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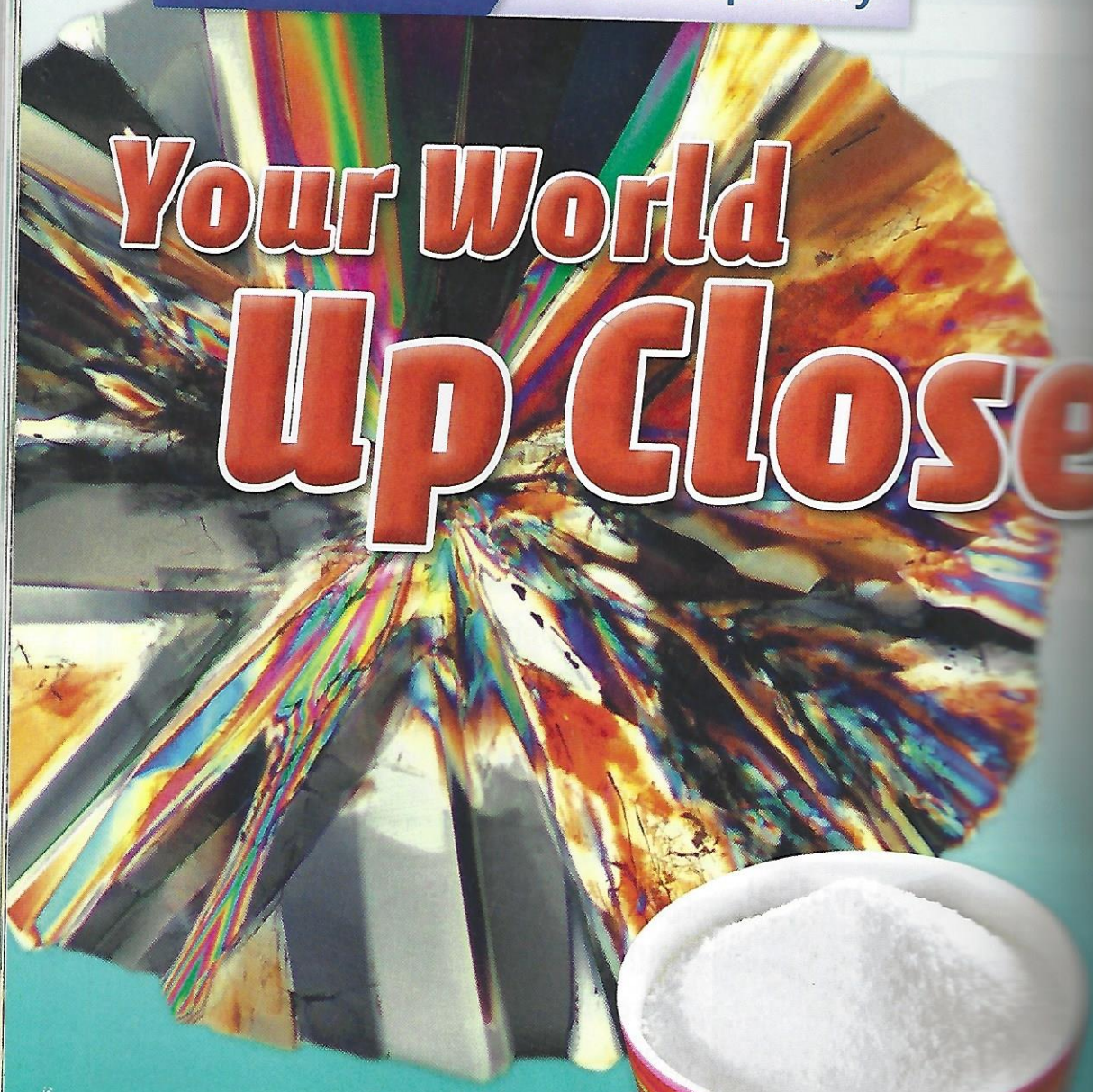
Your World Up Close



Compare these grains of sugar with the magnified sugar crystals.

Essential Question

What can you discover when you look closely at something?

Read about a tool that allows us to see everyday objects up close.

(t) Norbert Porta Sciencedoku/ScienceFoto/Getty Images; (b) FoodCollection/SuperStock

Does the picture on the left show a diamond or a glass prism? Look closer. Take a step back. You are *too* close.

It is a picture of a sugar crystal. This extreme close-up was taken by an electron microscope, a tool that can **magnify** an item to thousands of times its actual size.

Pictures taken with a high-tech electron microscope are called photomicrographs. The sugar crystal on the left may look huge, but the word *micro* means small. We are seeing a small part of the sugar crystal up close.

Photomicrography dates back to 1840 when a scientist named Alfred Donné first photographed images through a microscope. Around 1852, a German pharmacist made the first version of a camera that took photomicrographs. In 1882, Wilson "Snowflake" Bentley of Vermont became the first person to use a camera with a built-in **microscope** to take pictures of snowflakes. His photographs showed that there is no such thing as a **typical** snowflake. Each is unique. Nowadays, we have electron micrographs.

The photographs of "Snowflake" Bentley showed that snowflakes are shaped like hexagons.

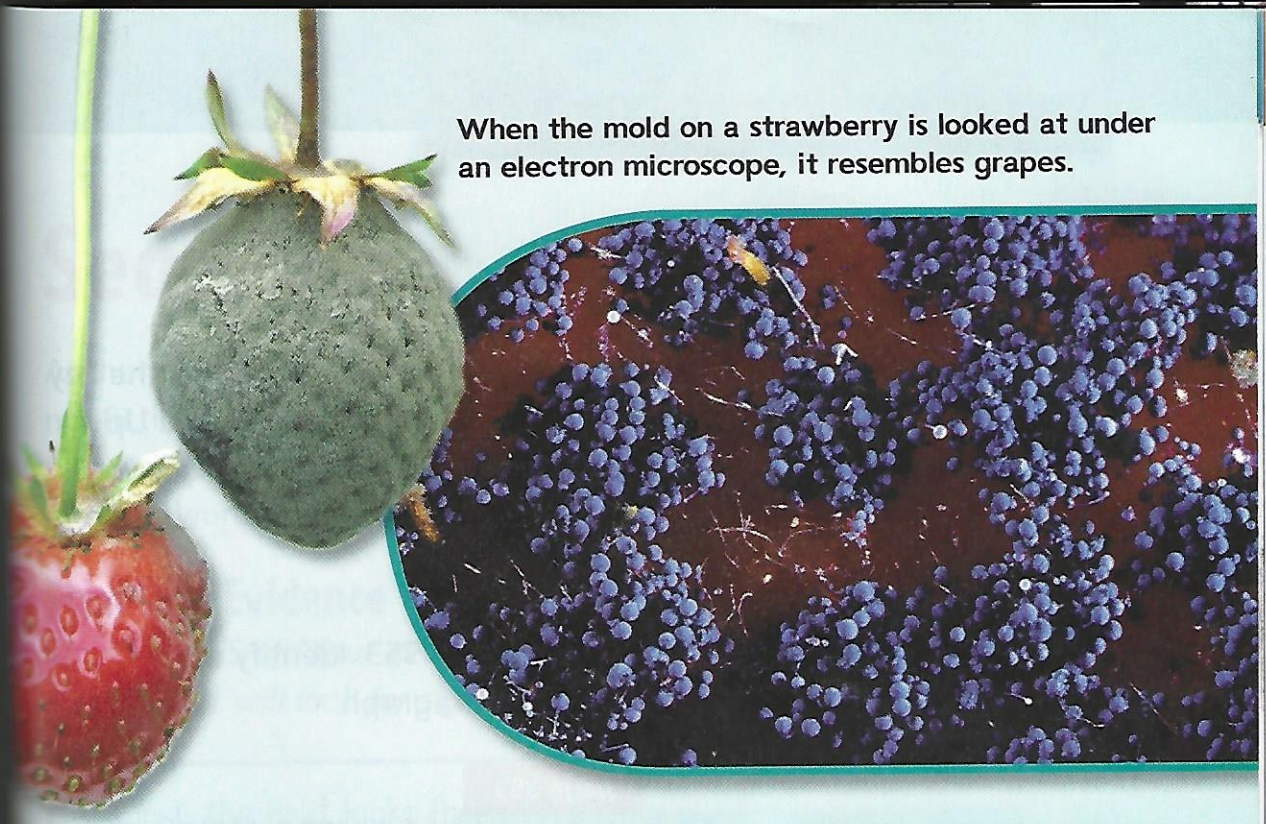
Wilson Bentley Digital Archives of the Jericho Historical Society/snowflakebentley.com

The light microscopes you use in school are weak and do not show much detail. An electron microscope is a much more powerful tool, and it allows scientists to see things we can't see with our own eyes such as skin cells or dust mites.

The picture below is a close-up of human skin and shows the detail an electron microscope can capture. The more an image is magnified, the more detail you will see in the photograph. The most magnification that a photomicrograph can capture is about 2 million times the original image size.

Magnified images have helped scientists to see what causes diseases. Over the years, scientists have learned how these diseases behave. Looking through microscopes, we have even learned what is inside a cell or how a snowflake **dissolves** into a drop of water.

This is a human fingerprint, magnified by an electron microscope.



When the mold on a strawberry is looked at under an electron microscope, it resembles grapes.

Scientists use electron micrographs to see how objects change over time. For example, we can look at a piece of fruit to see how it decays. First the fruit looks fresh. After a few days it begins to soften. Then specks of mold appear and **cling** to it. Days pass and eventually the fruit is covered in mold. We can see these changes under the microscope far earlier than we can see them with just our eyes.

Suppose you **mingle** outside on a **humid** day with friends. What would the sweat on your skin look like magnified? The possibilities are endless if you examine your world up close.

Make Connections

How do electron microscopes help scientists? ESSENTIAL QUESTION

What objects in your classroom would you like to see under a microscope? TEXT TO SELF