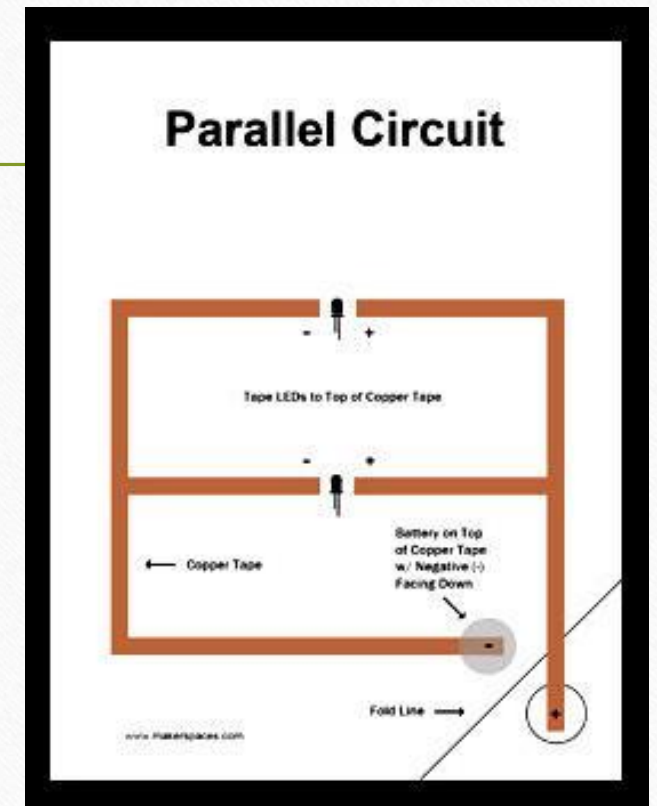
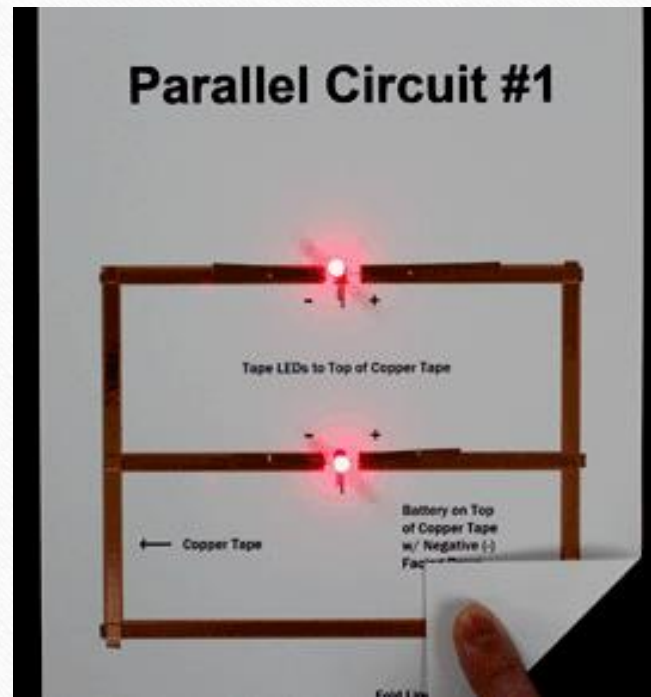
The basic concept: series circuit

- Series Circuit
- 2 LEDs
- Coin Cell battery
- Copper tape



The basic concept: parallel circuit

- Parallel Circuit
- 2 LEDs
- Coin cell battery
- Copper tape



Supplies you will need



LEDS...Light Emitting Diodes's ...

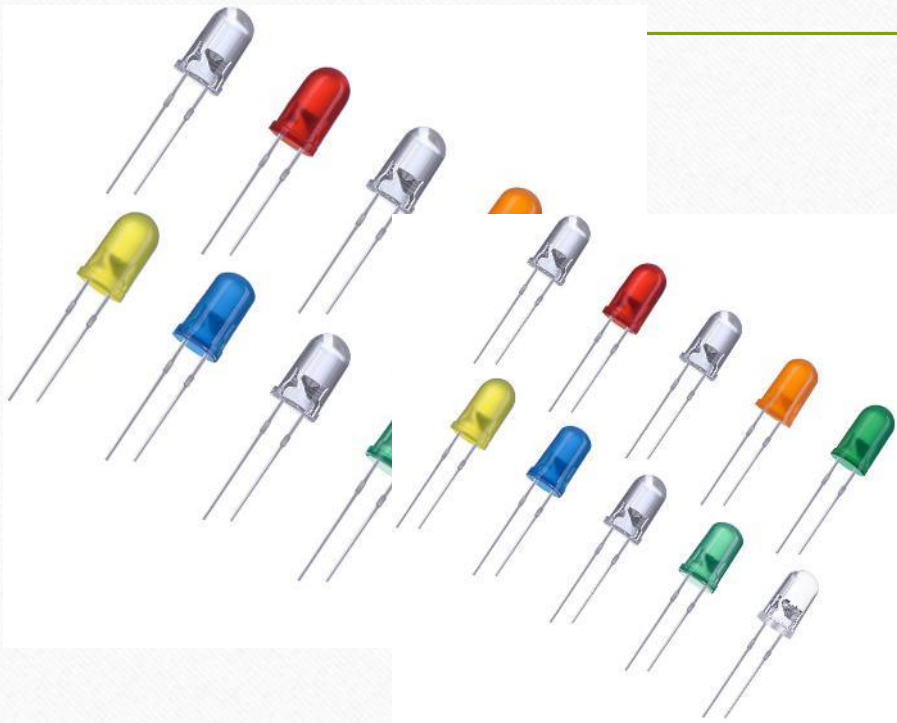
lots of choices



- 5 mm 3v
 - larger
 - harder to hide, rounded top
 - light comes out of top, not side
 - multiple colors, tri-colors

Light Emitting Diodes' ...

lots of choices



- 3 mm 3v
 - smaller
 - easier to hide, rounded top
 - light comes out of top, not side
 - multiple colors, tri-color

Light Emitting Diodes's ...

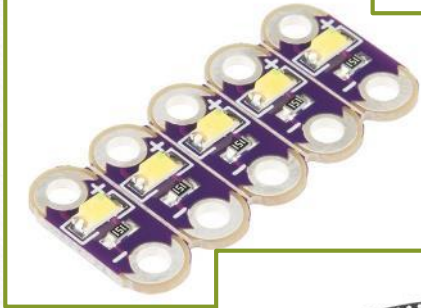
lots of choices



- 'flat' top LED's 3v
 - both sizes
 - shines upward
 - easier to hide
 - comes in multiple colors, tri-colors

Light Emitting Diodes' ...

lots of choices



- Specialty LED's 3v
 - Chibitronics.com
 - electronics for paper crafters, kids
 - stick-on circuitry
 - SparkFun Electronics
 - electronics for fiber arts and paper
 - Arduino and Lilypad

Batteries

Button Battery Parsing

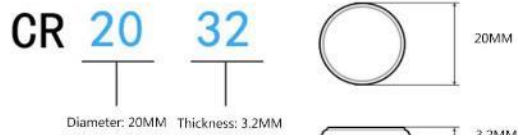


Note: This Chart Is For Reference Only

- 1 Battery Positive : +
- 2 Battery Negative: MJKAA
- 3 Battery Model : CR2032
- 4 Battery Voltage : 3V
- 5 Battery Origin : China

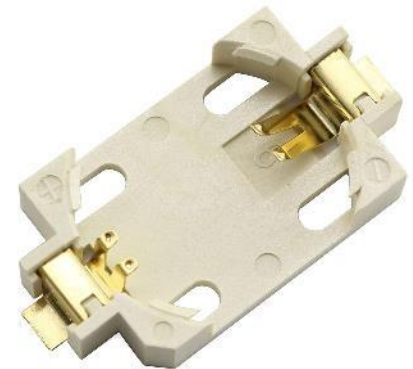


Button Battery Naming Rules

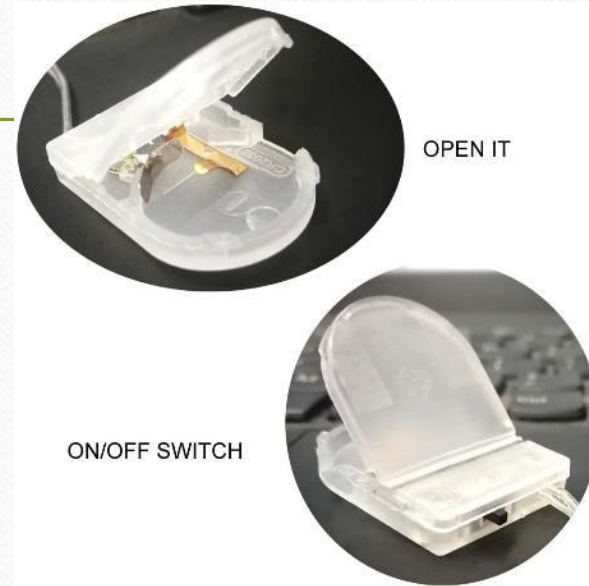
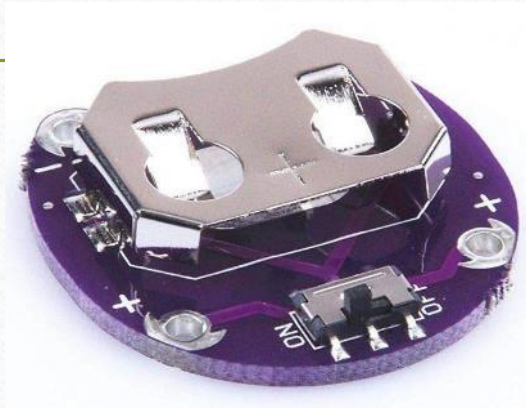


- Coin cell batteries
 - CR2032
 - 3V 180 mAh
 - more juice', lasts longer
 - CR2025
 - 3V 150 mAh
 - thinner height profile

Traditional Battery Holders

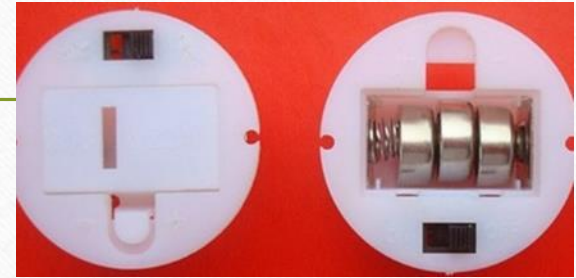


Other Battery holders



Button Batteries

- LR41
 - 1.5V
 - need 2 for most LED's
 - Thick, harder to hide in book
 - kinda fiddly, imho
 - often used in sound modules



Making Connections



- Conductivity

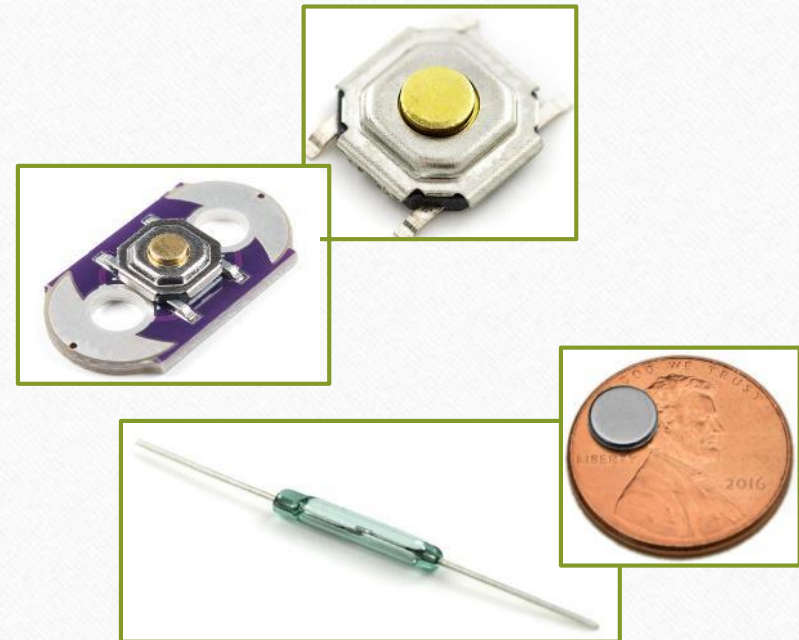
- copper foil
- Steel thread
- Coated wire
- Brass sheeting
- Circuit pens



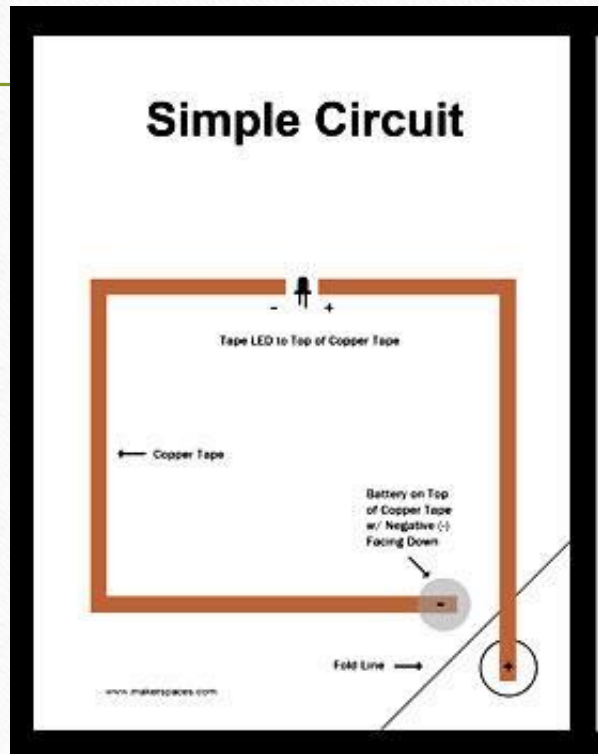
Switches



- Activate electronics
 - light
 - to activate when page is opened
 - to activate when action is taken
 - sound
 - to control activation of sound



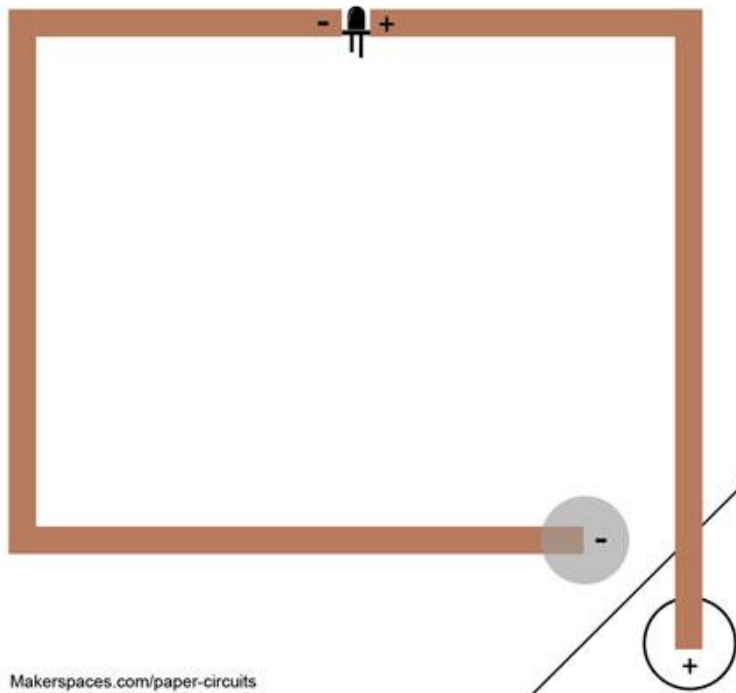
Making a simple circuit



Making a Paper Circuit



Simple Circuit

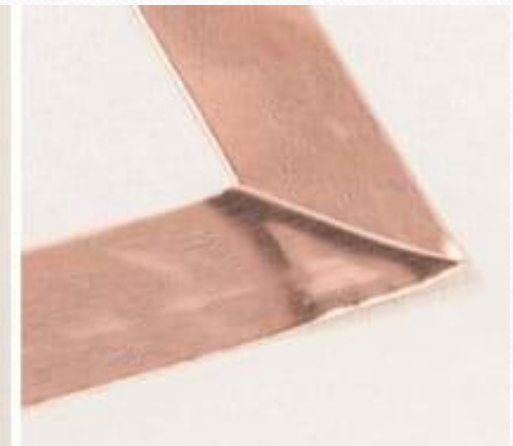
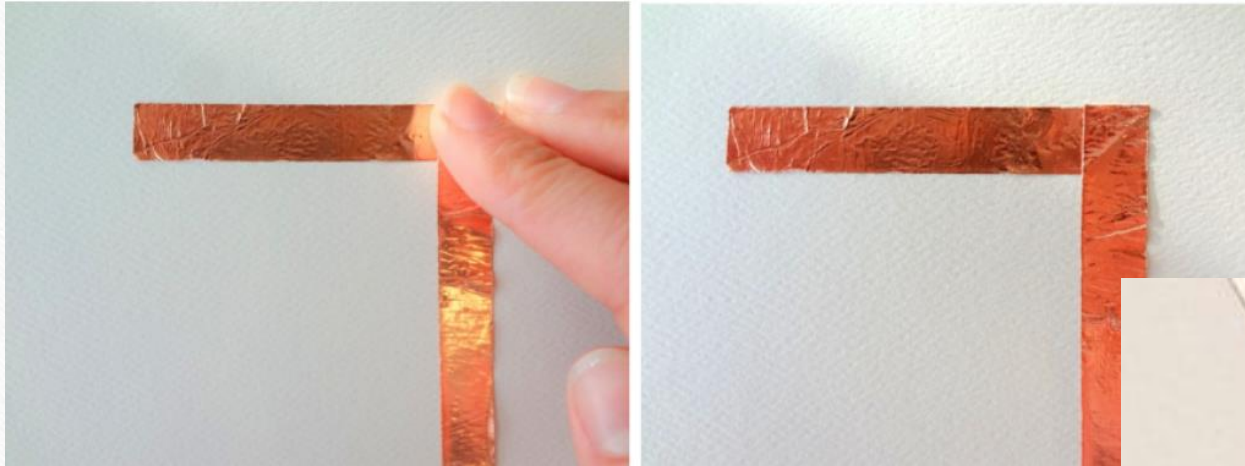
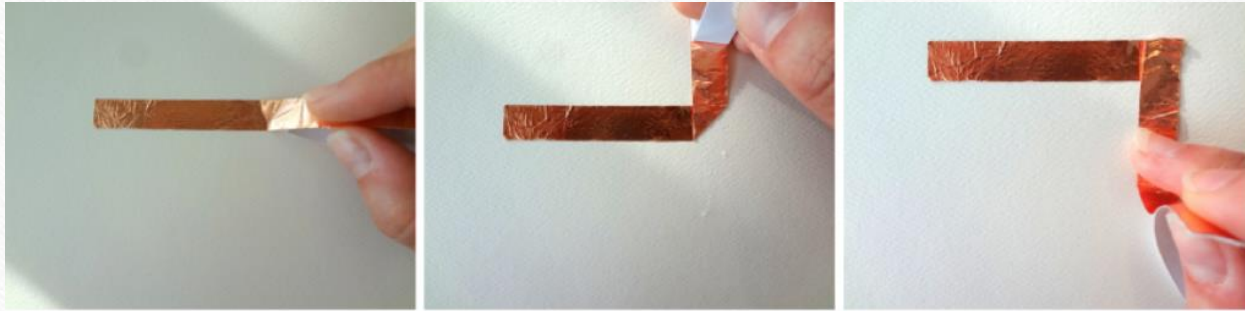


Makerspaces.com/paper-circuits

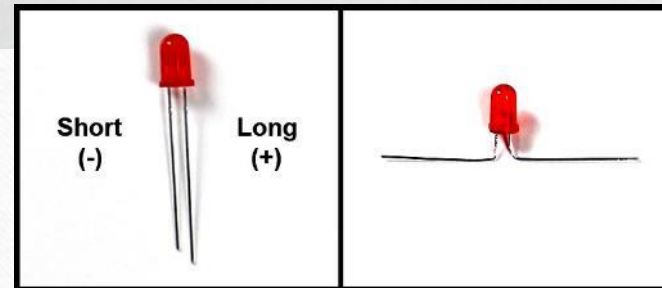
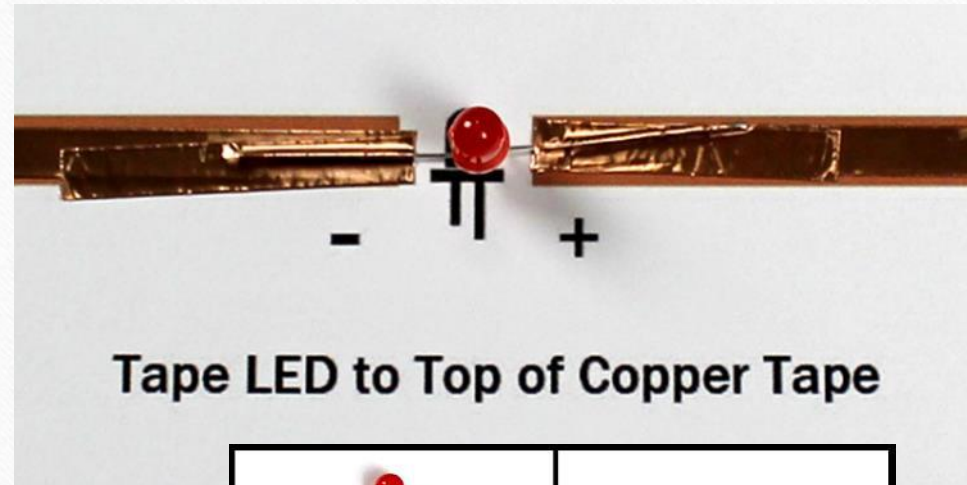
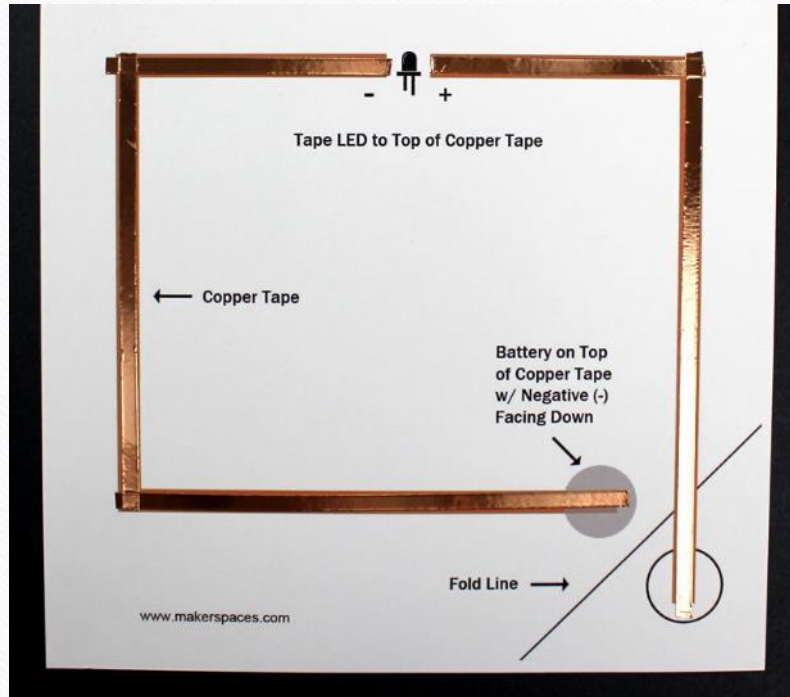
Use a template

Download a template from
[MakerSpaces.com](https://makerspaces.com)

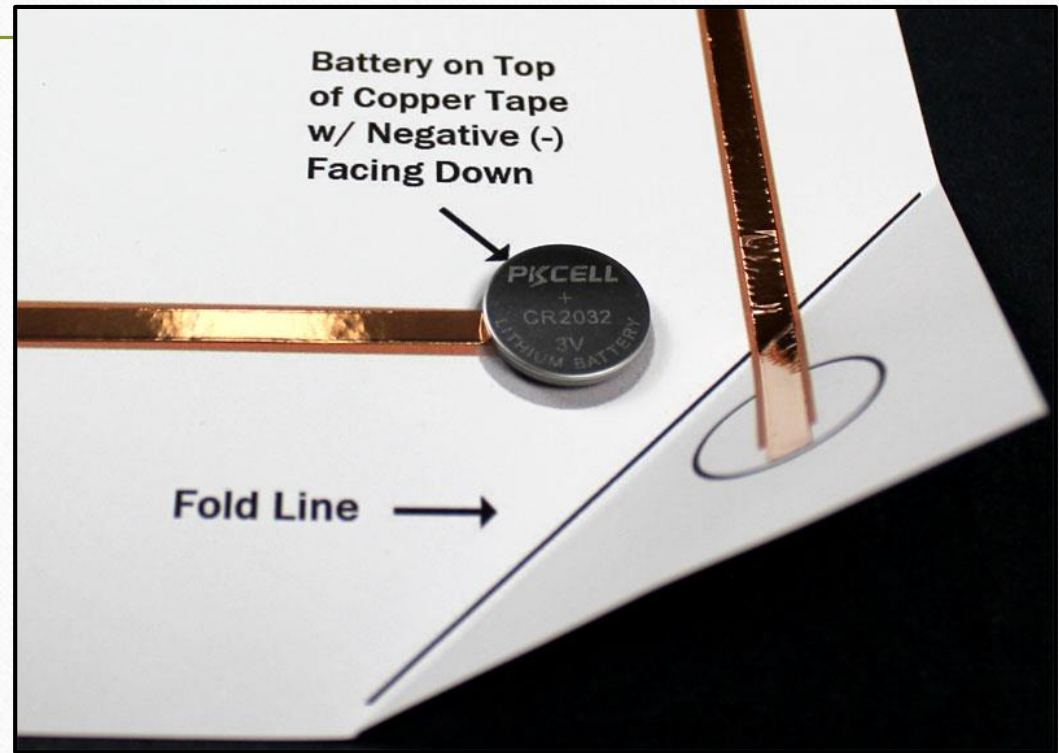
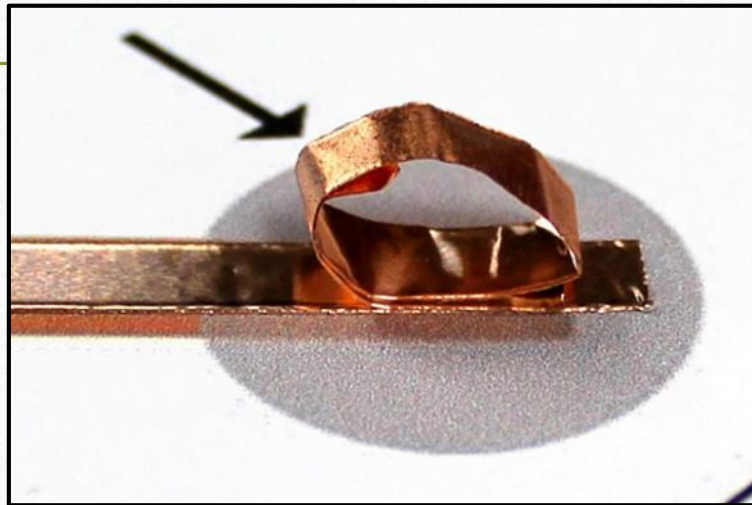
Making a copper foil corner



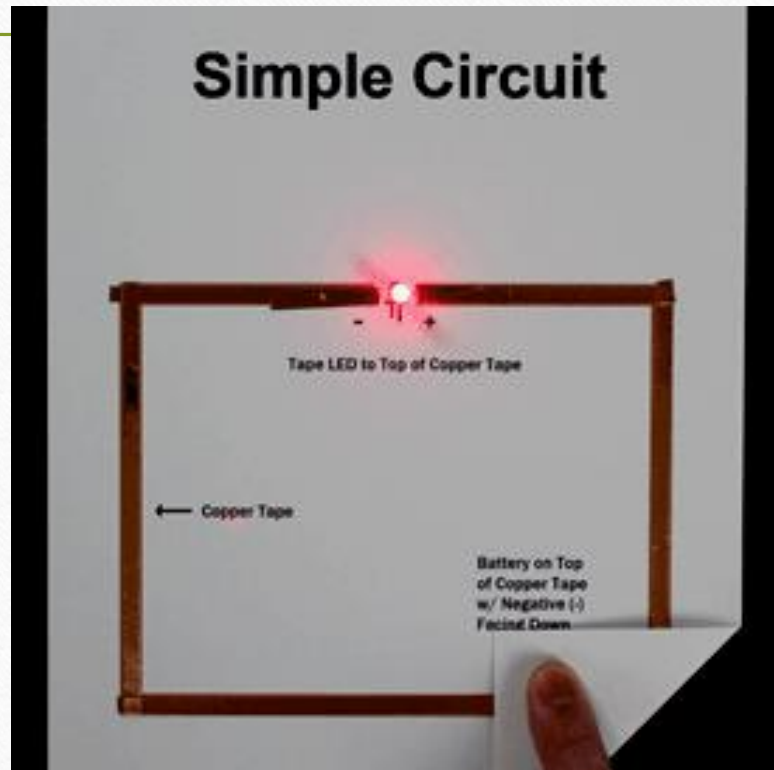
Making a simple circuit



Making a simple circuit



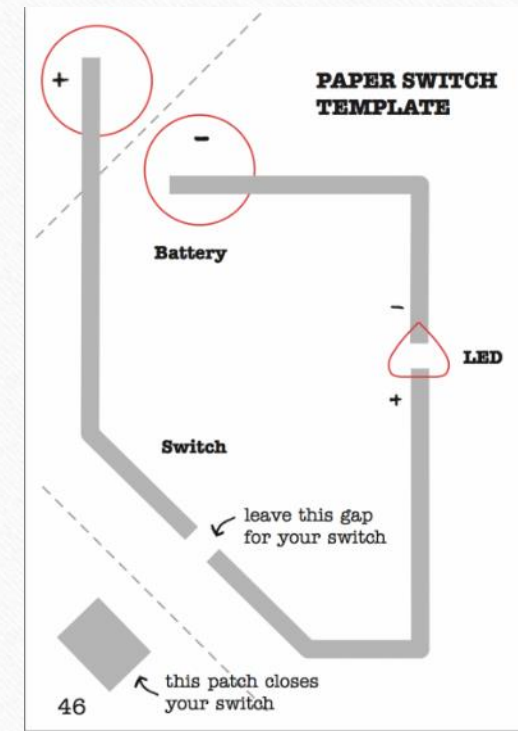
Making a simple circuit



- Now you have a simple circuit.
 - The ‘switch’ is you, pressing down on the corner of the paper to complete the connection.

Adding a switch

- Lilypad switch
- Chibitronic switch



Adding Sound to Your Artwork



My sound additions...

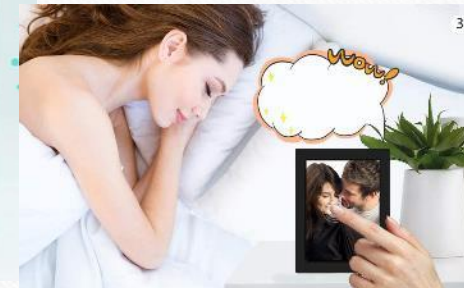
No Dog, No

Tool Box

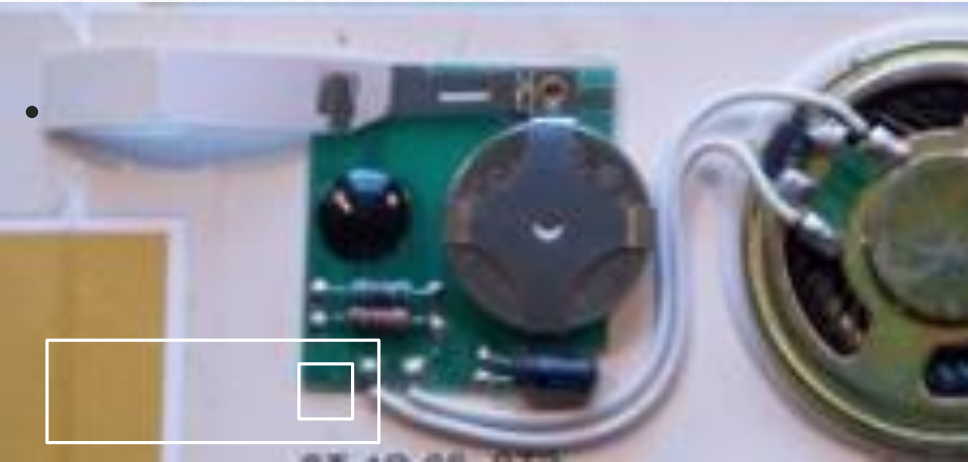
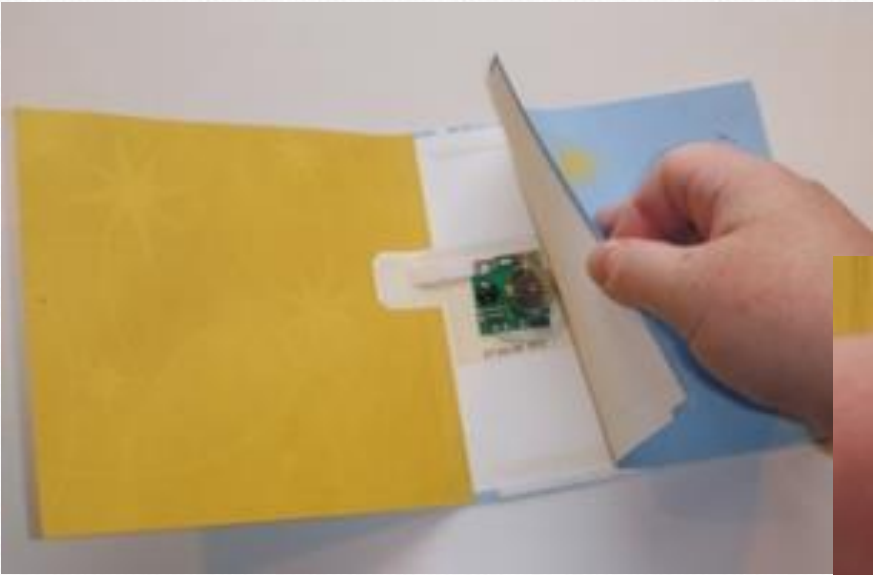


Adding sound

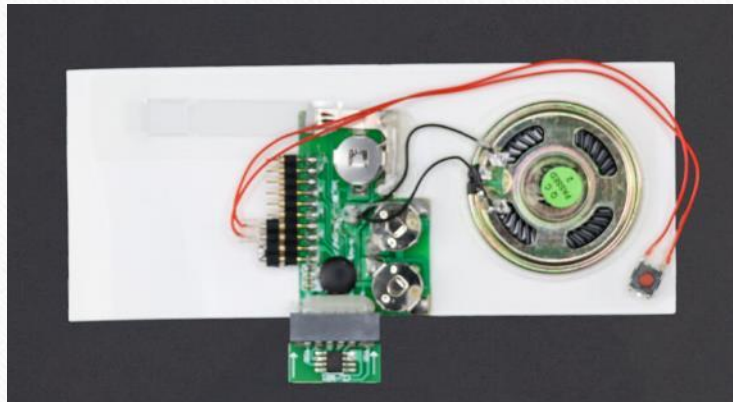
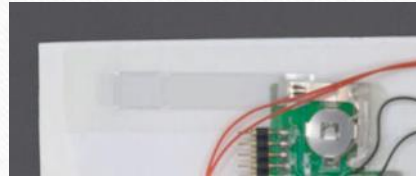
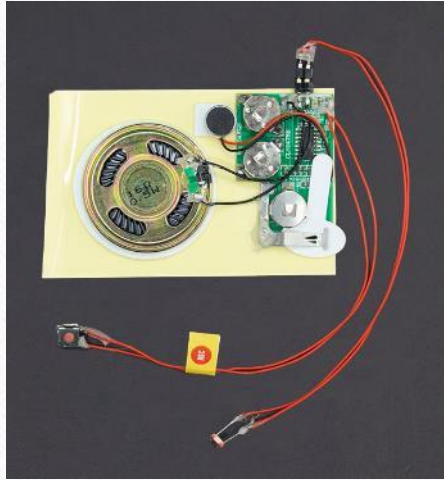
- Greeting cards
- Read-aloud books
- Talking picture frames



How sound cards work...



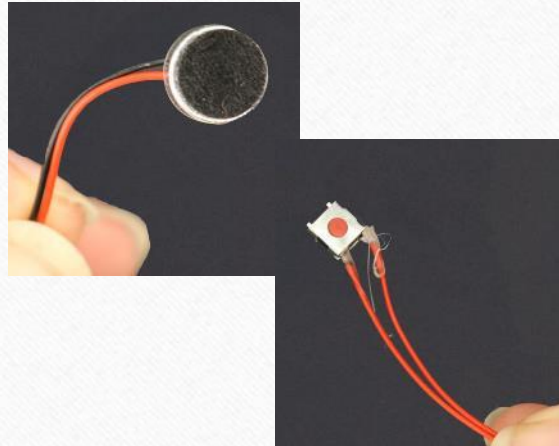
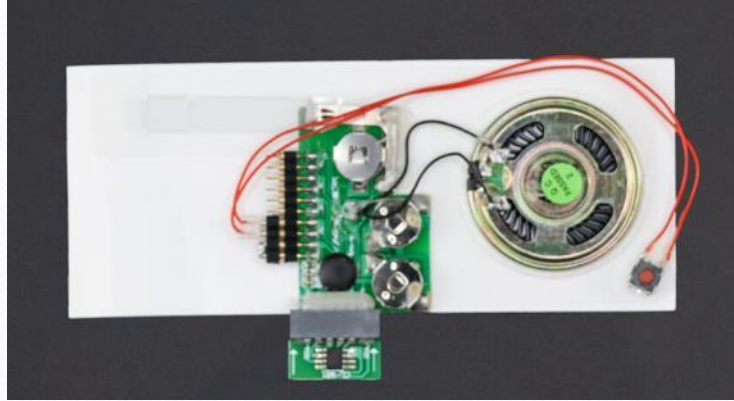
Big Dawgs Greetings



- User recorded sound modules
- Light activated sensors
- Tab activated sound

- bigdawgsgreetings.com

Big Dawgs Greetings



- User recorded sound modules
- various lengths of time...
 - 10 sec-200 sec
- Slider mechanisms
- Light activated sensors
- multiple sounds on one card
- bigdawgsgreetings.com

Resources

Sources:

- All Electronics: allelectronics.com batteries, LEDs, switches etc.
- Big Dawgs Greetings: Bigdawgsgreetings.com recordable sound cards
- The Battery supplier: thebatterysupplier.com inexpensive batteries
- Circuit Scribe: circuitscribe.com conductive ink pens, drones, etc
- Chibitronics: chibitronics.com paper-craft friendly LEDs, switches, controllers, and more.

Resources

Sources:

- Sparkfun electronics: sparkfun.com Lilypad electronics, fabric friendly components, programable color effects, etc.
- Digikey: digikey.com electronics, conductive adhesive copper tape, etc.
- Lessemf: Lessemf.com conductive fabrics
- Electric Mosaic: Electricmosaic.com Conductive supplies for paper, fabric, and LEGO projects
- Amazon: smile.amazon.com lots of everything above, at competitive prices, small vendors

Resources

- **Tutorials:**
 - instructables: [instructables.com/circuits/](https://www.instructables.com/circuits/)
 - Jie Qi: [technolojie.com](https://www.technolojie.com)
 - Maker Space: makerspaces.com

Making Amazing Books

The screenshot shows the Amazon product page for the book "Making Amazing Books: Pop-ups and Moveable Structures" by Mary Jeanne Linford. The page is displayed on a desktop browser with a dark navigation bar at the top. The navigation bar includes the Amazon Smile logo, the delivery location "Bainbridge, MD 21014", a search bar with the text "making amazing books linford", and links for "Account & Lists" and "Cart". Below the navigation bar, there are category links such as "Books", "Advanced Search", "New Releases", "Best Sellers & More", "Children's Books", "Textbooks", "Textbook Rentals", and "Best Books of the Month".

The main content area features a large book cover image on the left. The cover is titled "Making Amazing Books" and includes the subtitle "with Pop-up and Moveable Pages" and the author's name "Mary Jeanne Linford". The cover art shows a colorful, multi-layered book design.

To the right of the cover, the product title "Making Amazing Books: Pop-ups and Moveable Structures" is displayed in a large font, followed by "Paperback – August 6, 2021" and "by Mary Jeanne Linford MEd (Author)". Below this, there is a link to "See all formats and editions" and a price box for the paperback edition: "\$34.99 ✓ prime". A small text below the price indicates "1 New from \$34.99".

The product description begins with: "Making Amazing Books is a comprehensive in guide in workbook form for artists, teachers and pop-up book enthusiasts everywhere. Not only does this manual include clear and complete step-by-step illustrated instructions for making sixteen different pop-ups and movables (with printable patterns), but it also guides the reader through the process of imagining the book, from theme development to planning for the entire book. The illustrations and instructions are clear and thorough, and lead to a successful final book." A link to "Read more" is visible at the bottom of the description.

On the right side of the page, there is a purchase summary box. It shows the price "Buy new: \$34.99" with the Prime logo. Below this, it states "FREE delivery: Tuesday, Aug 10" and "Details". The delivery location is "Deliver to Mary - Bainbridge Is... 98110". The status is "In Stock." and the quantity is "Qty: 1". There are two buttons: "Add to Cart" (yellow) and "Buy Now" (orange). Below these buttons, there is a "Secure transaction" badge and information about shipping from Amazon.com and being sold by Amazon.com. The return policy is "Return policy: Eligible for Return, Refund or Replacement".

At the bottom of the page, there is a "Show all" button with a close icon (x).