

Paper Lanterns

Like so many Chinese traditions, Chinese lanterns have a long history dating back thousands of years (25-220 AD). They may have originated with Buddhist Monks honouring Buddha by lighting lanterns on the 15th day of the lunar cycle. The tradition then spread across China, with lantern festivals becoming a staple of many celebrations – the earliest evidence of which points to the Yuanxiao Festival during the Tang Dynasty during the latter half of the first Millenium.



Figure 1: Paper Lanterns hanging above the street

Each of the various types of Chinese lanterns comes with its own set of meanings, but generally speaking, all of the lanterns signify a wish for a better and brighter future. The meanings and superstitions behind colours are very important in China, so the intended message of any given Chinese

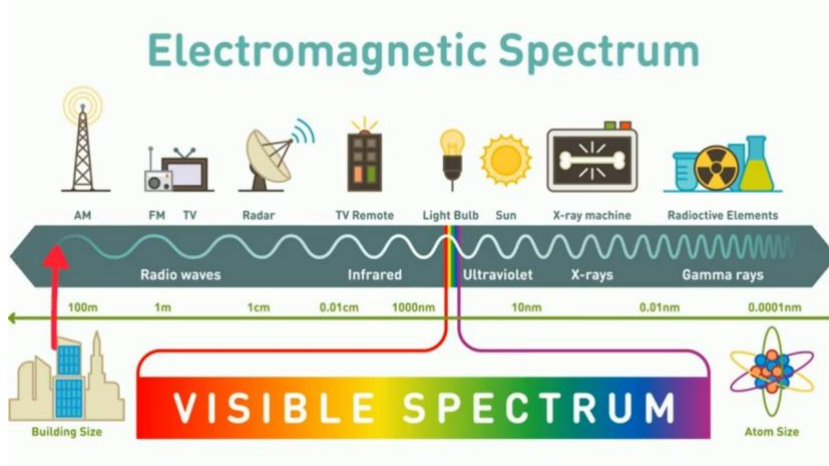
lantern can vary depending on its colour:

- Red – wealth, fame, and prosperity
- Yellow – freedom, good luck, and neutrality
- Green – health, prosperity, and harmony
- Purple – love, strength, and spiritual awareness
- Blue – immortality, growth, and optimism

In scientific research today, light is an exceptionally useful tool for observing the Universe around us. Electromagnetic radiation has come to be well understood thanks to Physicists like Ernest Maxwell and Max Planck. We can now understand how different types of radiation across the visible spectrum and beyond can affect us, and how to use these to create new technologies that help improve our lives.

Using different colours to explore the Universe

Central Laser Facility (STFC, Harwell Campus)



At the Central Laser Facility, we use a huge range of light to explore the world around us. Most of this light we cannot actually see! Our eyes can only see a very small part of the light that is all around us. This light is called the “Visible Spectrum” and is highlighted on the picture below.

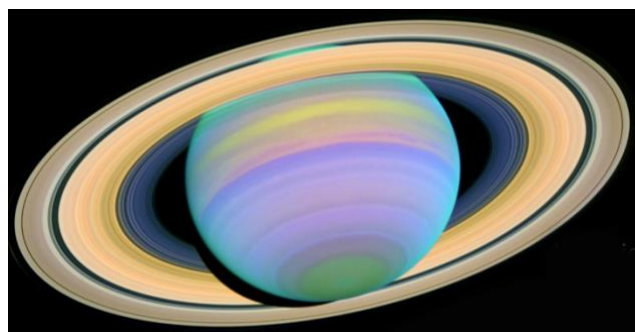
Everything outside of this “Visible Spectrum” we use to explore the Universe around us. We can use x-rays in hospitals to look at the bones inside our bodies or radio waves to listen to music on a car stereo!

RAL Space (STFC, Harwell Campus)



The James Webb Space Telescope (launched on Christmas Day 2021), has instruments developed and tested at RAL Space that see in **infra-red** (such as the Mid-Infra Red Instrument **MIRI**). This is a colour that is even redder than the red we can see with our eyes – to look deep into Space – through dust clouds, far away from Earth, and into the distant past of our Universe.

The Hubble Space Telescope has cameras that see in **ultra-violet** – a colour that is even more violet than the violet we see in the rainbow! We can use ultra-violet light to learn more about the properties of the gases that make up Saturn.



Credits: NASA, ESA, CSA, and STScI

Credits: NASA and E. Karkoschka (University of Arizona)

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How to Make a Paper Circuit

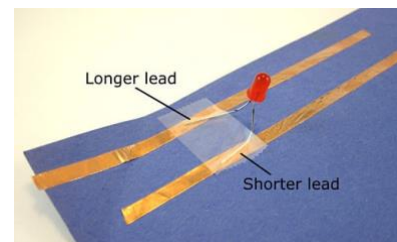
1. Cut two long strips of metal tape.
2. Stick near the edge of the piece of card paper, parallel to each other. The strips should be about half an inch apart, and one strip should NOT go all the way to the edge of the paper.
The copper tape should go until about 4 cm from the edge of your card paper.

3. Look closely at one of your LEDs. The LED has two legs, called leads (pronounced "leeds"). One of them is slightly longer than the other.

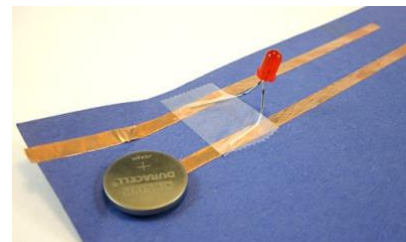


4. Carefully bend the leads of the LED and use tape to attach each lead to a strip of copper tape. The LED should be pointing upward.

Important: Make sure to place your LED's leads as they are labeled in the figure. The longer lead should be on the outer strip of copper tape (the one closer to the edge of the paper) and shorter lead should be on the inner strip.

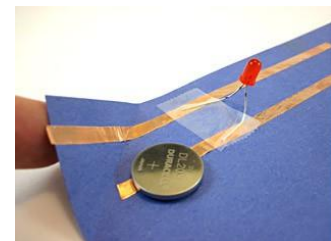


5. Place the coin cell battery on top of the inner piece of copper tape (the one farther from the edge). The writing on the coin cell (the side with the "+" symbol) should be facing up.

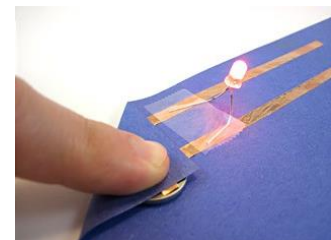


6. Fold over the corner of the piece of paper so the second strip of copper tape contacts with the top of the battery. This should cause your LED to light up. If your LED does not light up, try to:

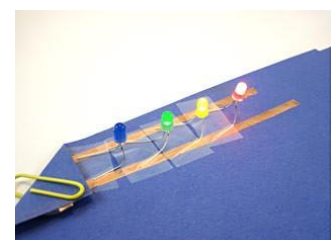
- a. Flip the LED or the battery around, the battery may be upside down and the LED leads may be backwards.
- b. Press harder on the battery and press down on the LED leads. These must make good contact with the copper tape to complete the circuit and cause the LED to light up.



7. Use the paper clip to hold the battery in place so the LED will stay lit. Congratulations! You just made your first paper circuit. Now you can expand your paper circuit into an art project.



8. To add more LEDs, simply tape them down the same way you taped down your first LED (step 3).



How to Make a Paper Lantern

1. If you wish to decorate your lantern, please do so before these steps as it's harder to decorate once made.
2. Fold the paper. Take a piece of paper and fold it in half lengthwise. It can be of any size and weight. Any paper will work, but the lighter the weight of the paper, the more likely the lantern will be to collapse under its own weight.



3. Cut the paper. Cut along the folded edge, but not all the way to the end – leave 2-3cm. It's up to you how many you cut. The more slits you have, the more light will shine through and the more flexible/floppy your lantern will be.



The number of strips will also completely change the look of your lantern and let different amounts of light through.

4. Make a tube. Take the two ends of the paper and wrap them around to make a round tube shape. Use a piece of tape, glue or staples to join it together.
5. Make the handle. Cut off another piece of paper to make a handle. If you used a piece of printer paper, your handle should be about 6" (15 cm) long and 1" (2.5 cm) wide. If you're hanging it, however, you don't necessarily need a handle -- it can be hung through the base on ribbon or string.



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6. Attach the handle. Using glue or tape, secure the handle to the inside of the top of your lantern.



How to Combine your Lantern and Circuit

1. Take your paper circuit and cut it out as a strip of card paper that should be about 4 cm wide.
2. Fold your paper circuit gently along the indicated lines in the picture. It should be folded in half gently, and then folded about 4 cm from each edge (the battery edge and the edge the copper tape does not touch).
3. Carefully tape, or paperclip, the edges of your strip of card paper together to form a triangle. The battery should be at the bottom to weigh down the triangle and the copper tape and LED lights should face outwards so that the light will shine through your lantern.
4. Place your paper lantern over your paper circuit triangle.
5. Enjoy your light up lantern!

