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We know
books

Your Body for Life

Mental Development

From birth to old age

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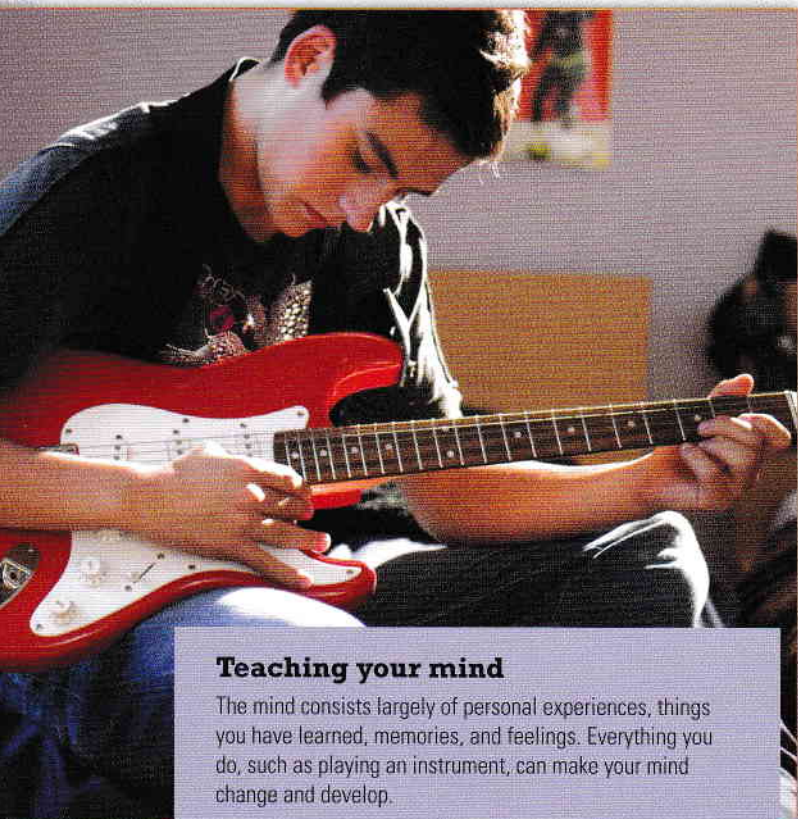
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Some words are printed in **bold**, like this. You can find out what they mean by looking in the glossary on pages 60–61.

The changing mind

What does it mean to have a mind? It is a hugely important part of our lives. Your mind is the constant conversation you have with yourself in your head. It is the inner world of your thoughts, memories, and feelings – all the things you experience, wonder about, decide, and imagine. And, as you know, your mind can easily change. In fact, it changes all the time throughout your life – from before you are born to the day you die.



Teaching your mind

The mind consists largely of personal experiences, things you have learned, memories, and feelings. Everything you do, such as playing an instrument, can make your mind change and develop.

Growing and changing

Your brain is the part of your body that makes your mind work. Like other body parts, your brain grows as you grow up, getting more powerful and efficient until it reaches a peak when it works best and fastest. Eventually, it gets weaker and works less well. The changing brain affects the way your mind works.

Stages of life timeline

This book explores the many ways in which the mind changes and develops throughout life. These are the main stages it goes through.

Before birth:

It takes nine months for a baby, the baby's brain, and the first signs of a mind to develop inside the womb.



Babyhood:

From birth to one year old, a baby learns constantly as the mind starts to take shape.



Childhood:

Between one and five years old, children learn to talk, walk, use their bodies, ask questions, work things out, and come up with ideas. Older children develop many more abilities, such as reading and writing, and learn thousands of new facts, words, and skills.



Teenagers:

The years between the ages of 13 and 19 are essential for the brain and mind, as they go through major changes.



Early adulthood:

Even when you're grown up, you keep learning, and your mind keeps developing.



Middle age:

In their forties and fifties, many people's minds are working at maximum power.



Old age:

In old age, the brain and mind sometimes (but not always) stop working as well.

However, your mind also changes a lot throughout life for another reason: because so much of it is made up of real-life experiences, things you have learned, memories, and feelings. All the things that happen to you can make your mind change and develop.

The human mind

As humans, we are used to having a brain and a mind, but not all living things have them. Plants, fungi (very basic living things like moulds), and even some animals have no brains and do not think. Animals without brains, and many animals with relatively small brains, mainly live by **instinct**, which means the things they do are programmed into their **genes** – the instructions that control the body's **cells**. The more intelligent a creature is and the more complex its brain is, the less it relies on instinct and the more it learns and changes throughout life. Humans have the most powerful brains of any living thing. So, the mind is more important for us than it is for any other animal.



See for yourself

On a big piece of paper, make a "mind map", like the one here, of some of the things that form your own, individual mind. You could include memories, personality features, skills, languages you have learned, and even likes and dislikes. All these things are parts of your mind and are stored in your brain.

What is the mind?

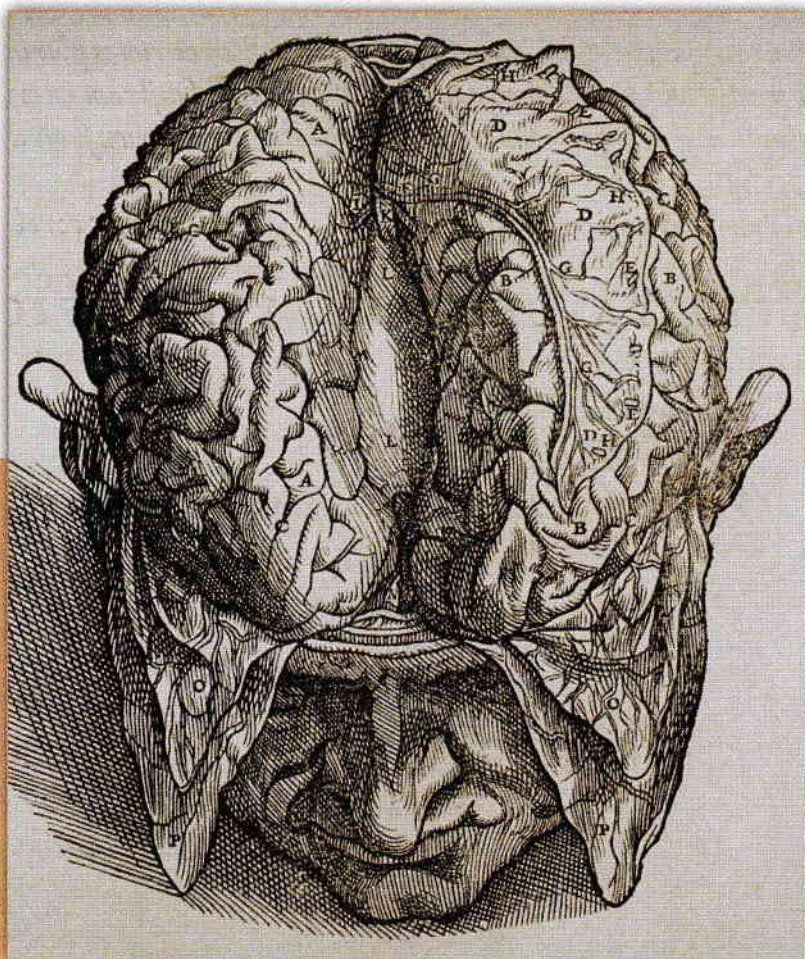
Although we know what it is like to feel, think, and remember, scientists still argue about what the mind really is and how it works. We know that thinking happens when signals pass between cells in the brain (see page 9). But is the mind just a constant flow of these tiny signals? Or does it exist separately from the brain? Is there such a thing as the soul, the spirit, or the “self”? And how is it that we have **consciousness** – the ability to know that we are thinking? There are many different ideas and beliefs about the mind. This book explores what scientists have discovered about the mind, how the mind develops, and how it works.

It is very hard to say how the mind works – partly because the only way you can think about your mind is by using your mind! Scientists are constantly studying this and other problems. They may find answers that can help to explain more about how the mind does its job and develops over time.

Where is the mind?

Long ago, many people thought the mind was based in the heart or even the intestines – not the brain. The ancient Greek thinker Aristotle, for example, thought the heart did the thinking and feeling, while the brain’s job was simply to release spare heat out of the head.

But other ancient scientists, such as Alcmaeon and Herophilus, did believe that thinking happened in the brain, not the heart. By dissecting (cutting up) people’s bodies and looking at the bits and pieces inside, they discovered that the brain controlled movements and senses. Sometimes they performed these dissections while the people being operated on were still alive!



What's in your head?

This picture of a head opened up to reveal the brain comes from a book by anatomist (body scientist) Andreas Vesalius, published in 1543. Vesalius studied the bodies of executed criminals, and paid artists to make detailed drawings of them.

Mental memories

The word **mental** means “relating to the mind”, so “mental development” is the way the mind develops and changes. The words mental and mind actually come from the Old English word *gemynd*, meaning “to remember”. If you think about it, memory is a huge part of what your mind is. You can only know and do so many things because you have learned about them and can use your mind to remember them. Without memory, you would not be able to talk, read, get dressed, or recognize your friends, your favourite foods, or even your front door.



It can take from half a second to seven seconds for your brain to become aware of something you have experienced, depending on what it is and what else you are concentrating on at the time.

Brain puzzle

What exactly happens between experiencing something in the real world and being aware of it in your mind? Scientists do not yet know. The way in which we become **conscious** of events around us is one of the biggest puzzles in science.

AMAZING BUT TRUE!

How soon is now?

You feel as though your mind is experiencing things in the present, right now – for example, when you are reading, touching, and seeing this book. But it takes a split second for your brain to take in what you experience, process it, and make you become aware of it. So, you never truly experience “now”. Everything that you experience is already a little while in the past.



Inside the brain

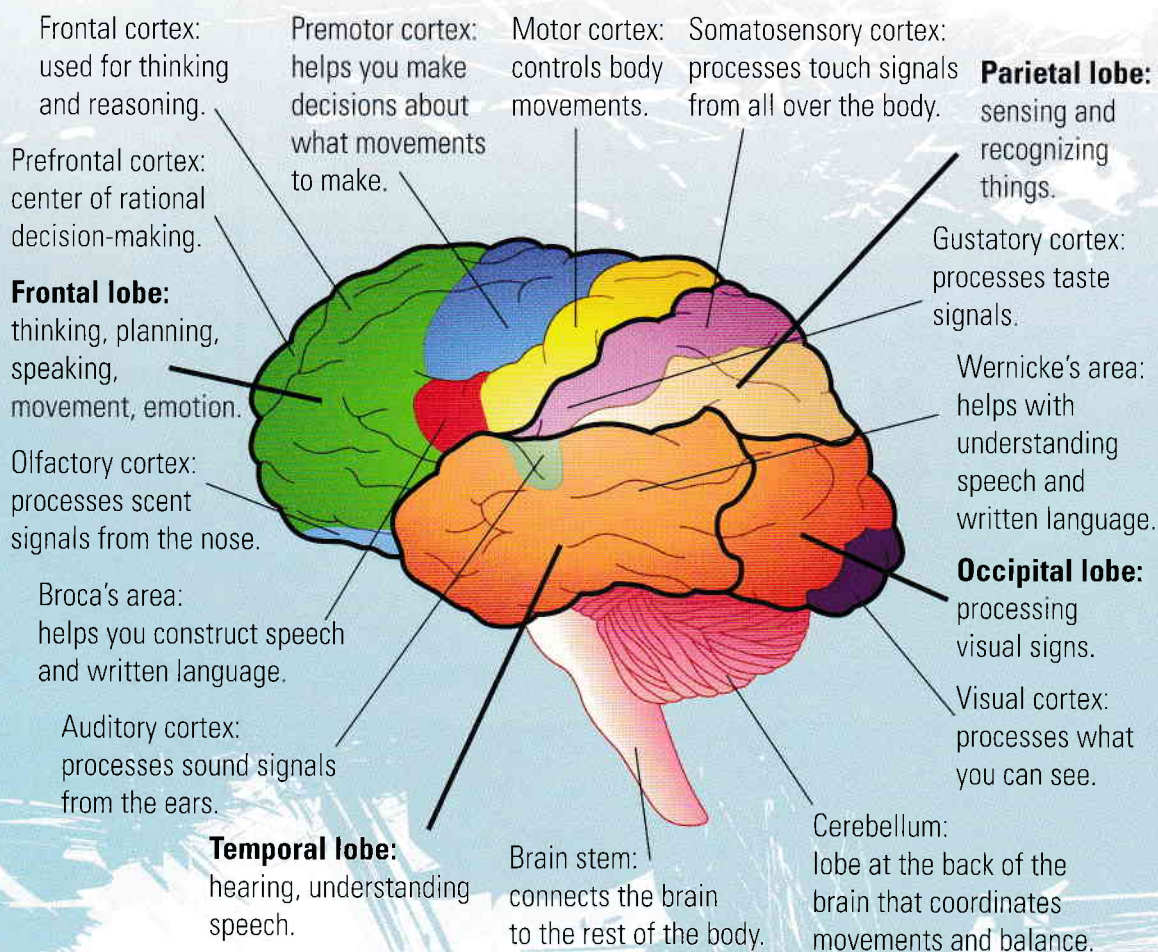
The brain is the organ that thinks, remembers, and makes decisions – it is where your mind “is”. In some ways, a brain is similar to a computer. The brain does these main jobs:

- It takes in information from outside your body, through your senses.
- It processes information, letting you understand things, have ideas, and make decisions.
- It controls body actions, such as making your legs walk or making your eyes focus.
- It stores all kinds of information, such as words, images, tunes, and numbers.

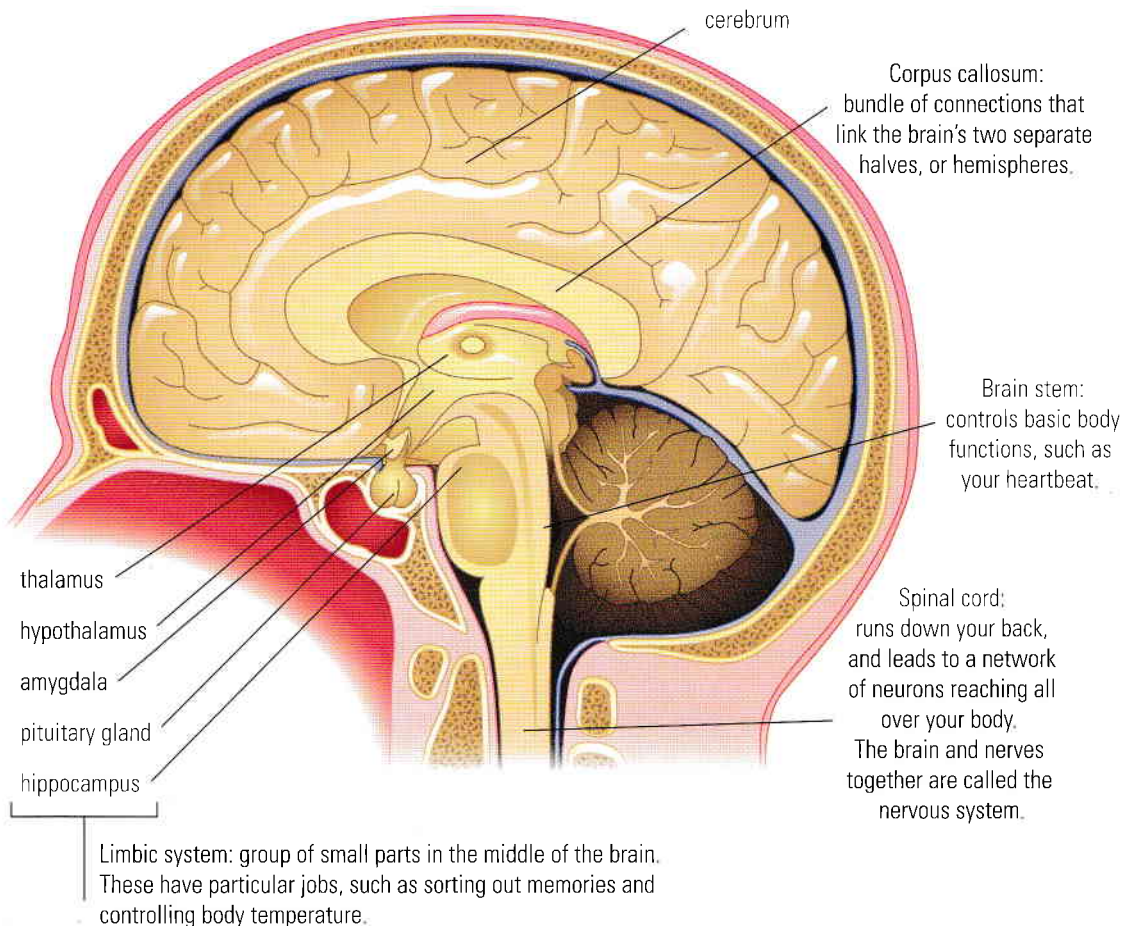
Even when you are not thinking about it, your brain is always active, controlling your body’s basic life processes, such as breathing, growing, and your heartbeat.

The different sections of the brain are known as “lobes”, and deal with different things.

Different parts of the cortex do different jobs.



If you could cut your brain in half, you'd see these parts, which are found inside it. The cortex, or "grey matter", is the brain's wrinkled outer layer, and contains most of the neurons. The cerebrum is the main part of the cortex. White matter is beneath the cortex. It supports the neurons and carries signals between different areas of the cortex.



AMAZING BUT TRUE!

Brain figures

- A typical human brain contains about 100 billion (100,000,000,000) **neurons**.
- There are at least one quadrillion (1,000,000,000,000,000) connections between them!
- A normal brain can carry out trillions of calculations per second and is faster than the most powerful computer processors on Earth.
- Though the brain makes up only 2 to 3 per cent of an adult's weight, it uses 20 per cent of the body's energy supply.