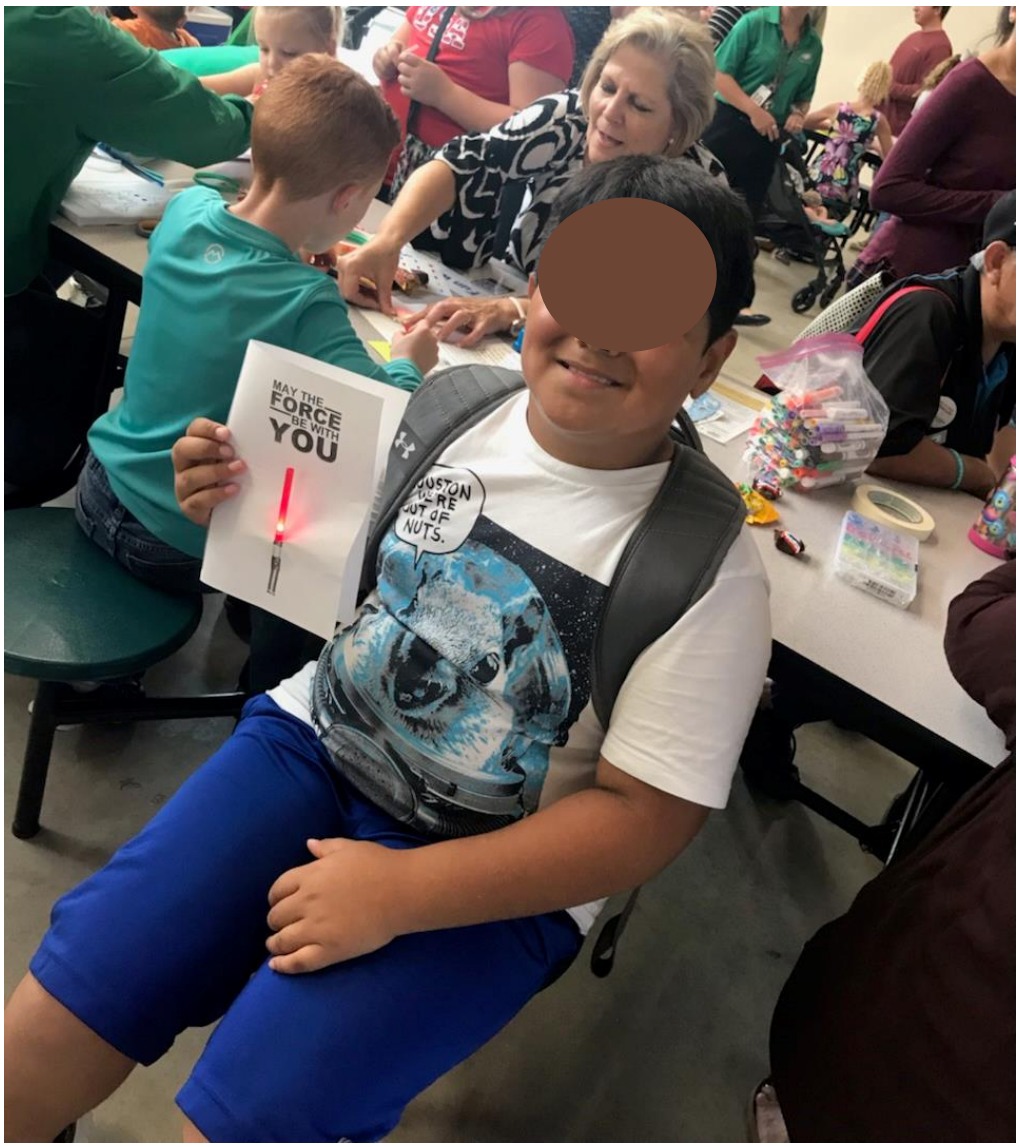
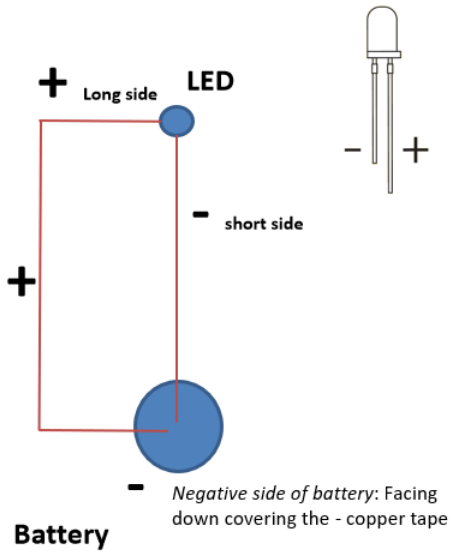
Paper Circuit STEM Activity





Negative side of battery: Facing down covering the - copper tape

Positive side of battery: Facing up with the + copper tape on top

Troubleshooting

1. Check LED and battery are working
2. Reverse battery
3. Make sure + and – cooper tape strips are not touching
4. Make sure copper tape is continuous and smooth

2 Templates Included

Table of Contents

Thank You!

Thank you so much for your download. We hope you and your students enjoy this product.

We take pride in knowing that our products empower teachers with a high quality activity that is rich in content. Engaging and equipping students in S.T.E.M. is our passion! We would love to get your feedback on how we may continue to provide for you. Please email us at VivifySTEM@gmail.com with any comments or questions you may have.

- Claire & Natasha, The Vivify Team

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Overview

Paper circuits are a fun way to teach circuits and conductivity. Students use the easy-to-follow diagrams to create their own card that will light up! Materials needed include: paper, copper tape, LED lights, coin batteries, and clear tape. Students can also use markers or crayons to decorate the card.

Included are instructions for using paper circuits as a classroom project or part of a STEM Family Night.

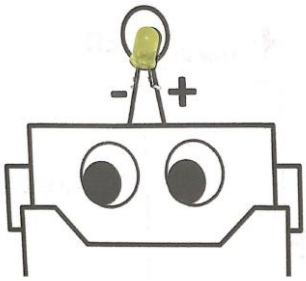
NGSS	TEKS (Texas)
4-PS3-4 Energy 4-PS3 Energy	Science 4.6 B, C

FUN WITH CIRCUITS

Create a circuit with materials provided.

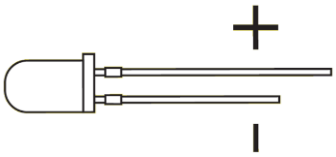
STEM Connection	Key Words
Electrical Engineer	Open & Closed circuit, electricity, conductivity

Materials



Materials per Student

- ❑ **1** LED light
- ❑ **1** Paper Circuit Template
  - ➢ Light Saber: Easy Level
  - ➢ CIS Robot: Medium Level
- ❑ **1** Battery
- ❑ **6 in** Copper Tape (Robot template only)
- ❑ **1** Straw (Light Saber template only)
- ❑ *Optional:* Colored pencils



Station Set-up

1. Instructions to create paper circuits are printed on the cards. English and Spanish versions available.
2. Read the instructions and create the robot and light saber paper circuits. Read over the troubleshooting tips.
3. For Light Saber template: pre-cut 2 inches of straw per card.
4. For Robot template: pre-cut 6 inches of copper tape.

Light Saber Template: This paper circuit only requires placing the LED directly on either side of the battery. This card is best for younger students or for a shorter activity.

Robot Template: This paper circuit is more complex and requires multiple steps to complete. Students may become frustrated with accurately placing the copper tape and is intended for upper elementary and middle school ages.

SAFETY WARNING

Please carefully monitor children using batteries and LEDs to avoid accidental swallowing.

Keep battery in protective case until ready to use. Storing batteries together will cause them to drain.

Watch video

www.vivifystem.com

MAY THE FORCE BE WITH YOU

Light Saber Paper Circuit Instructions:

1. You need: 1 LED light, 1 battery, 1 straw
2. Poke LED right above light saber
3. Cut straw about 2 inches tall
4. Place LED inside end of straw and tape straw to the card.
5. On inside of card, place battery between two LED wires. The longer wire must touch the + side and shorter wire touches the – side.
6. If your light turns on: you have created a close circuit that allows electricity to flow through the battery and LED! If no light shines, try switching the placement of wires and make sure both sides are fully touching the battery.
7. Tape wires and battery in place.

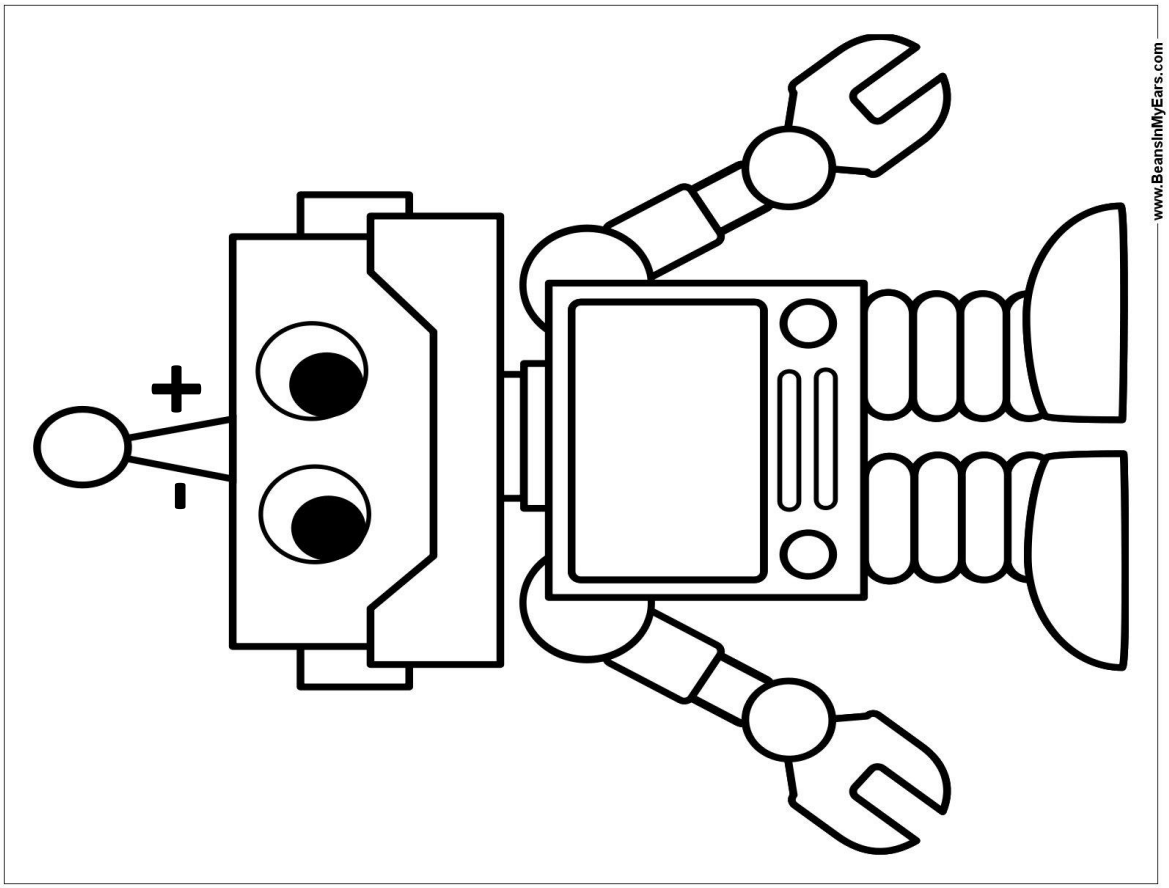
Version en Español

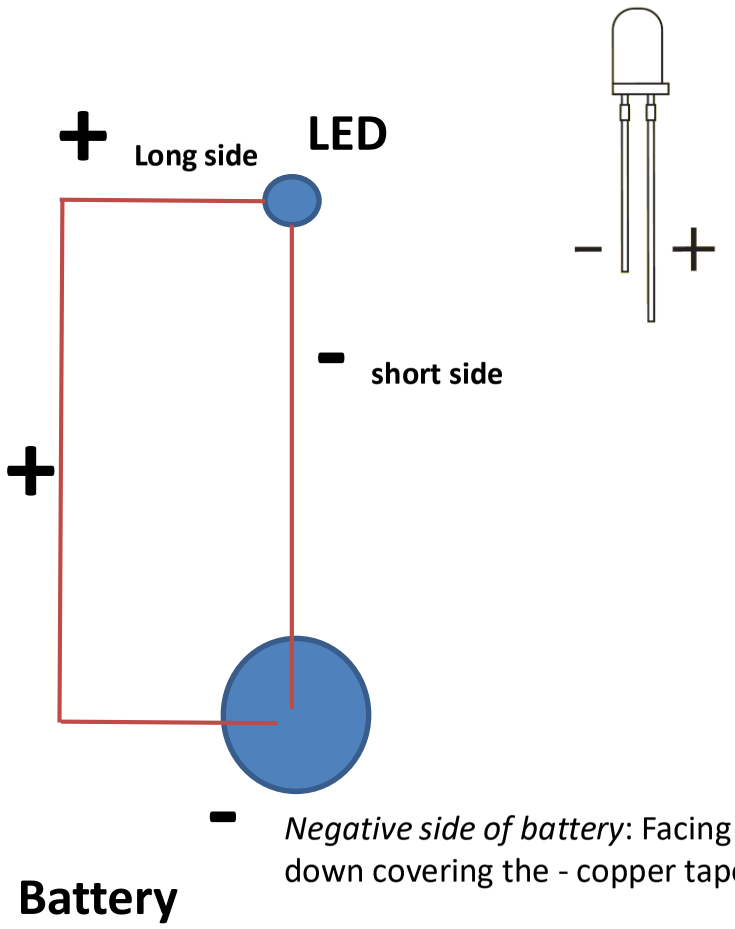
www.vivifystem.com

MAY THE FORCE BE WITH YOU

Instrucciones del circuito del papel de Light Saber: *Necesita: 1 luz del LED, 1 batería, 1 popote*

1. Penetre LED derecho sobre el Light Saber
2. Corte el popote cerca de 2 pulgadas de alto
3. Coloque el LED dentro del extremo del popote y peque el popote a la tarjeta.
4. En el interior de la tarjeta, coloque la batería entre dos cables LED. El cable más largo debe tocar el lado **(+)** y el cable más corto toca el lado **(–)**
5. Si su luz se enciende: usted ha creado un circuito cerrado que permite que la electricidad fluya a través de la batería y el LED! Si no brilla la luz, intente cambiar la colocación de los cables y asegúrese de que ambos lados estén tocando completamente la batería.
6. Pegue con los cables y la batería en su lugar cinta adhesiva





Negative side of battery: Facing down covering the - copper tape

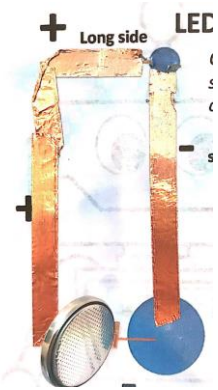
Positive side of battery: Facing up with the + copper tape on top

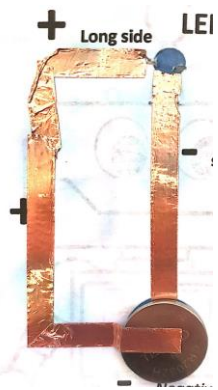
Troubleshooting

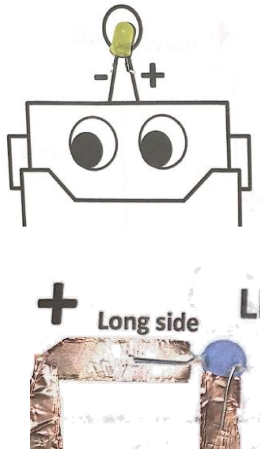
1. Check LED and battery are working
2. Reverse battery
3. Make sure + and – cooper tape strips are not touching
4. Make sure copper tape is continuous and smooth

Robot Paper Circuit Instructions:

1. You need: 1 LED light, copper tape, 1 battery
2. On the diagram to the left, place copper tape along all the lines on the (-) negative side. Make sure there are not breaks in the tape.
3. Place the battery negative side down where shown. Make sure it overlaps the copper tape.
4. Add copper tape to the positive (+) side of the circuit diagram all the way to the positive side of battery. Make sure to continue tape to cover battery.
5. Insert LED through the **FRONT** of the card with the longer wire (+) to the left. On inside of card, bend wires so the bulb is flat to the paper and the wires lay on top of the copper tape.
6. Add copper tape on top of the wires to secure.
7. Close card and press on CIS STEM logo. If your LED lights up, you are creating a closed circuit that allows electricity to pass from the battery to the LED!







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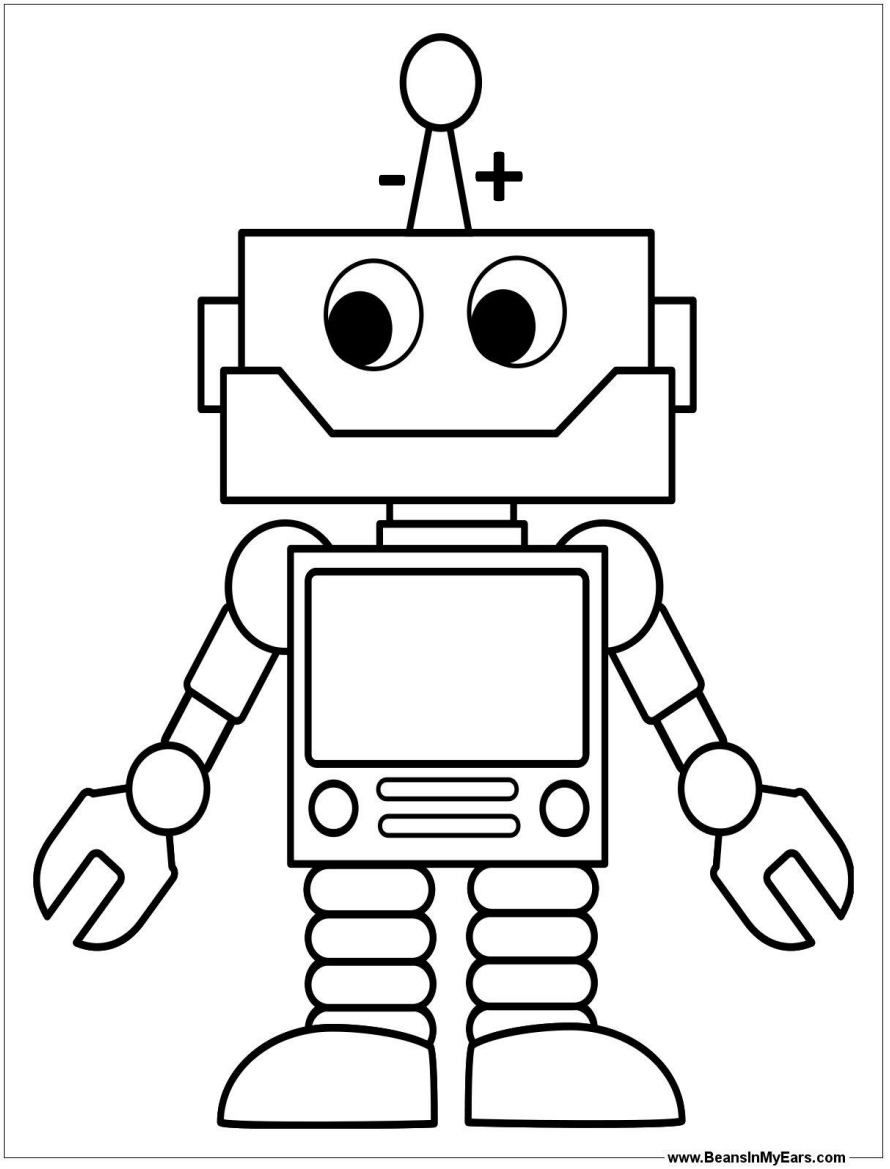
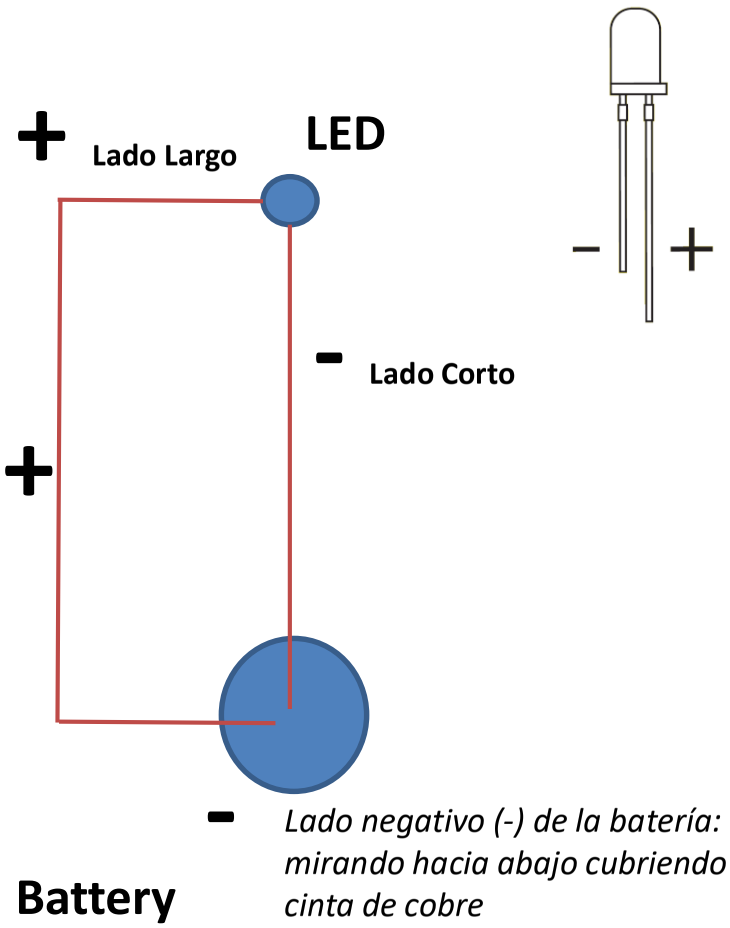




Lado negativo (-) de la batería: mirando hacia abajo cubriendo la cinta de cobre

Lado positivo de la batería: hacia arriba con la cinta (+) de cobre en la parte superior

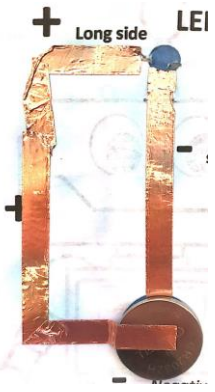
Solución de Problemas:

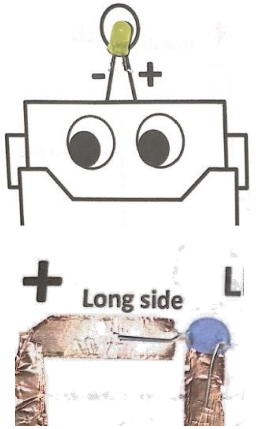
1. El LED de comprobación y la batería funcionan
2. Volteé Batería
3. Asegúrese de que las tiras de cinta (+) y cinta de cobre no toquen
4. Asegúrese de que la cinta de cobre sea larga y lisa

Instrucciones del Circuito de Papel del Robot:

Necesita: 1 luz LED, cinta de cobre, 1 batería

1. En el diagrama a la izquierda, coloque una cinta de cobre a lo largo de todas las líneas en el lado negativo (-). Asegúrese de que no haya interrupciones en la cinta.
2. Coloque el lado negativo (-) de la batería hacia abajo, como se muestra. Asegúrese de que se traslape con la cinta de cobre.
3. Agregue cinta de cobre al lado positivo (+) del diagrama del circuito hasta el lado positivo de la batería. Asegúrese de continuar la cinta para cubrir la batería.
4. Inserte el LED a través del FRENTE de la tarjeta con el cable más largo (+) hacia la izquierda. En el interior de la tarjeta, doble los cables para que la bombilla quede plana sobre el papel y los cables queden sobre la cinta de cobre.
5. Agregue cinta de cobre en la parte superior de los cables para asegurar.
6. Cierre la tarjeta y presione el logotipo CIS STEM. Si su LED se enciende, está creando un circuito cerrado que permite que la electricidad pase de la batería al LED.





STEM Family Night Station

This activity is a great station for a STEM Family Night! For a complete planning guide along with 14 stations, check out our STEM Family Night Guide and Activities here.

Learn more about STEM Family Nights here.

The next page is a poster for this station to be a part of your event!

Fun with Circuits

Watch video

Create a circuit with materials provided.

STEM Family Night