20/01/22

Year 5/6 English Homework

Reading Comprehension

Sir Isaac Newton's Colour Experiments

Sir Isaac Newton (1642 - 1727) was a famous scientist and mathematician. His experiments into light and colour were groundbreaking and have contributed greatly to our understanding today. In the late 1660s, Newton started to develop his theory of colour.

At the time, people believed that:

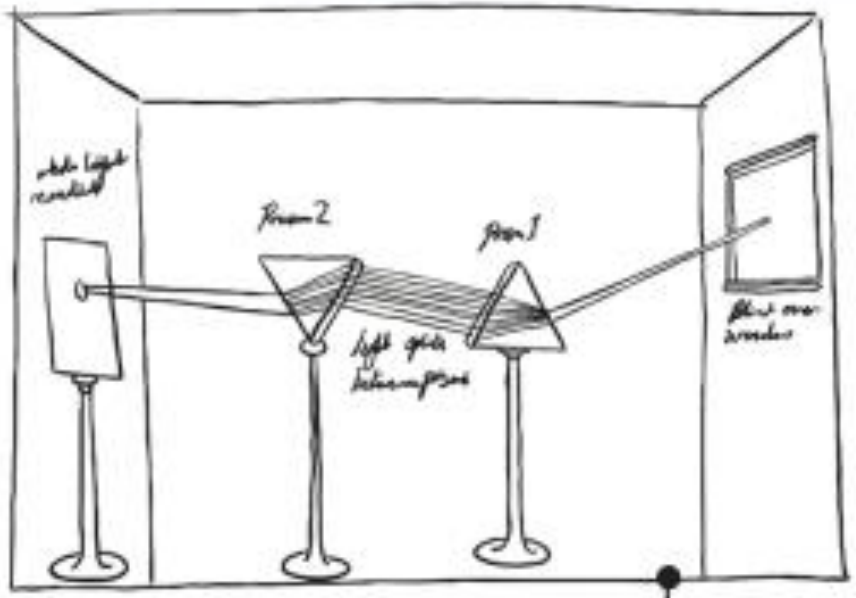
- colour was caused by a mixture of light and dark;
- red was the lightest colour with the least amount of dark added to it;
- blue was the darkest colour and the last step before black.

People also thought that prisms actively coloured light. Newton set out to prove this wrong in what was to become known as his crucial experiment. Around this time, there was a deadly outbreak of the bubonic plague in Cambridge, where Newton usually worked.

He moved back home to the Lincolnshire countryside for a while, until it was safe to return to the city.

While living on the family farm, Newton began conducting lots of experiments and began to form his theories.

Newton's Crucial Experiment



Newton's sketch of his crucial experiment

1. He used a hole in his shutter to direct a beam of sunlight into his room.
2. He **refracted** this beam of light using a prism.
3. As he saw the spectrum of colours form, Newton then used another prism to refract the separated rays of coloured light back into a ray of white light.

Glossary

Refracted - When a ray of light changes direction when it enters water, air or glass at an angle.

This proved that light is made up of colours. From this, Newton invented the phrase 'colour spectrum', choosing to split the spectrum into the seven colours we know today: **red**, **orange**, **yellow**, **green**, **blue**, **indigo** and **violet**.

Rays of coloured light refracted through a prism.

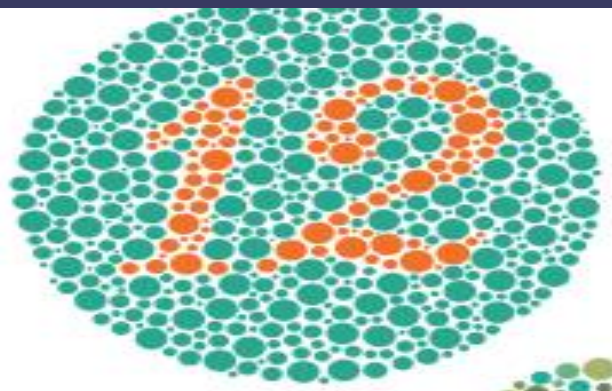
Although the spectrum is continuous, with no boundaries between each individual colour, he selected the number seven because he believed it to be a special number.

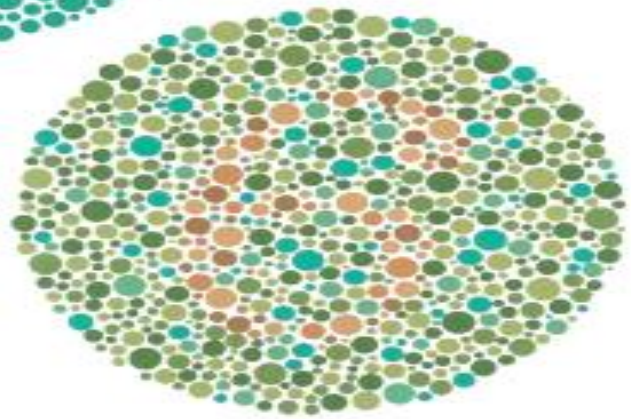
Newton was able to show that each colour has its own angle of refraction. He used this to prove that an object's colour is a property of the light reflecting off it, rather than a characteristic of the object itself.

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

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

– Sir Isaac Newton





Colour Blindness

What do you see inside the circles?

Some people have a condition called colour vision deficiency, more commonly known as colour blindness, which means they cannot see all the colours. Ishihara plates, named after a Japanese professor, are used to test for various types of colour blindness. Someone with a colour vision deficiency might not be able to see the numbers inside these circles.

Newton carried out further investigations into light and colour, publishing his book 'Opticks' in 1704. For the first time, it explained how rainbows were caused by raindrops refracting sunlight. Some scientists consider this the most influential book of that century.

By scientifically proving the colours we see in a rainbow *(our visible spectrum)*, Newton made it possible for others to experiment with colour in a scientific way. His work led to advancements in many areas, including optics, physics, chemistry and the study of colour in nature.

Questions

1. When was Sir Isaac Newton born?

   _____

2. Where was Sir Isaac Newton's home? Tick one.

   - ○ Cambridge
   - ○ Lancashire
   - ○ Lincolnshire
   - ○ Oxford

3. How did people believe that colour was created in the 1660s before Newton started carrying out experiments into this area? Tick **two**.

   - ○ Colour was caused by a mixture of light and dark.
   - ○ Yellow was the lightest colour with the least amount of dark added to it.
   - ○ Red was the darkest colour with the most amount of dark added to it.
   - ○ Blue was the darkest colour and the last step before black.

4. Explain in your own words what Newton's 'crucial experiment' proved.

4. Explain in your own words what Newton's 'crucial experiment' proved.

5. Explain the significance of Newton splitting the colour spectrum into the number of colours that he did.

6. Look at the final paragraph. Find and copy one word which means the same as progressions.

7. What does colour vision deficiency mean?

8. What do you think Newton means when he says he stood 'on the shoulders of giants'?

Spelling – Year 5- 6

ambitious
cautious
infectious
nutritious
pretentious
fictitious
superstitious
fractious
vexatious
anxious

Word of the week:

Find the definition and use this word in a complex sentence

Vicarious