

LIGHT UP WEARABLES



What if...

you could up-cycle a piece of clothing and brighten it up for a brilliant occasion?

Students will transform old garments into festive attire by adding programmable light circuits. The final product will be a customized, light-up garment that combines creative design with functional electronics.



This project fosters sustainable fashion practices by repurposing old garments and integrating technology, reducing textile waste and promoting ethical consumerism. This approach can also inspire a broader adoption of eco-friendly practices in the fashion industry.

Ideation and problem-solving is encouraged as students brainstorm and develop creative ways to incorporate lights into their designs, experimenting with different patterns and effects. Their innovative ideas will enhance the garment's aesthetic appeal and functionality, contributing to the overall success of their festive creations.

UN SDG



- Hands-on learning and interdisciplinary exploration
- Developing lifelong learning opportunities
- exposure to traditionally gender biased skills
- Innovation through wearable circuits.
- Reducing the impact mass production and consumerism has on the environment
- supporting ethical and sustainable production practices and environmental stewardship
- Reducing the material going into landfills

SKILLS

Students will learn :

Basic principles of light circuits:

Designing circuits and integrating LED lights into clothing.

Sustainable fashion:

Repurposing existing clothing to reduce waste and promote eco-friendly practices.

Coding and Programming skills:

Coding the circuits to create various lighting effects and patterns.

DID YOU KNOW?

Light-up wearables can change colors and patterns based on your mood or environment! Using sensors, these stylish accessories light up in response to your emotions, music, or even temperature.





Topics/curriculum area

Science: Electricity, Environment

Technology: Circuits, Coding and Programming

Engineering: Designing, Textile Manipulation

Arts: Sewing, Visual Representation

Mathematics: Measurement, Geometry

Competencies

This project has been designed to support the Council of Ministers of Education, Canada global competencies.

- Critical thinking and problem solving
- Innovation, creativity, and entrepreneurship
- Learning to learn/self-awareness and self-direction
- Collaboration
- Communication
- Global citizenship and sustainability

BADGES

- Circuits
- Design Thinking
- Micro:bit
- Wearables
- Sewing/Textile Manipulation





Levels of activity

Hello World

- sew lights into a garment

Intermediate

- code lights sewn into a garment

Advanced

- incorporate other components, inputs and outputs, (, switches and sensors, fans, buzzers, switches, controllers)
- code the different components within the garment

Brilliant

- code the project to interact with the viewer (e.g. heart rate, movement or possible medical conditions)
- have the garments interact with external influences (e.g. react to temperature, light, moisture, etc.)
- introduce audio

Prerequisite skills

Basic circuit and coding knowledge

Timeframe

3 - 4 hours

Suggested grade level

4 - 12



Materials & resources

In the Kit:

- conductive thread
- large eyed needles suitable for conductive thread
- sewable LEDs
- sewable neopixel
- chalk
- micro:bits
- batteries

Not in the Kit:

- item of clothing



Useful resources

b.Board Cards

Brilliant Holiday Challenge



Possible development

Introduction

Embark on a creative project that combines technology, environmental responsibility, and upcycling. Give new life to old clothing by transforming them into festive and luminous sweaters, complete with light circuits that they will learn to program.



Group brainstorming session

Discuss the various promotions we see for fashion (holidays, red carpet events, seasonal transitions, etc.). What do you see as wasteful about these events? What are the environmental and ethical consequences of buying fast fashion?



Learning through creativity and technology:

- Reusing old clothes helps combat pollution and reduce waste.
- Learn valuable skills such as how to sew, create and program light circuits.



Creating the

PROJECT

Preparation and design

1. Students select clothing, design light patterns, and plan circuit placement.
2. Prepare clothing by sewing pockets for components (micro:bit, batteries, etc.) and creating openings for LED lights.



Making\building

3. Place LED lights and microbit in appropriate positions, before sewing with conductive wires.
4. Draw, using chalk, the route for the conductive thread making sure it does not cross itself.
5. Use conductive thread to whip stitch 3 or 4 times through the positive holes of the light , then use a running stitch to go to the micro:bit (if using) and whip stitch 3 or 4 times through the pin 0, 1 or 2 hole.
6. Using a new piece of conductive thread repeat the previous step for the negative and GND holes.
7. If using a second, or third light, continue from the positive hole to the next positive hole and from the negative hole to the next negative hole, to make sure the lights are in parallel



Creating the **PROJECT**

Programming

9. Use the code.brilliantlabs.ca website to code a program to control the lights
10. Connect the micro:bit to the computer with the usb cable and download the code.
11. Disconnect the usb from the Micro:bit and connect the battery pack.

DID YOU KNOW?



Light-up wearables can improve safety at night! From glowing jackets to illuminated shoes, they help make you visible while cycling, jogging, or walking in the dark.

Possible Problems:



The lights are not working



- make sure the battery holder is turned on and the batteries are not dead
- ensure the thread goes from the pin 0, 1 or 2 to the positive of the light and the GND to the negative
- check the pin number in the code correlates with the pin used on the microbit
- cut off any extra thread
- check that the threads are not crossing over or touching anywhere
- Check the pause block allows for a long enough period of time

Addressable lights are not working



- ensure the neopixel code is being used.
- check the threads are going to the correct ports on the microbit and light (Pin 0,1 or 2 to arrow pointing to neopixel ,GND to -, 3V to +) see diagram on addressable light card
- check that the threads are not crossing over or touching anywhere



Facilitator tips

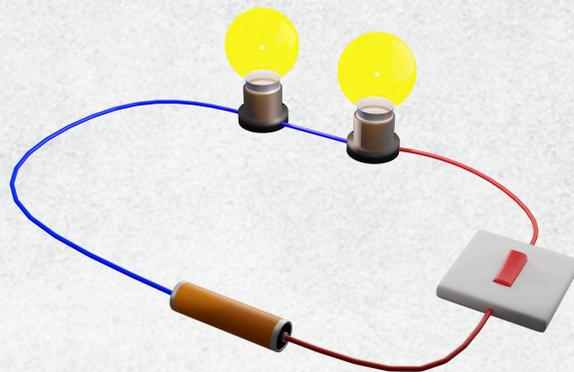
Provide Demonstration:

- Make sure tasks are of manageable sizes and that the instructions can be easily followed.
- Model how to sew stitches,
- Model how to code
- Remind about the difference between parallel and series circuits

Safety tips

Excess heat

If any part appears to be getting hot, unplug the battery pack and check for short circuits.



Handle tools with care:

Needles are very sharp, so remind students to handle them carefully, avoid touching the sharp tip. Needles should be stored safely in a container or needle holder.

Glossary

LED (light emitting diode)

A small electrical component that produces light.

Addressable lights

Lights that allows the color of each light to be controllable individually

Parallel circuit

A circuit that has all components separately connected to the positive and negative, so each component has its own path for the current to flow.

Conductive thread

A sewable thread that allows the flow of electric current.

micro:bit

Small, programmable electronic device for coding.

Series circuit

a circuit that has all the components connected one after the other along which the whole current flows through each component.

Add a design using a cutting machine, such as Cricut, before integrating the circuit.

Take it further

Circular making

Felting: renew and reuse kit

Innovative Fashion

Robotz got Brilliance



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