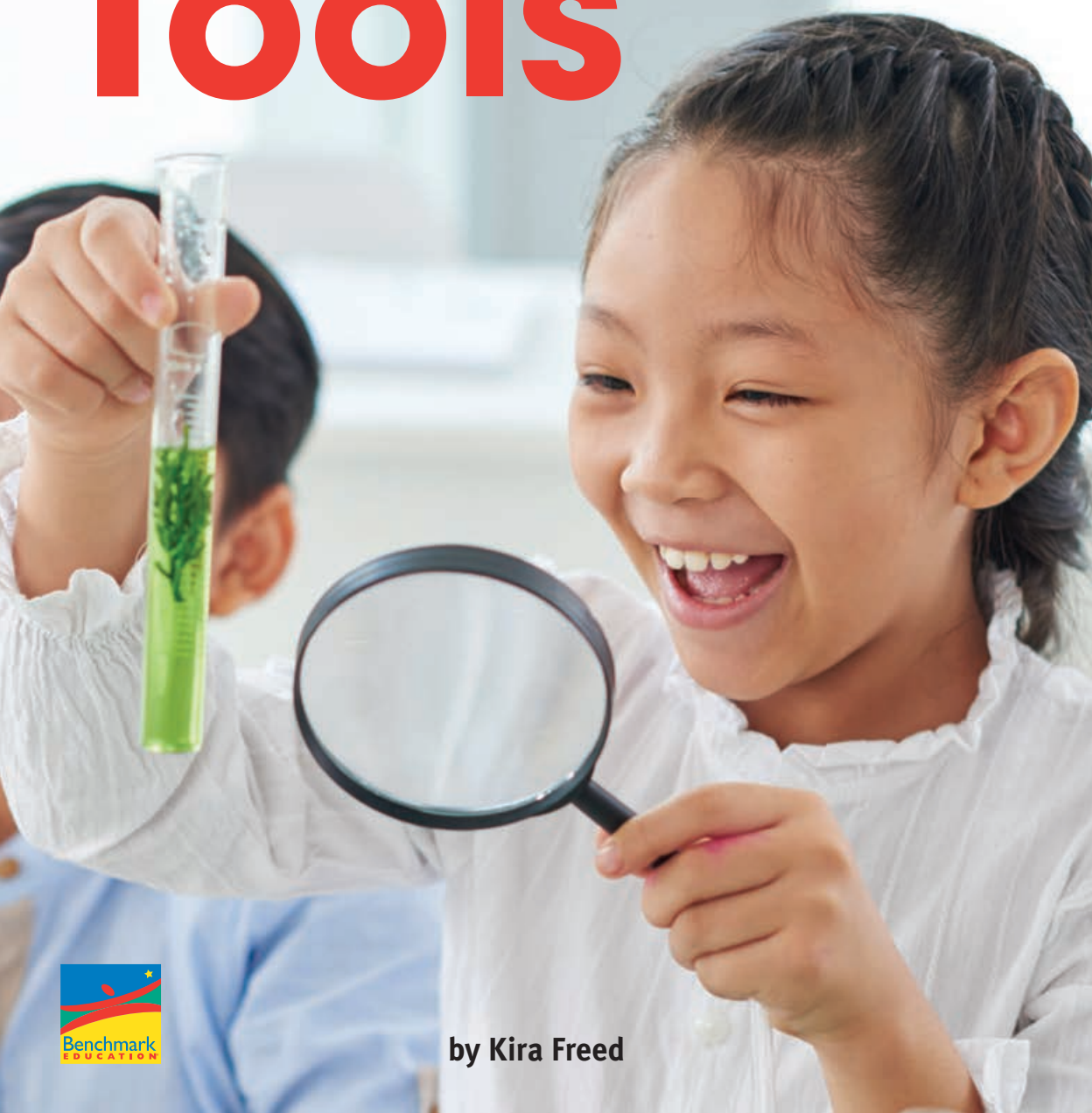
Spot On Science & Technology

Exploring with Science Tools



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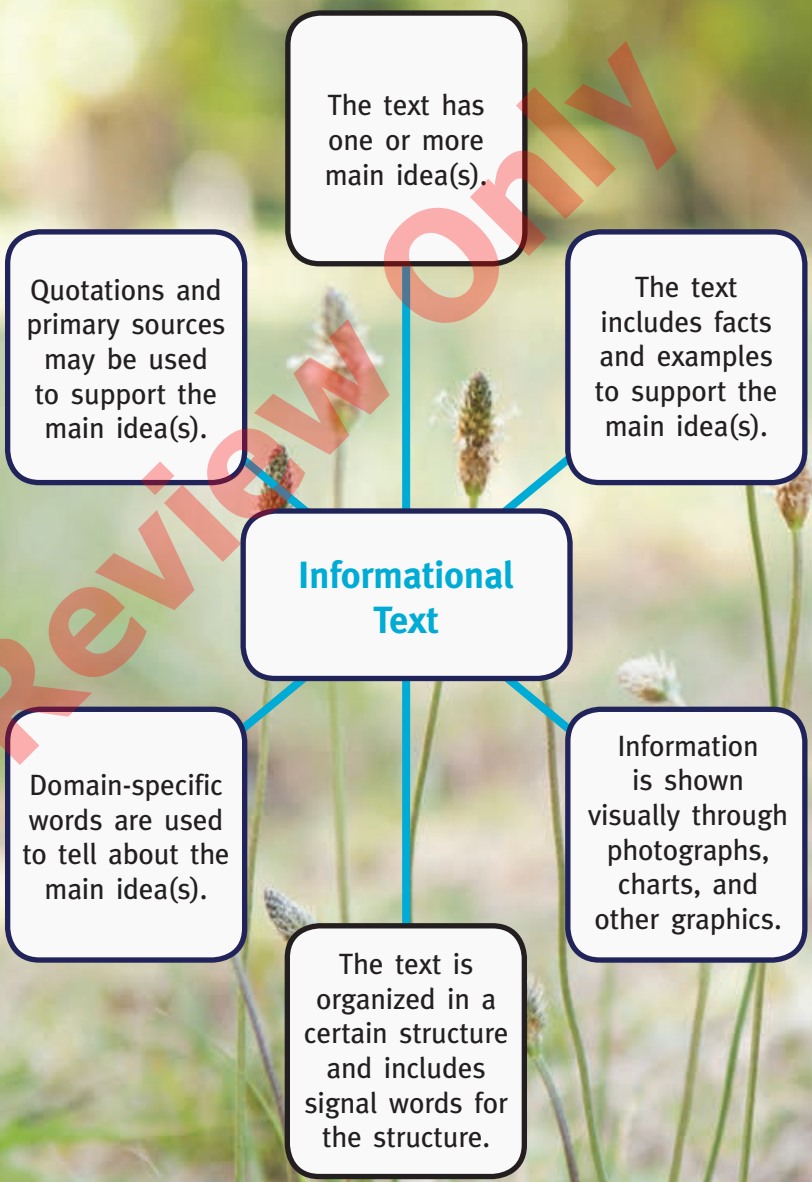

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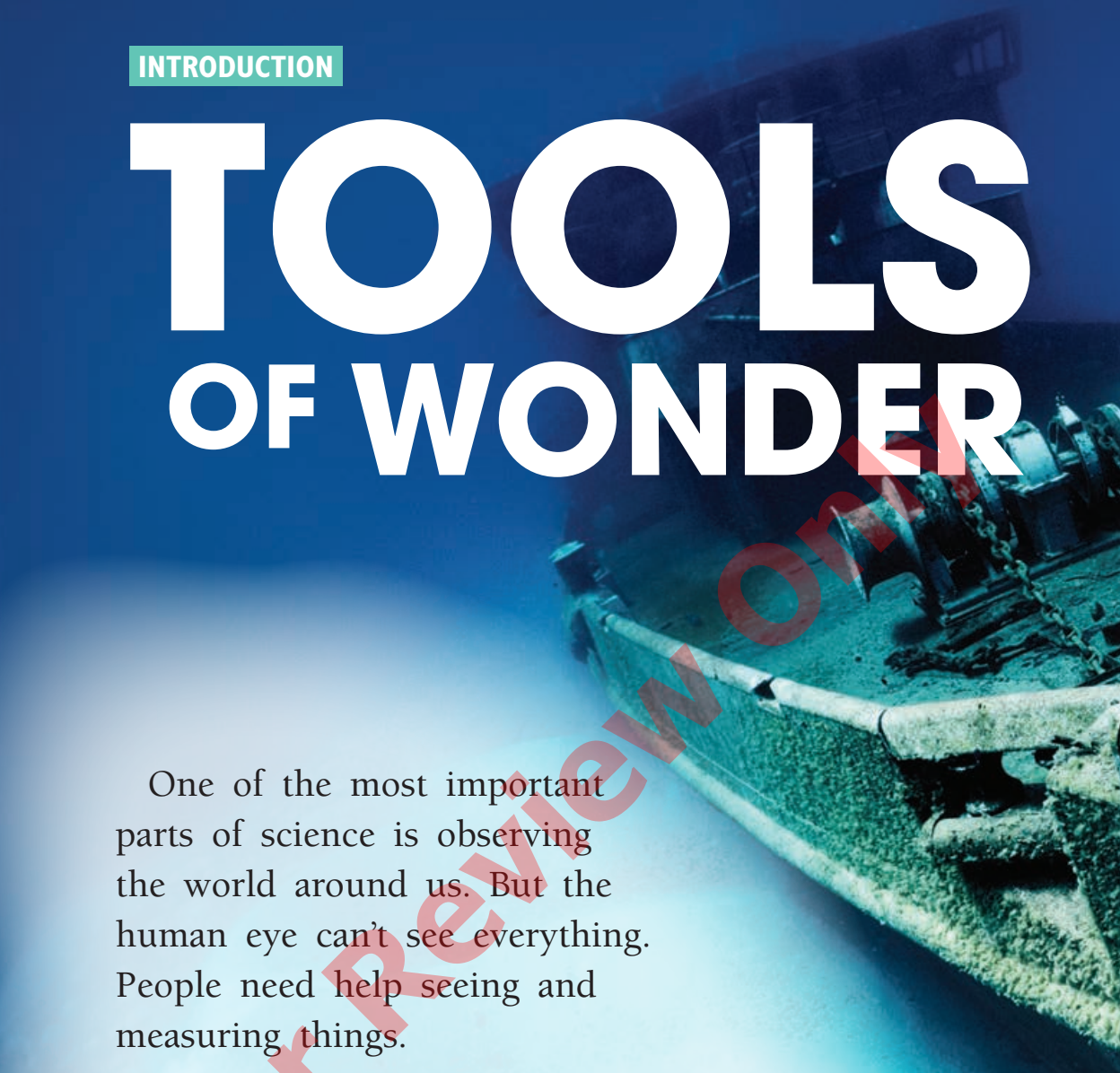
INTRODUCTION

TOOLS OF WONDER



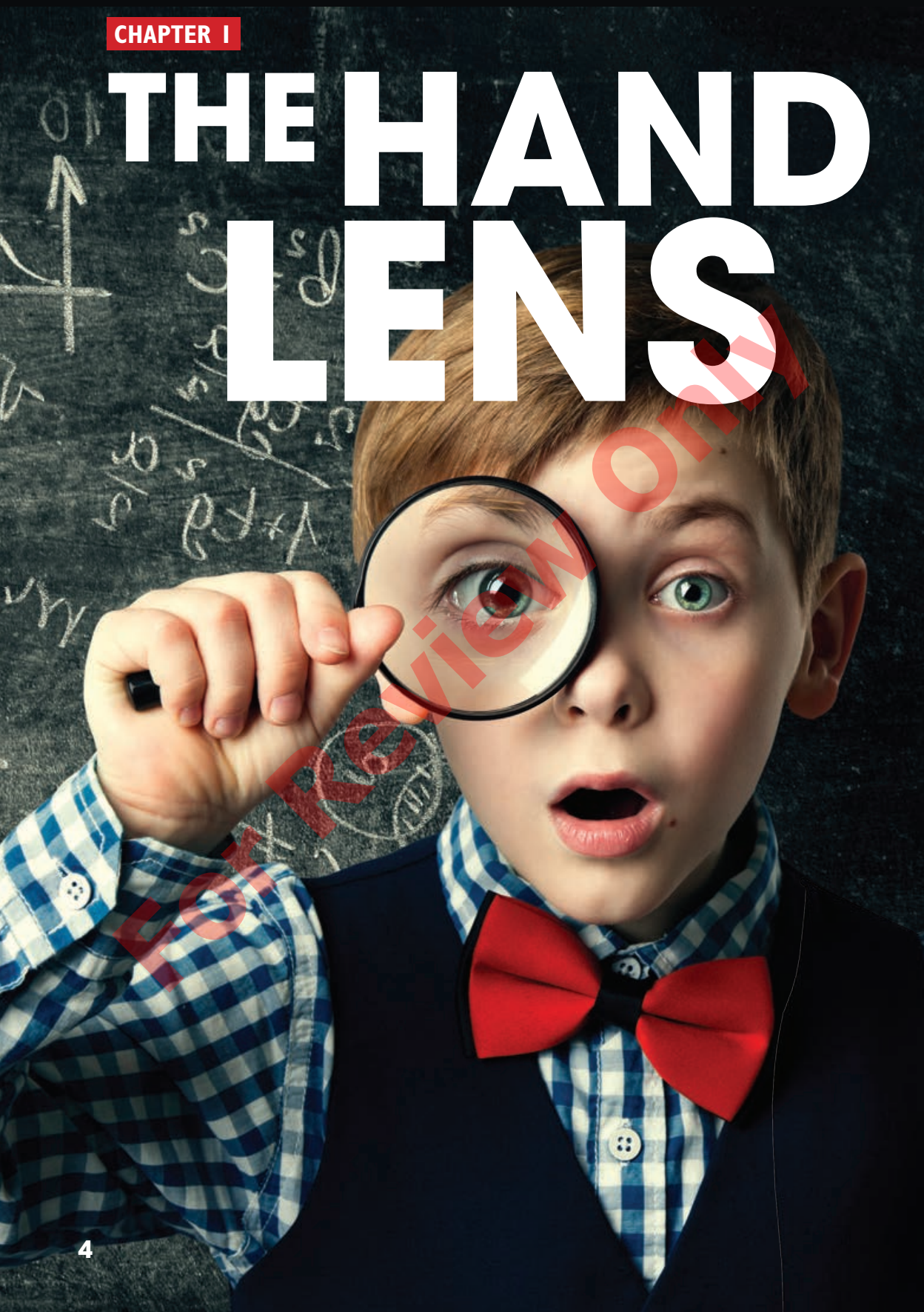
One of the most important parts of science is observing the world around us. But the human eye can't see everything. People need help seeing and measuring things.

That's why scientists have invented certain tools. These tools let us see and measure things we might not otherwise be able to see. Out in the field, these tools allow scientists to answer questions about the world around us.

Tools allow scientists to make important observations.

CHAPTER 1

THE HAND LENS



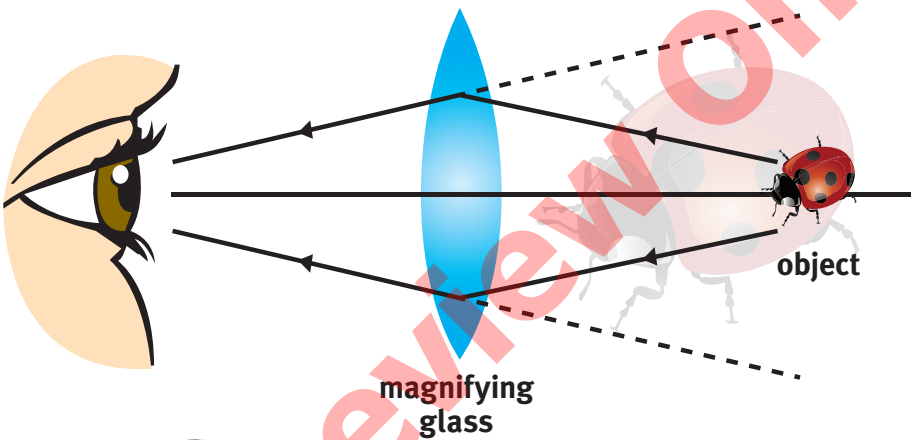
A hand lens makes objects appear larger. This science tool helps us see **details** about the world.

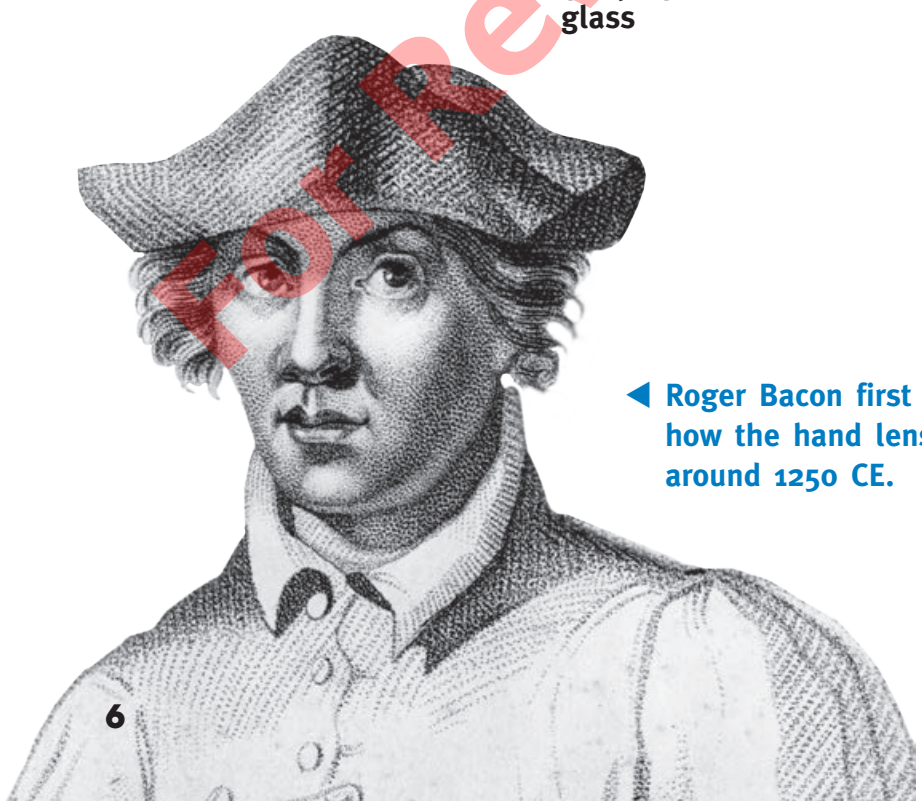
A hand lens is made up of a lens with a handle. A lens is a see-through piece of glass or plastic. The glass or plastic is not flat. One or both sides are **curved**.

Another name for a hand lens is a magnifying glass. To magnify means to make something look bigger than it is. How does a hand lens do that?

◀ A hand lens helps us study small details in objects.

The glass or plastic in a hand lens is curved out, like a bubble. Rays of light change direction as they pass through the lens. The rays bend around the lens and meet on the other side. This causes the object to look closer than it really is. If the glass were flat, the light would not bend, so things would not look closer.





◀ Roger Bacon first described how the hand lens worked around 1250 CE.

You can look through either side of a hand lens. To use this tool, hold it between one eye and an object. Move the hand lens closer to your eye and then away. Find a place where the object becomes very clear. Using a hand lens is not hard, but it may take a little practice.

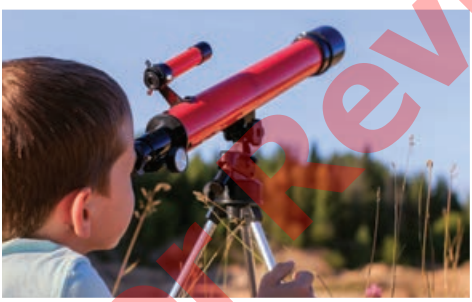
◀ The details of a leaf look much bigger when seen through a hand lens.

A hand lens is useful to learn about rocks, plants, animals, and many other things. Seen through a hand lens, rocks have more bumps and cracks. The middle of a sunflower looks dark and furry. The tiny scales on a butterfly's wing look like jewels. Each little piece of a bird's feather looks soft and fuzzy.

Other science tools use lenses, too. Microscopes make even small objects look larger. The lenses in binoculars make faraway objects look closer. Telescopes help us see space objects that are very far away. Camera lenses let us take pictures of things around us. A lens is an amazing science tool with many uses.

microscope

binoculars



telescope

camera

Eyes

The most important lenses are in our eyes. Muscles help these lenses change shape. The lenses become thicker to help us see objects close to us. They get flatter so we can see faraway objects.