

Year 4 – Structure and Mechanisms

Can I design and make a light box, using electricity?

Design and Technology

Design Brief

Design, make and evaluate a light box. Your light box must successfully light up and share a message. You should also be able to turn it on and off.

Key Skills

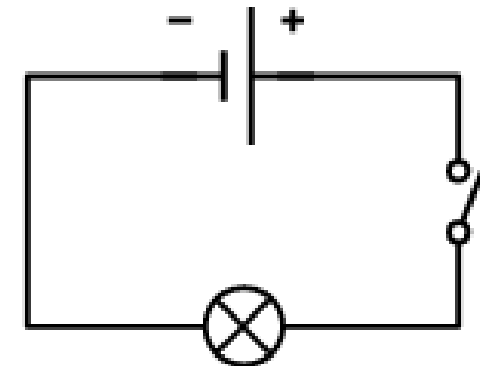
- How to draw a scientific diagram for an electric circuit.
- How to create a working electrical circuit for a bulb(s).
- Ensure wires are securely connected to the battery.
- Understand and use electrical systems in products.
- A product (light box) must be appealing to the person it is being made for. You can do this by carefully decorating the product with different materials e.g. Paint, paper, tissue paper

What I Should Already Know

- 3D structures can be made stable in a variety of ways.
- Electrical components can be added into a structure to add light, sound or motion.
- Selecting from and using a wider range of materials and components, including construction materials, is an important part of the design process.
- Light is a form of energy. Light sources can be natural or humanly constructed.
- To understand the differences between opaque, translucent and transparent materials.

Key Vocabulary

series circuit	A closed circuit where the current follows one path.
input device	Parts that control an electrical circuit
output device	Parts that produce an outcome, such as a light or buzzer.
switch	A break in a circuit that can be joined when needed
circuit	A path through which electricity passes
illuminated	To be lit with bright lights.
LED	LED stands for light emitting diode. LED lighting products produce light up to 90% more efficiently than incandescent light bulbs.



Key Information

- A lightbox sign traditionally is an electrically-lit sign that contains the mechanisms to display a backlit film which includes a print image or set of letters.
- Lightboxes can be designed for outdoor and indoor use. An outdoor lightbox is a great way of ensuring night-time visibility for important signage e.g. customer information.
- Individuals can have lightbox signs in their houses for decoration. They are also popular features in shop window displays.
- An electrical circuit is composed of a source of electrical power, two wires that can carry electric current, and a light bulb. To light up the bulb, the electrical circuit needs to be completed/closed so an electric current can be transmitted to the bulb. When a switch is open, this cannot happen.

Links to other Learning

- Science- Light and shadows, electricity, materials
- Maths - measures
- Art and Design
- D & T - structures and mechanisms all year groups

Key Questions

- Appearance/aesthetics - how will it look?
- Cost - how much money will it be?
- Customer - how will you make your light box appealing? Who might use it and why?
- Environment - will you use sustainable materials and renewable energy? Will you be able to turn your lightbox on and off?
- Size - how big or small will it be?
- Safety - how will you make it safe to use? How will you stay safe when working with electricity?
- Function/purpose - how will it produce light? Have I used my knowledge from Science to support my design? Can I explain how my product works?
- Materials - what materials will you use?
- Manufacture - how will you make and power it? Does my creation work and meet its purpose?



Examples of light boxes