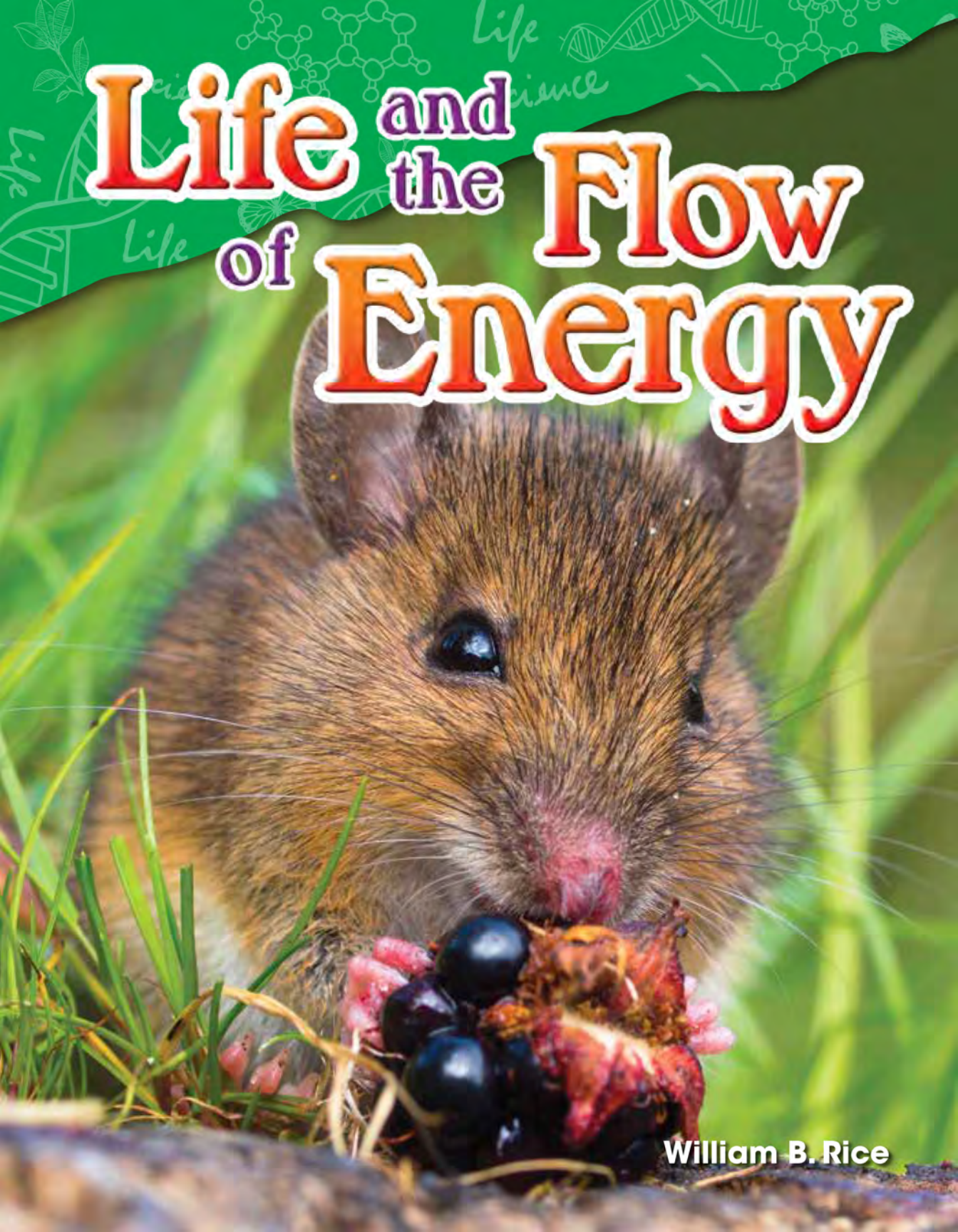
Life and the Flow of Energy



William B. Rice

For teachers' inspection ONLY

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Teeming with Life

No matter where you are in the world, there is always something interesting to see. Life—things that grow, live, and die—is everywhere. *Everywhere*!

When we look across our planet, we see a beautiful and diverse place teeming with life. The living things on the planet are known as **organisms**. They are in abundance in every corner of the globe. There are countless kinds of organisms—perhaps millions of different kinds! Some organisms are microscopic, such as single-celled amoebas (uh-MEE-buhs) or the bacteria that grow and thrive in plenty. They can only be seen with a special lens. Some organisms are enormous, such as the thundering elephants that stomp through Africa and Asia or the elegant whales that swim through the oceans of the world.



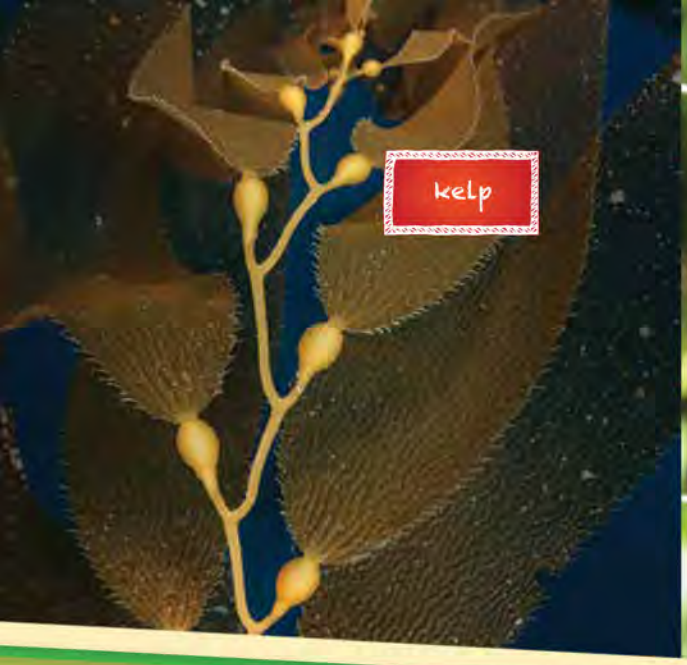
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Organisms move all over Earth and in every way imaginable. Insects fly and crawl through air, water, and land. Animals climb and fly both high and low. They walk and run at all speeds, from lightning quick to barely seen. They dig and swim with agility and ease. There are more animals in the world than we know, and they can do things that awe and astound us.

One Tough Bunny

The Arctic hare lives in the frozen tundra of North America. It has a thick white coat that keeps it warm in freezing temperatures and allows it to blend into its surroundings. Most animals couldn't survive one winter night in this harsh environment.







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Plants are also organisms. They live everywhere across the planet, too. We see them growing in oceans, on mountains, in deserts, and especially in jungles. They are often green but also come in all colors of the rainbow. Like every organism, plants have a life cycle.

Organisms grow and multiply. They **breed** offspring that keep the species going. Organisms eat or take in **nutrients**. Organisms may get hurt or sick. But they also recuperate and heal. Some organisms live only a short time, maybe a few days or a few weeks. Some may live for hundreds or thousands of years. But, at some point, all come to the same end. All organisms die.

Compared to a rock or a pile of sand, organisms are quite active. How do they do this? They use **energy**. Energy is the **force** that makes things happen. Energy flows and is stored, changed, converted, and transformed. Organisms use energy to do everything that they do.

But how do organisms get energy? Where does this energy come from? People have been asking these kinds of questions for centuries, maybe even for thousands of years. To answer these questions, scientists study Earth and its **ecosystems**. They also study the organisms and other things that make up ecosystems.





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Living Longer

With all the advancements in technology and medicine, people are living longer than ever. Jeanne Louise Calment lived to be 122 years old. When she was 100 years of age she was still riding a bicycle!

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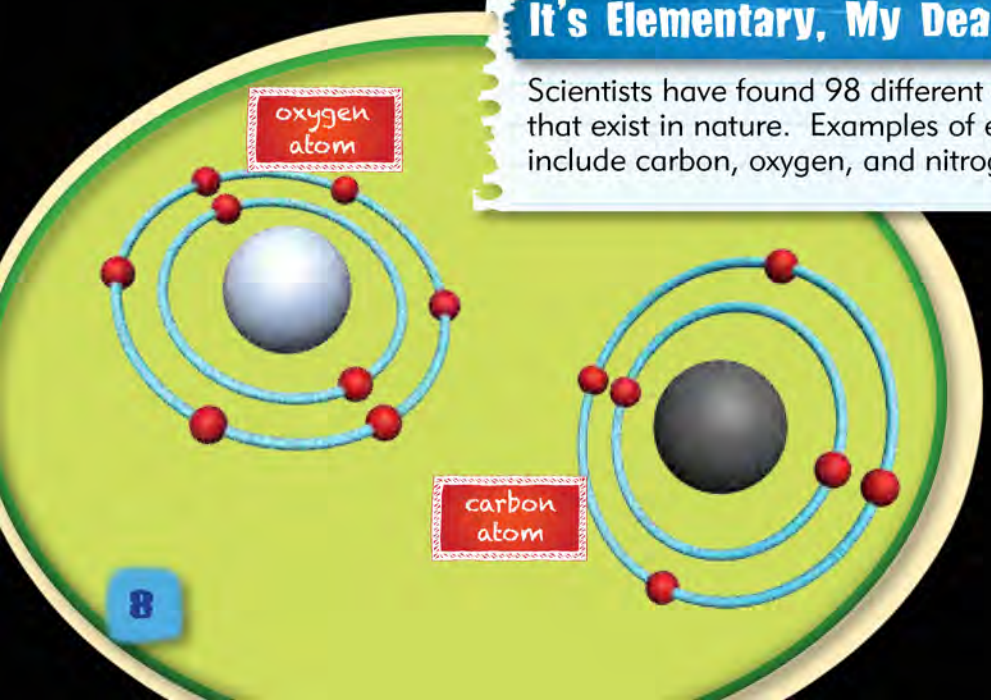
Energy and the Sun

The sun is a giant mass of **matter**. Matter is the basic stuff that everything is made of. This book, a plant, you, me—we are all matter. Matter is made of tiny particles called **atoms**. And atoms are made of even tinier particles called *electrons*, *protons*, and *neutrons*. Each type of atom has a different number of particles. Different numbers make different kinds of atoms. Each kind of atom behaves differently from the others. It has different properties, too. All of this makes each kind of atom unique.

An **element** is a chemical substance made of a single type of atom. The sun is mainly made of two elements. They are hydrogen and helium. The sun has lots of matter—lots and lots of matter. Because the sun has so much matter, it also has a lot of **gravity**. Gravity is one of the basic forces of the universe. It helps hold matter together. Gravity puts pressure on matter. Because of this pressure, the sun undergoes a process called **fusion**. Fusion releases many different types of energy—a lot of energy.

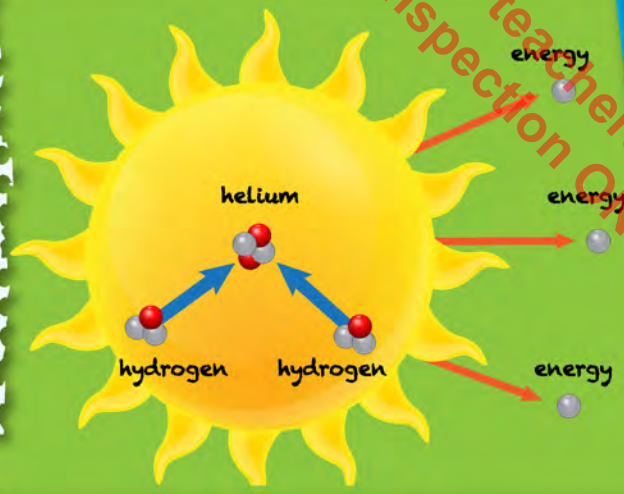
It's Elementary, My Dear Reader

Scientists have found 98 different elements that exist in nature. Examples of elements include carbon, oxygen, and nitrogen.



Fusing Elements

During fusion, elements such as helium and hydrogen fuse, or join, together. Temperature and pressure must be extremely high for elements to combine. Once fusion takes place, energy is released.



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About 75 percent of the sun is hydrogen, about 23.3 percent is helium, and about 1.7 percent is made of elements such as carbon, oxygen, and iron.

Hydrogen atoms in the sun are converted into helium atoms and energy.

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Think Like a Scientist

Can you capture the sun's energy? Experiment and find out!

What to Get

- aluminum foil
- black paper
- box-cutter knife (adult use only)
- food to cook
- newspaper
- plastic wrap
- plate
- ruler
- tape
- thin cardboard box (a pizza box works great)

