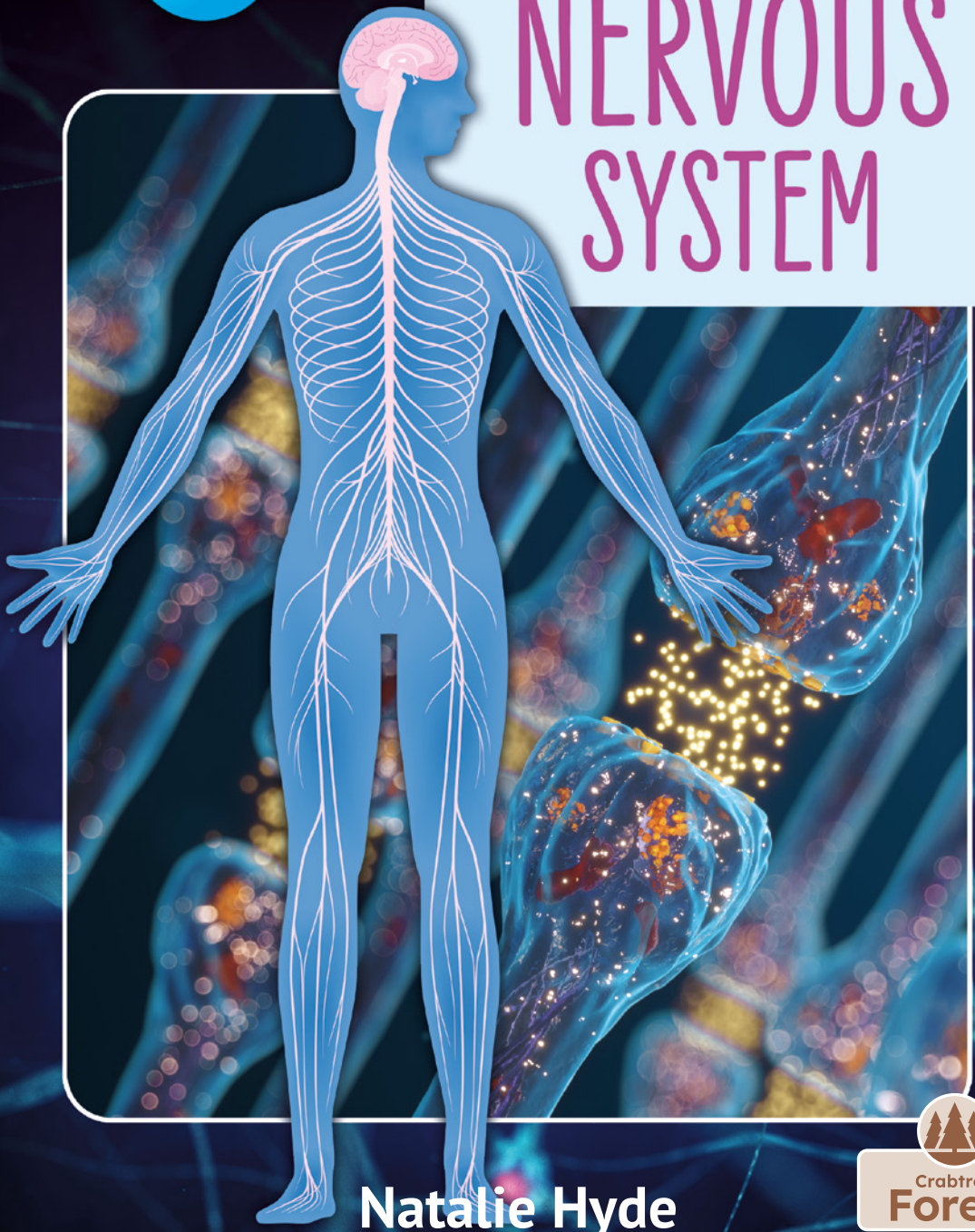
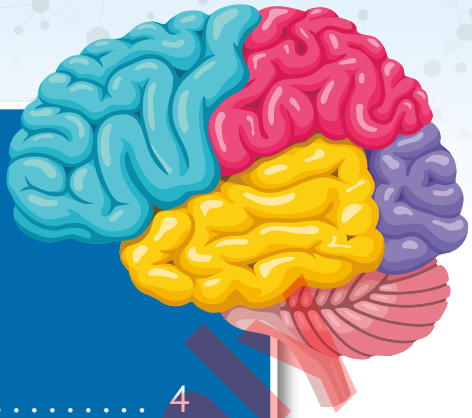
INVESTIGATING
Body Systems

Investigating the NERVOUS SYSTEM



Natalie Hyde

Crabtree Forest



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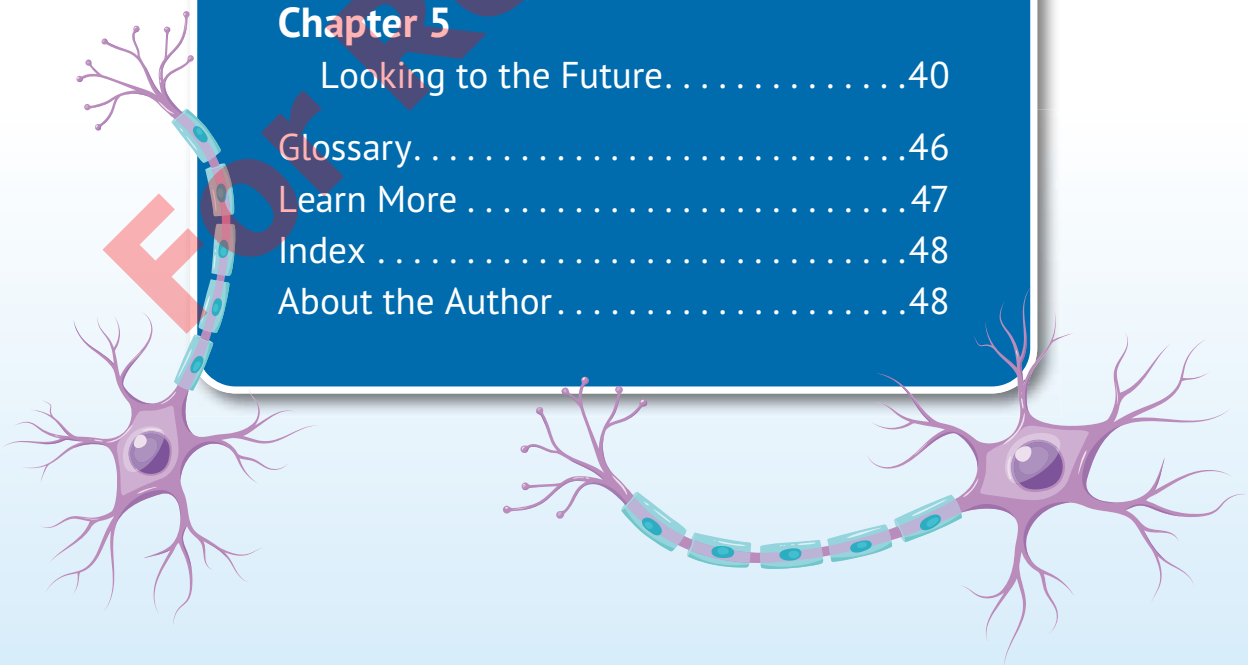
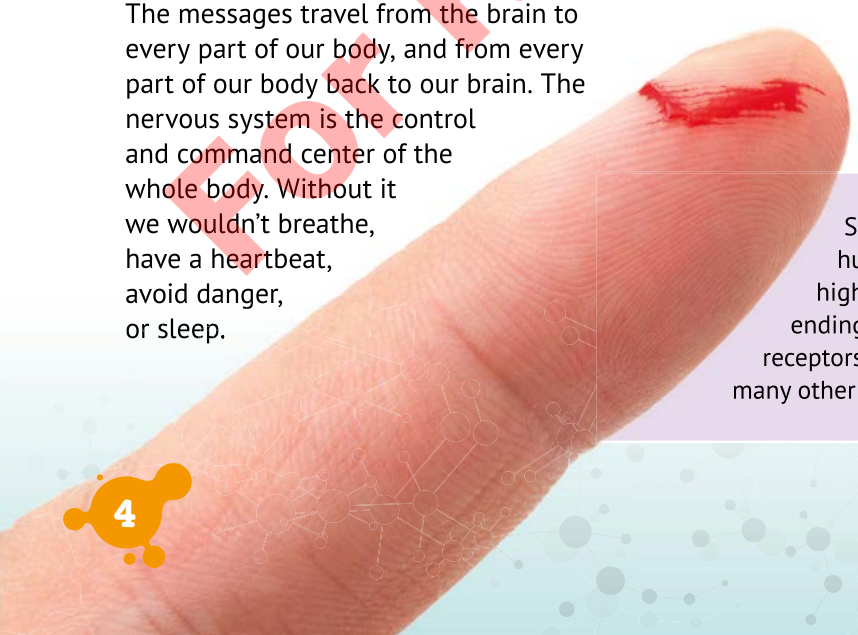


The Body's Control and Command Center

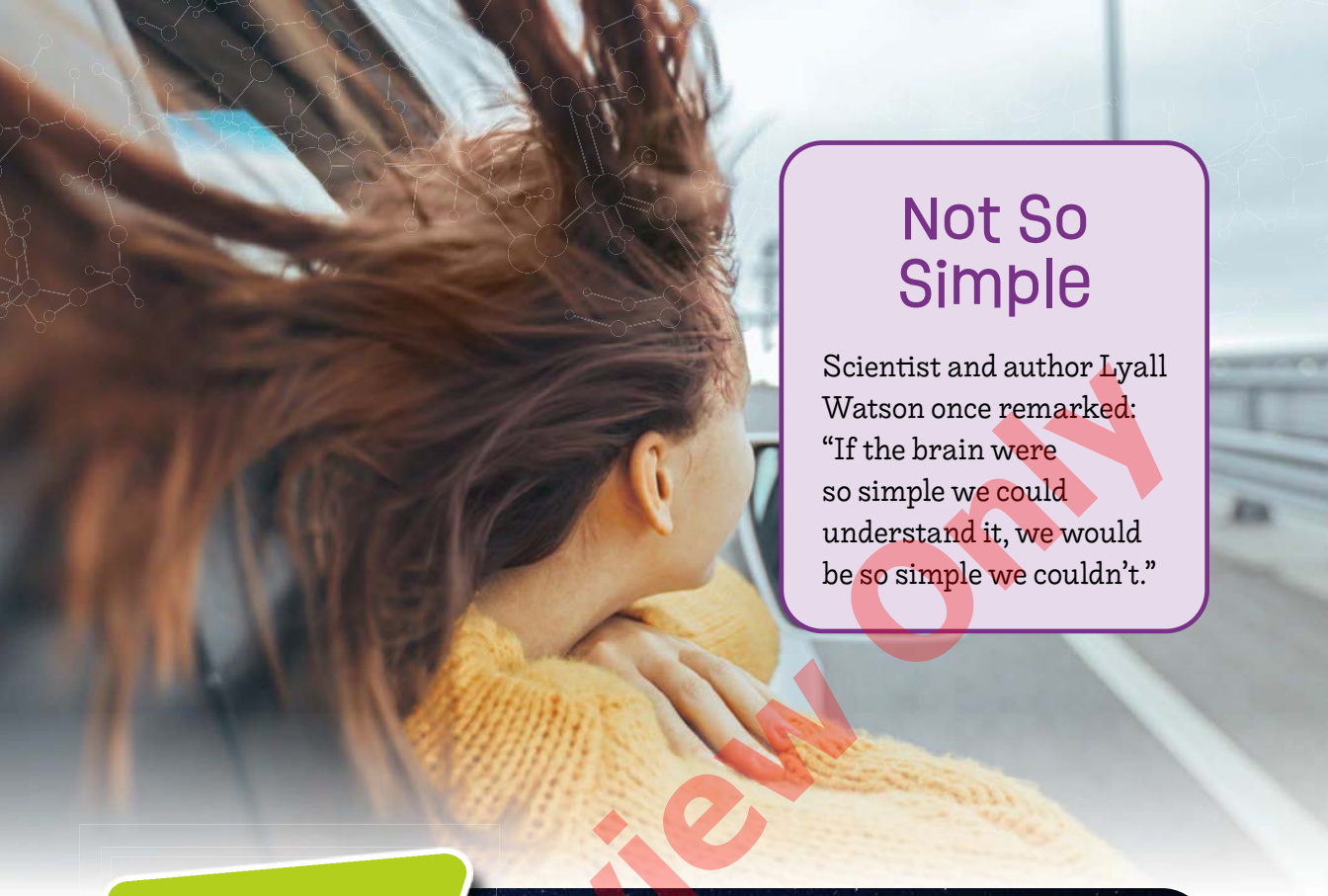
You are reading your favorite book and turn the page just a bit too fast. And then it happens, a sudden sharp pain across your finger...a paper cut. The feeling of pain that travels from your finger to your brain to tell you that you have an injury that needs attention, is thanks to your nervous system.

Our nervous system is a network of cells that send signals or messages. These signals that travel around the body act like telephone lines delivering information. The messages travel from the brain to every part of our body, and from every part of our body back to our brain. The nervous system is the control and command center of the whole body. Without it we wouldn't breathe, have a heartbeat, avoid danger, or sleep.

Most of the time we don't even think about it working. The signals are sent and received automatically. The powerhouse of the nervous system is the brain. It is like a computer controlling all the telephone lines. It regulates body systems, helps move muscles, and senses the world around us. The most powerful skill of this system is memory. Memory is how we learn not to repeat mistakes. It helps us build on our knowledge, avoid danger, and pass on information for new skills.



Small cuts on your finger hurt a lot because of the higher number of nerve endings. There are more pain receptors in fingertips than many other areas of the body.



Not So Simple

Scientist and author Lyall Watson once remarked: "If the brain were so simple we could understand it, we would be so simple we couldn't."

Fact Check

There are billions of nerve cells, called neurons, in our brains that do all the work.

FACT: There are more neurons in our brains than there are stars in the milky way!

No Pain, No Brain

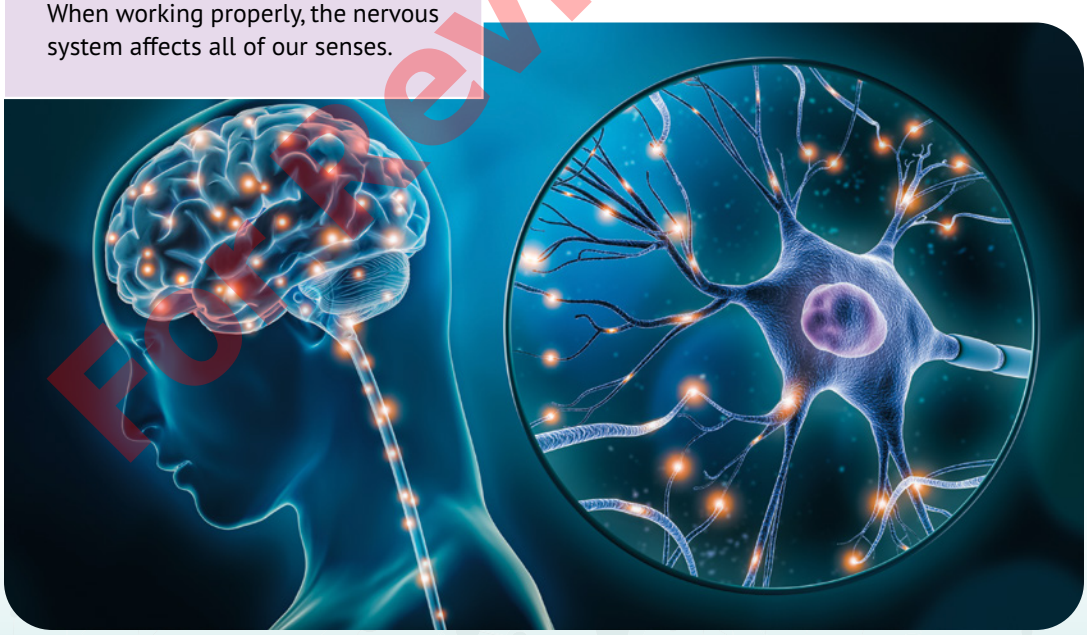
We can't see the small nerve cells, called neurons, that make up our nervous system without a microscope. But we can see evidence of our nervous system working every day.

Pain is one of the signs of our working nervous system. If you touch a hot stove element you will feel **searing** pain. The role of this pain is to get you to take your hand away to avoid more damage. Shivering is the body's way of telling us our body temperature is too low and we need to warm up. Sweating shows us that our body temperature is too high and that we need to cool down. It can also be a sign of nervousness, like when we have to do a speech or meet a new person.

Some of the work our nervous system does happens without us controlling it. The nervous system keeps us breathing and is responsible for our dreams. Dreams are the stories our mind creates while we sleep.

The way we experience the world is through our five senses. Our eyes see things with light and shape. Our nose detects odors. Our ears sense sound waves and our brain processes them as words or noise. Information from our taste buds is sent to the brain to figure out how something tastes. Our skin senses texture, temperature, and shape. It is our nervous system that allows us to collect information through our senses and send it to the brain to be identified.

When working properly, the nervous system affects all of our senses.



Mirror Neurons

Mirror neurons are a type of brain cell that react not only when we perform an action, but also when we see an action performed. This is what makes us laugh when we hear someone else laughing or why we say yawns are **contagious**.

Our brains learn to avoid searing pain when exposed to it.

CHAPTER 1

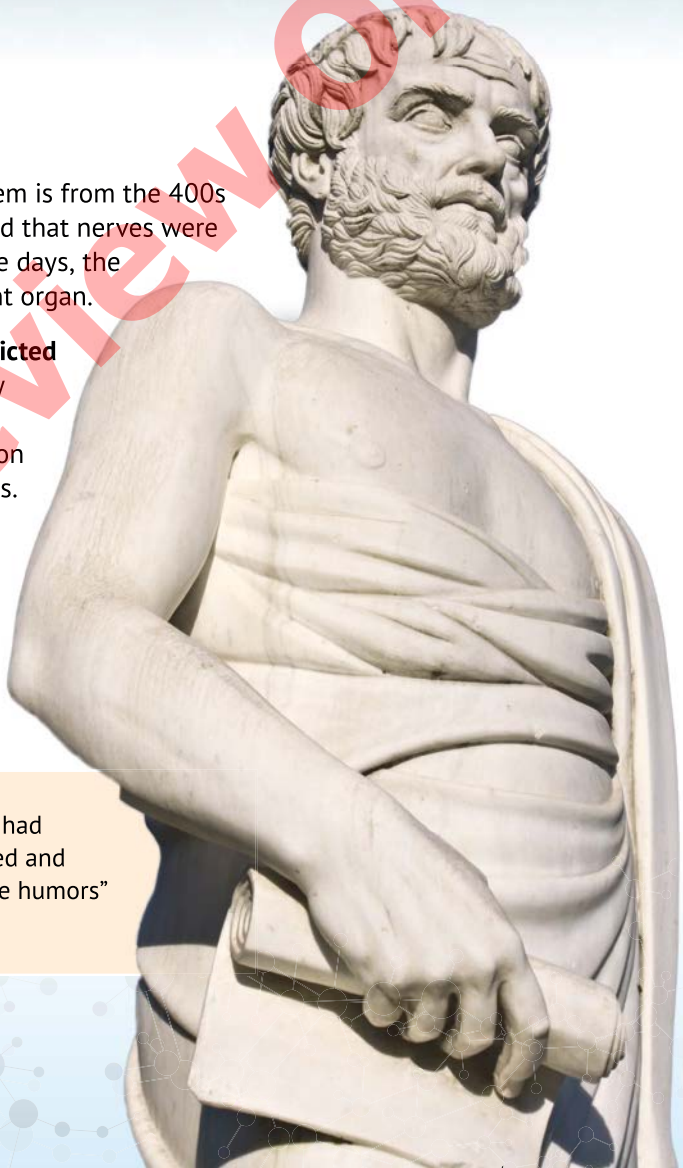
How Do We Know?

Ancient medical physicians had figured out that nerves controlled movement and sensation. The confusion was over exactly how they worked and which organ controlled them.

Ancient beliefs

The first writing about the nervous system is from the 400s BCE. Greek philosopher Aristotle believed that nerves were controlled by the heart, because in those days, the heart was considered the most important organ.

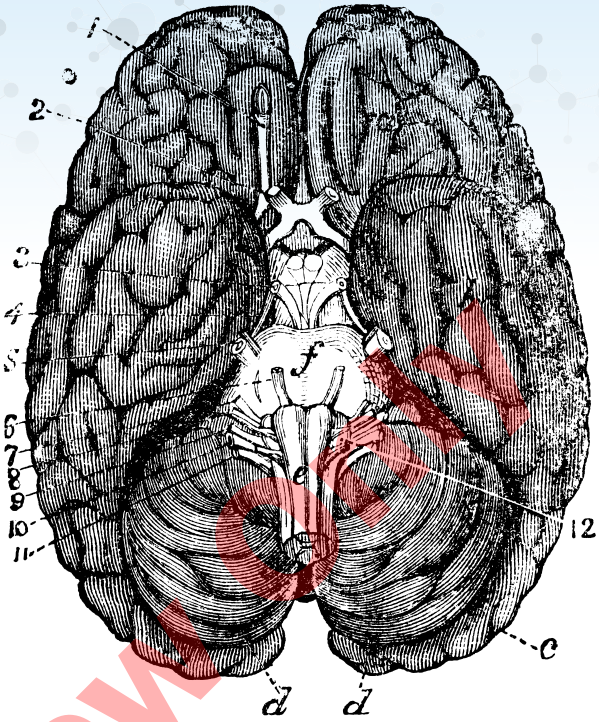
A Greek physician named Galen, **contradicted** him. He was able to look inside the body and see that the nerves led to the brain. He believed that movement and sensation were run by two different kinds of nerves. He called these hard and soft nerves. He saw that the spinal cord was an extension of the brain. He concluded that the brain was the most important organ in the body and it controlled the nerves.



Ancient philosophers such as Aristotle had vague ideas about how the body worked and often attributed bodily functions to "the humors" or water, earth, fire, or air.

Dissections for Detail

Ancient medical researchers in the 1100s CE started to make the connection that the nervous system might be linked to emotions. This was a huge leap in understanding the role of the nervous system. But the advances in knowledge that were being made through **dissection** stalled over the next 200 years. This was because the Catholic church—the dominant Christian religion at the time—stated that dead bodies were sacred. Because of this view, the church banned dissections.



Herophilus was known for dissecting cadavers, or dead bodies, and recording his findings. He was among the first to base his medical ideas on science. Galen read his work and used it to advance ideas on anatomy.

Key Figures

Three Greeks played an important part of forming the concept of the brain and nervous system. They were Alcmaeon of Croton, Praxagoras of Kos, and Herophilus of Chalcedon. Alcmaeon put forward the idea that the mind and soul were located in the brain, not the heart. Praxagoras was the first to use the word neuron to describe what he believed to be tiny arteries that sent signals throughout the body. Herophilus showed that the nervous system was a network in the body.