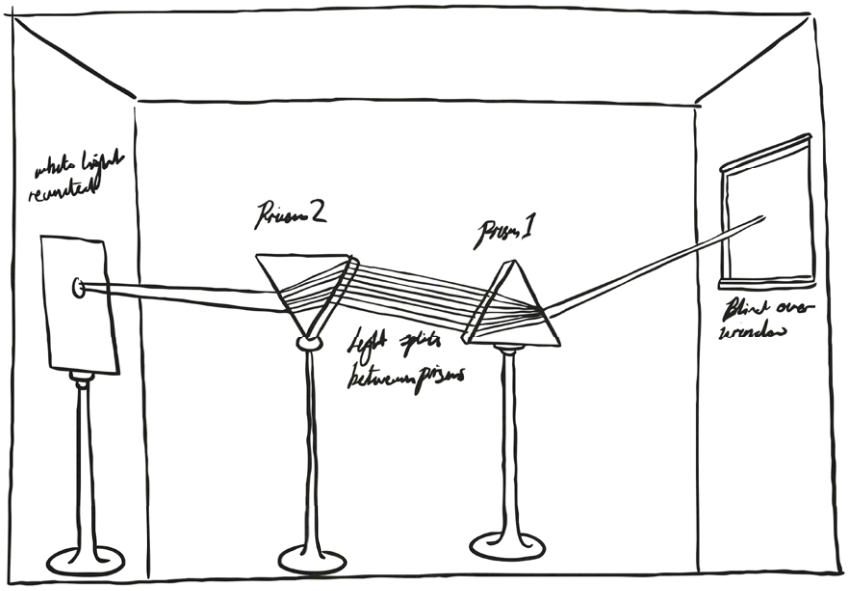
Isaac Newton's Colour Experiments Fact Sheet

Isaac Newton (1642 - 1727) was a famous scientist and mathematician. His experiments into light and colour were extremely influential in informing our understanding of these areas today.



Newton's sketch of his crucial experiment.

Newton started looking into the "celebrated phenomenon of colours" in the late 1660s. At the time, the deadly Bubonic Plague was rife in Cambridge, where Newton usually worked, so he conducted his first experiment at his home in Lincolnshire.

People then believed that colour was caused by a mixture of light and dark, and that red was the lightest colour with the least amount of dark added to it, while blue was the darkest colour, the last step before black. They also thought that prisms actively coloured light. Newton set out to prove this view wrong in what was to become known as his crucial experiment. He used a hole in his shutter to direct a beam of sunlight into his room, and refracted this beam using a prism. He was able to see the spectrum of colours form, and then used another prism to refract the separated rays of coloured light back into a ray of white light. This proved that light is made up of colours; the prism simply allows them to be seen.

Newton coined the phrase 'the colour spectrum', and he chose to split the spectrum into the seven colours we know today; red, orange, yellow, green, blue, indigo and violet. Although the spectrum is continuous, with no boundaries between each individual colour, he selected the number seven because he believed it to be a special number.

He was able to show that each colour has its own angle of refraction. He used this to prove that an object's colour is a property of the light reflecting off it, rather than something inherent within the object itself.

Newton continued to carry out further investigations into light and colour, and published his book 'Opticks' in 1704. Some scientists consider this the most influential book of that century, and it explained how raindrops refract sunlight to cause rainbows for the first time.

Isaac Newton: "If I have seen a little farther than others, it is because I stand on the shoulders of giants."

Newton felt that he learnt a lot from other scientists, such as Galileo and Copernicus.

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I can explain what Isaac Newton discovered about colour.

Use the Fact Sheet above to answer these questions about Isaac Newton and his discoveries.

1. When was Isaac Newton born?

2. Where was his home?

3. Why did he conduct his experiment at home?

4. How did people in the 1660s believe colours were created?

5. What did Newton use to create a beam of light?

6. What did his 'crucial' experiment prove?

7. Why did Newton split the spectrum into seven colours?

8. What was Newton's book called and what did it explain?

9. Which other scientists did Newton learn from?