

Understanding Nature

Light

Newton disagreed with the theories of his time about light. People thought that **white light** was natural light. They thought that colored light was made when light went through air or water and was changed. They thought that a rainbow (called a **spectrum**) comes from a **prism** (PRIZ-uhm) because the prism changes the light.

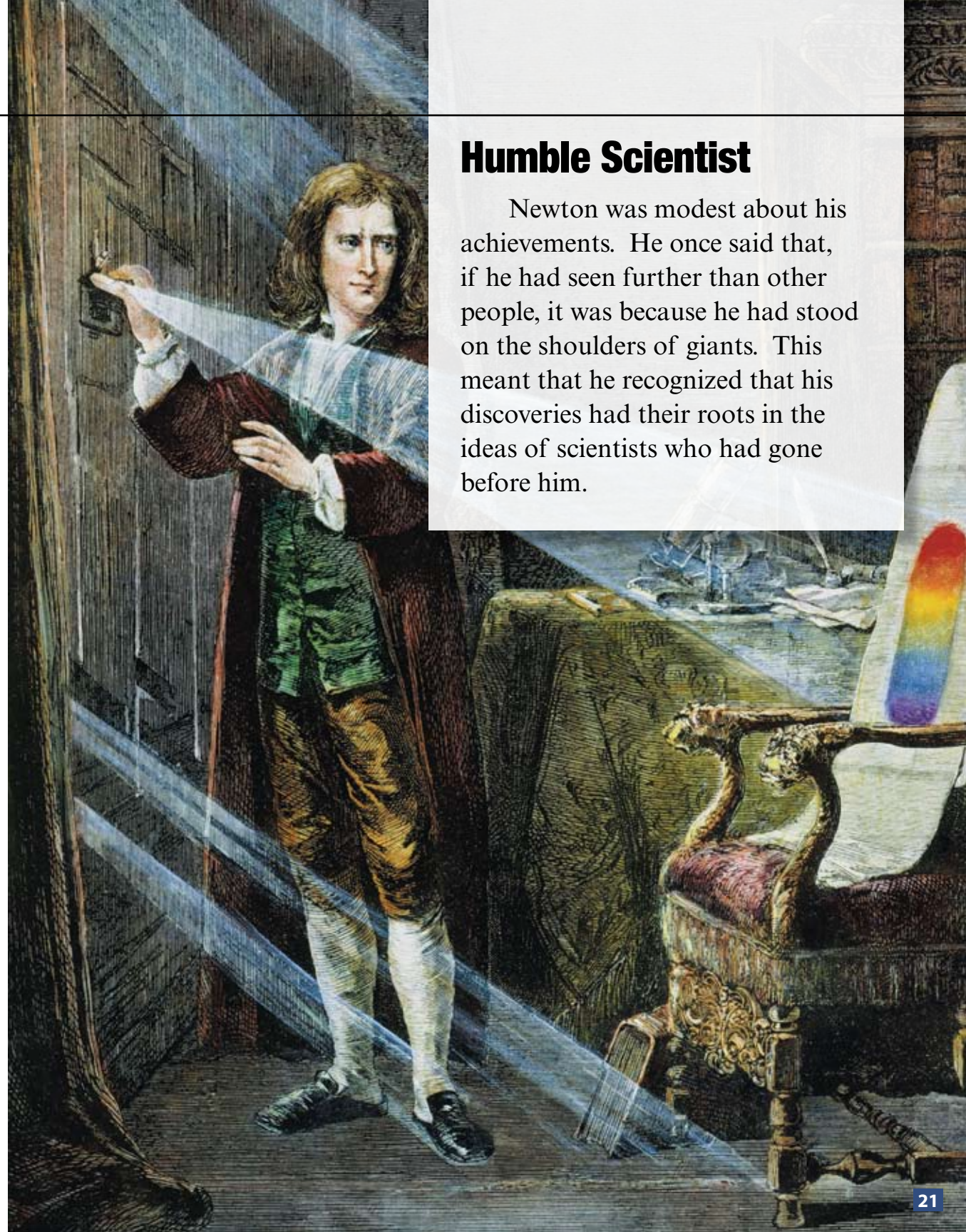
Newton did an experiment with two glass prisms. He showed that, if the spectrum coming from one prism was put through another prism, the colors didn't change again. So he knew that white light must be made of all the colors of the rainbow. It was just broken up into different colors through the prism. From this, people could explain why rainbows happen.

Newton changed people's understanding of light. But many people criticized his ideas. He got tired of defending them. So he didn't publish his work on light until 30 years after he completed it.

← White light is composed of all the colors in the rainbow at once. A prism separates the different colors in white light so you can see them individually.

Humble Scientist

Newton was modest about his achievements. He once said that, if he had seen further than other people, it was because he had stood on the shoulders of giants. This meant that he recognized that his discoveries had their roots in the ideas of scientists who had gone before him.



Inventions

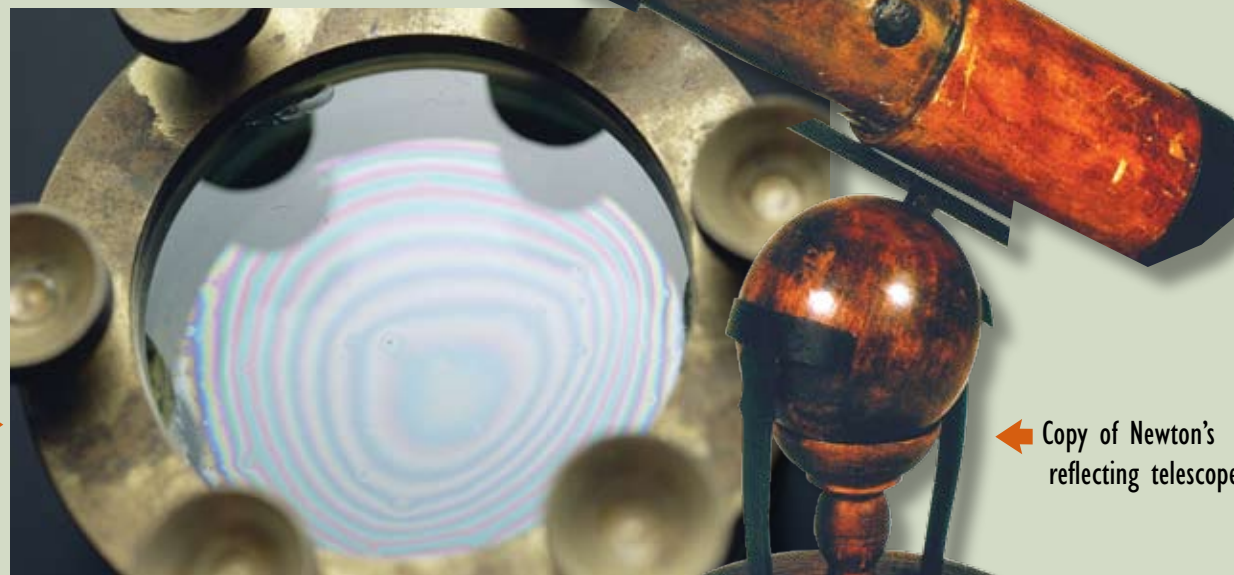
Newton invented many gadgets. Some of them are still used today. He invented a **reflecting microscope** (MY-kruh-skope). He designed and built the first **reflector telescope** (TEL-uh-skope). They both use mirrors. Before this, all telescopes used lenses. Lenses are curved pieces of glass such as those used in eyeglasses. The type of telescope that Newton invented is still used. It is very good for looking at groups of stars. It is called the Newtonian telescope.

Quality lenses were important to Newton. He decided to play with lenses and a glass plate to see what he could figure out. He showed that shining a light on the lens and plate at a certain angle could produce rings of light. We call these **Newton's Rings**. They are used for testing the quality of lens surfaces.



↑ Sextants used a viewfinder tube to find stars in the sky and a metal rim with measurements on it to find latitude.

Newton's Rings →



← Copy of Newton's reflecting telescope

Newton also wrote a formula to describe how far away a lens will focus light. This is called the lens equation. It is useful for making anything with a lens in it. In fact, Newton ground his own lenses for his telescopes.

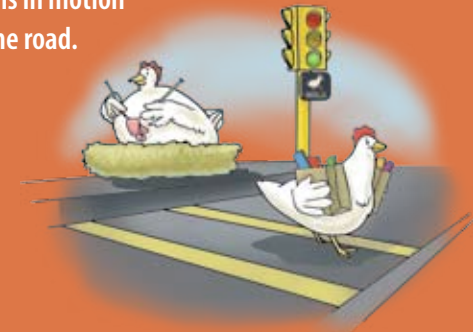
Sailors of his time owed thanks to Newton. He designed the **sextant**. The sextant helped sailors to find their position at sea. They used the sun and stars to do it.

Newton's Chicken

Newton is such a famous and important scientist that everyone knows about him. He's so well-known that people even tell jokes about him. Here are some answers to a famous joke that tell about Newton's laws of motion and gravity.

Why did the chicken cross the road?

First Law of Motion: Chickens at rest stay at rest. Chickens in motion cross the road.



Second Law of Motion: The chicken was pushed.

Third Law of Motion: The chicken was pushed by another chicken who knocked itself over by pushing so hard.



Law of Gravity: The chicken was attracted to a bigger chicken waiting across the road.