



Substances found in Earth's rain forests have treated many medical conditions for thousands of years. Today, scientists try to make versions of those substances in the lab.

Synthetic Materials: Making Substances in the Lab

For billions of years, every substance on Earth was produced in nature, through natural processes, and without input from people. However, within the last few centuries, people have begun experimenting with making substances we can't find in nature. Substances that are produced by humans instead of being found in nature are called synthetic. Scientists make synthetic substances by arranging atoms and molecules in the lab. They use what they know about different types of atoms and molecules to arrange them and make the kinds of substances they want. One type of synthetic material that you probably use every day is plastic. Scientists developed plastics in the

early 1900s. Plastic is made from petroleum, a natural resource that is also used to make gasoline and other products. By combining different atoms and molecules, scientists are able to make lots of different kinds of plastic for lots of different purposes, from bottles to boats. Plastic is very useful, but also causes problems. For example, a large amount of plastic ends up in the ocean and harms ocean animals.

In some cases, synthetic substances are copies of substances found in nature. If the synthetic substances are copies of natural substances, scientists can analyze the natural substances and arrange the same types of atoms in the



Many common medicines used today are synthetic versions of substances found naturally in Earth's rain forests.

same way. For example, many plants found in the rain forests of Asia, Africa, and South America have properties that can be used for healing all kinds of health problems, from small cuts to serious diseases. These plants have been used for healing by people who live in and near the rain forests for thousands of years, and in recent years, scientists have begun to understand the substances inside them that make them good for healing. In some cases, scientists have been able to make synthetic versions of those substances, producing them in large amounts without needing to travel to the rain forests.

Synthetic medicines aren't any different at the atomic level from the natural medicines found in the rain forest. After all, molecules are just

molecules—whether they're made in nature or in a lab, the same types of atoms arranged in the same ways always form the same molecules that behave in the same ways.

The rain forest is a rich source of medicines for humans to use, but it may not be for much longer. Earth's rain forests are being burned and cut down to make room for farms and other uses. In fact, about 325 square kilometers (125 square miles) are cut down every day. At this rate, our rain forests may be gone soon.

Name: _____ Date: _____

Homework: Reading “Synthetic Materials: Making Substances in the Lab”

To learn how scientists apply their knowledge of substances at the atomic scale to create synthetic materials, read and annotate the “Synthetic Materials: Making Substances in the Lab” article. Then, answer the questions below.

How are synthetic substances made?

At the atomic level, are synthetic medicines different from natural medicines? Explain your answer.

Why is it useful to be able to produce synthetic medicines?

Active Reading Guidelines

1. Think carefully about what you read. Pay attention to your own understanding.
2. As you read, annotate the text to make a record of your thinking. Highlight challenging words and add notes to record questions and make connections to your own experience.
3. Examine all visual representations carefully. Consider how they go together with the text.
4. After you read, discuss what you have read with others to help you better understand the text.