



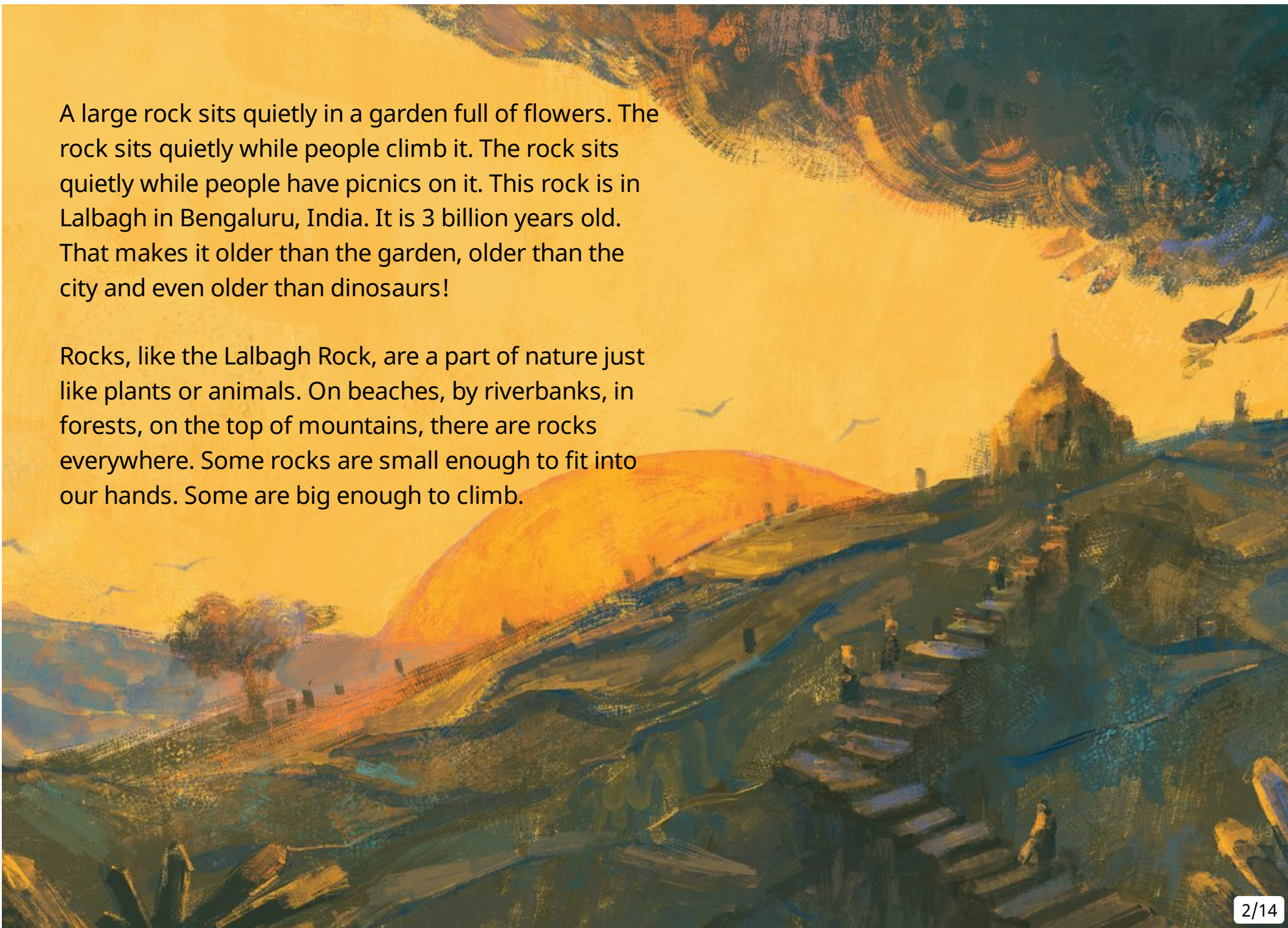
The Secrets of Rocks


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Level 4

A large rock sits quietly in a garden full of flowers. The rock sits quietly while people climb it. The rock sits quietly while people have picnics on it. This rock is in Lalbagh in Bengaluru, India. It is 3 billion years old. That makes it older than the garden, older than the city and even older than dinosaurs!

Rocks, like the Lalbagh Rock, are a part of nature just like plants or animals. On beaches, by riverbanks, in forests, on the top of mountains, there are rocks everywhere. Some rocks are small enough to fit into our hands. Some are big enough to climb.





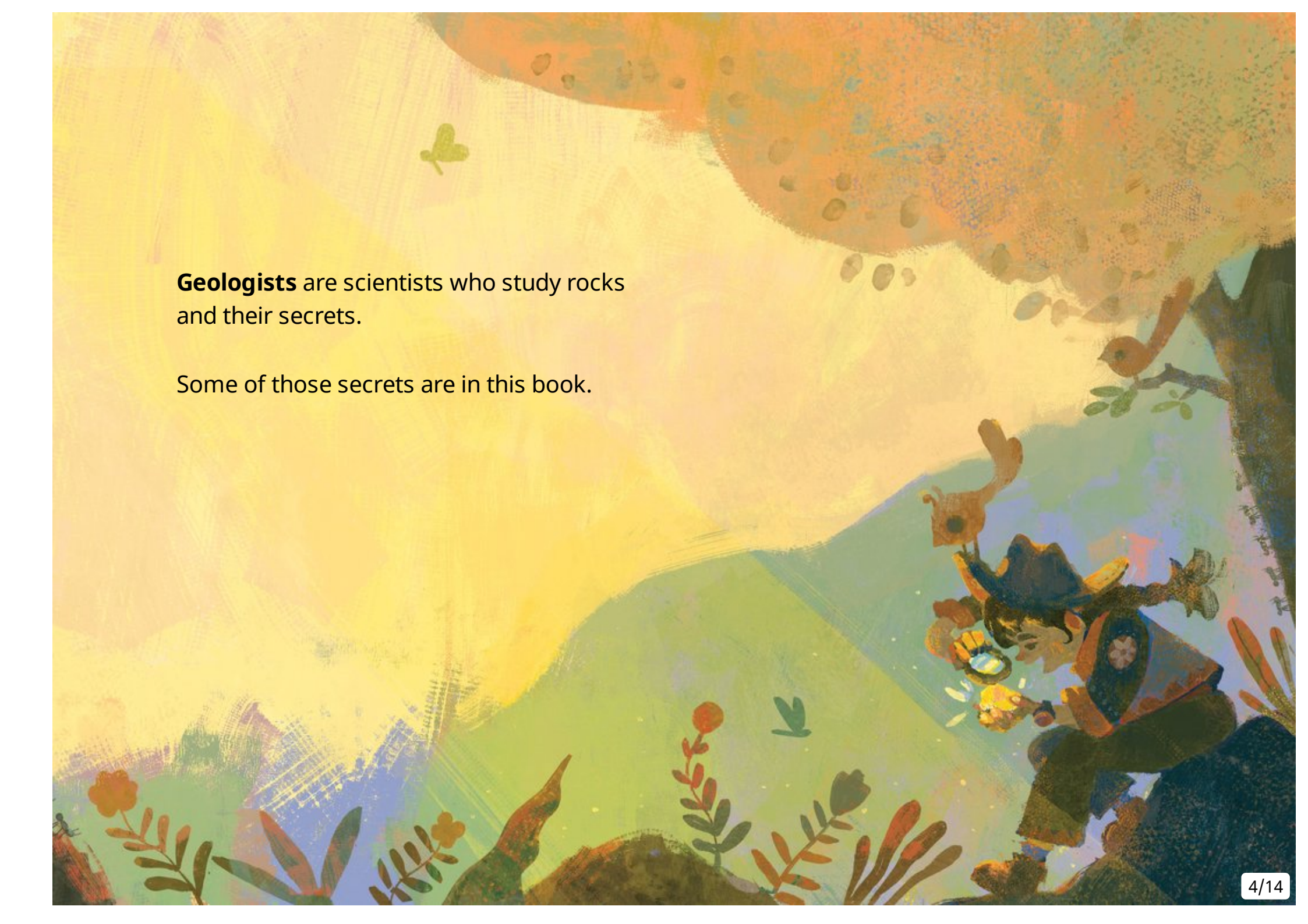
Rocks can be

hard or soft

shiny or dull

rough or
smooth

patterned or
plain.



Geologists are scientists who study rocks and their secrets.

Some of those secrets are in this book.

Secret No. 1. **ROCKS ARE EVERYWHERE**

Earth is a rocky planet. Beneath our feet, it is all rock.

Rocks are made of a mix of minerals.

Even soil and sand are made of powdered rock and other natural materials. Beneath rivers, seas and oceans, it is all rock.

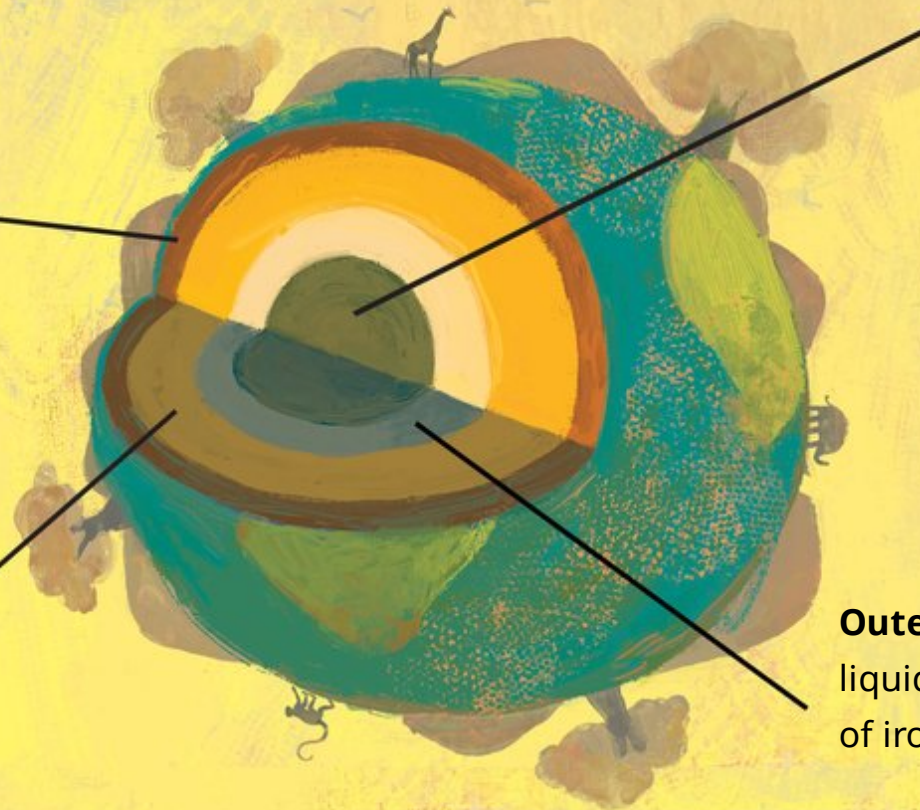
Earth's rocky layers

Crust: A solid layer of rock on which we live.

Mantle: The thickest, solid layer, but parts of it can melt and flow.

Inner core: A heavy and hot solid ball of iron.

Outer core: A hot liquid layer made of iron.



Secret No. 2. **ROCKS CAN MOVE AND MELT**

Rocks get pushed underground and pushed out all the time. Sometimes, rocks inside the Earth's crust and mantle melt, because of heat and pressure. They become a hot liquid called magma. When magma comes out of the crust through a volcano, it is called lava.

Closer to the Earth's surface, giant pieces of the crust and uppermost mantle, called tectonic plates, keep moving slowly. When they slip and slide against each other, it causes earthquakes. When they collide, mountains rise up — but this happens over thousands of years.



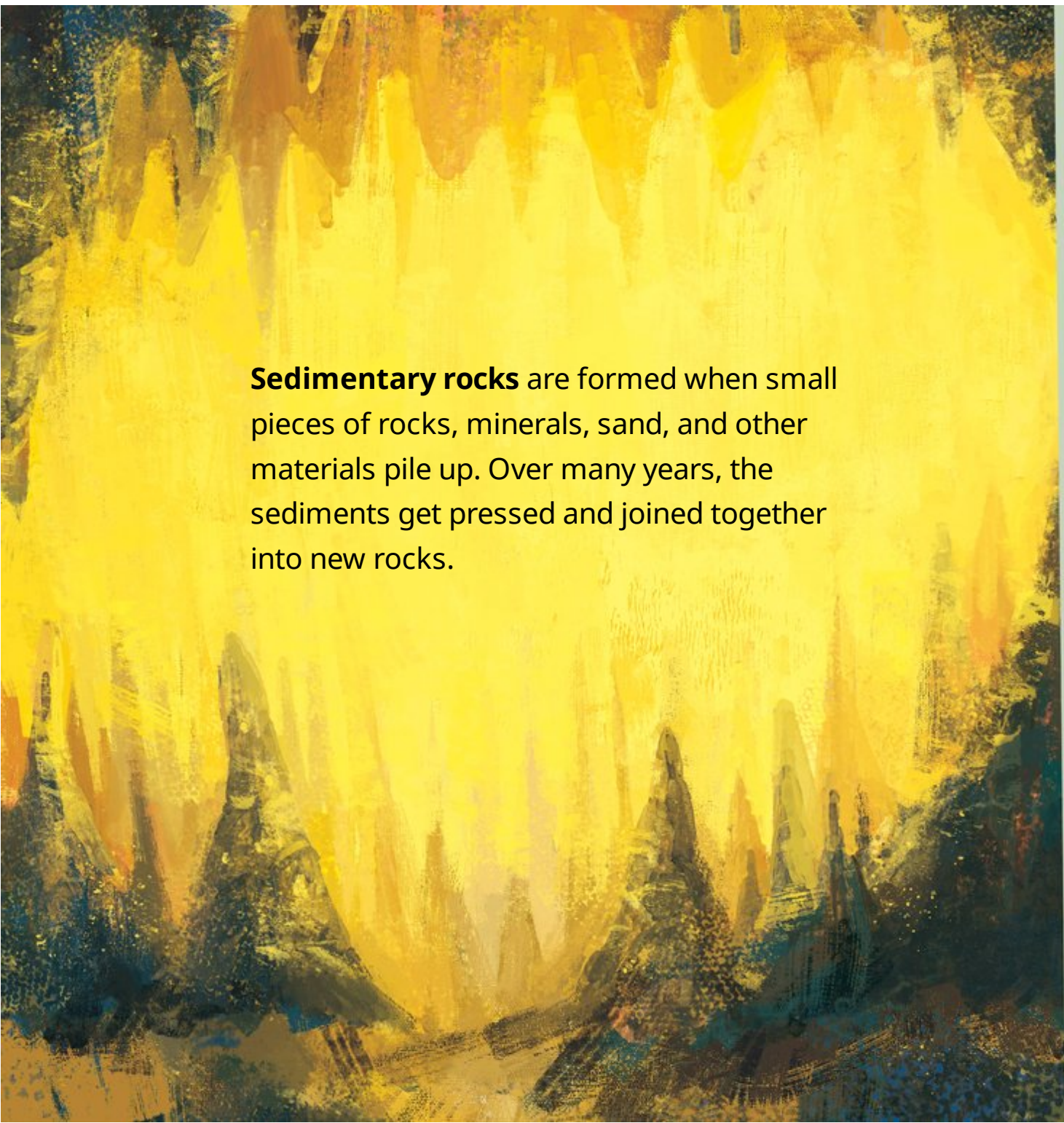
Secret No. 3. **ROCKS ARE OF THREE KINDS**

Rocks come in many colours, shapes and sizes. But geologists sort them into three kinds, not by appearance, but by how they are formed.

Igneous rocks are formed when magma or lava cools down.




Granite, which is used in a lot of buildings, is an igneous rock. Imagine having magma in your kitchen!



Sedimentary rocks are formed when small pieces of rocks, minerals, sand, and other materials pile up. Over many years, the sediments get pressed and joined together into new rocks.



Piles of sand and other minerals can come together to become **sandstone**. Small bits of shells, coral and bones pile up in shallow waters to become **limestone**.



Metamorphic rocks are rocks that have two lives. They start off as igneous or sedimentary rocks — or even other metamorphic rocks. Then, because of heat, pressure or certain chemical reactions, they change into completely new rocks.



Marble starts out as limestone, a sedimentary rock. Because of heat and pressure, limestone becomes marble!

Secret No. 4. **ROCKS ARE CALENDARS**

It is not easy to find out how old our planet is — but rocks can help! At this time, geologists think the Earth is about 4.54 billion years old.

Secret No. 5. **ROCKS HOLD MEMORIES OF ANCIENT LIFE**

Inside old rocks are traces of ancient animals and plants —



A dinosaur skeleton

A mollusc cast



A mammoth's footprint



A leaf impression



Such traces are called fossils. Fossils form when dead plants and animals get covered by sand, soil and other natural materials. As these materials get pressed into rocks, the remains stay inside, like in a tight box.



Fossils help us understand how life evolved on Earth.

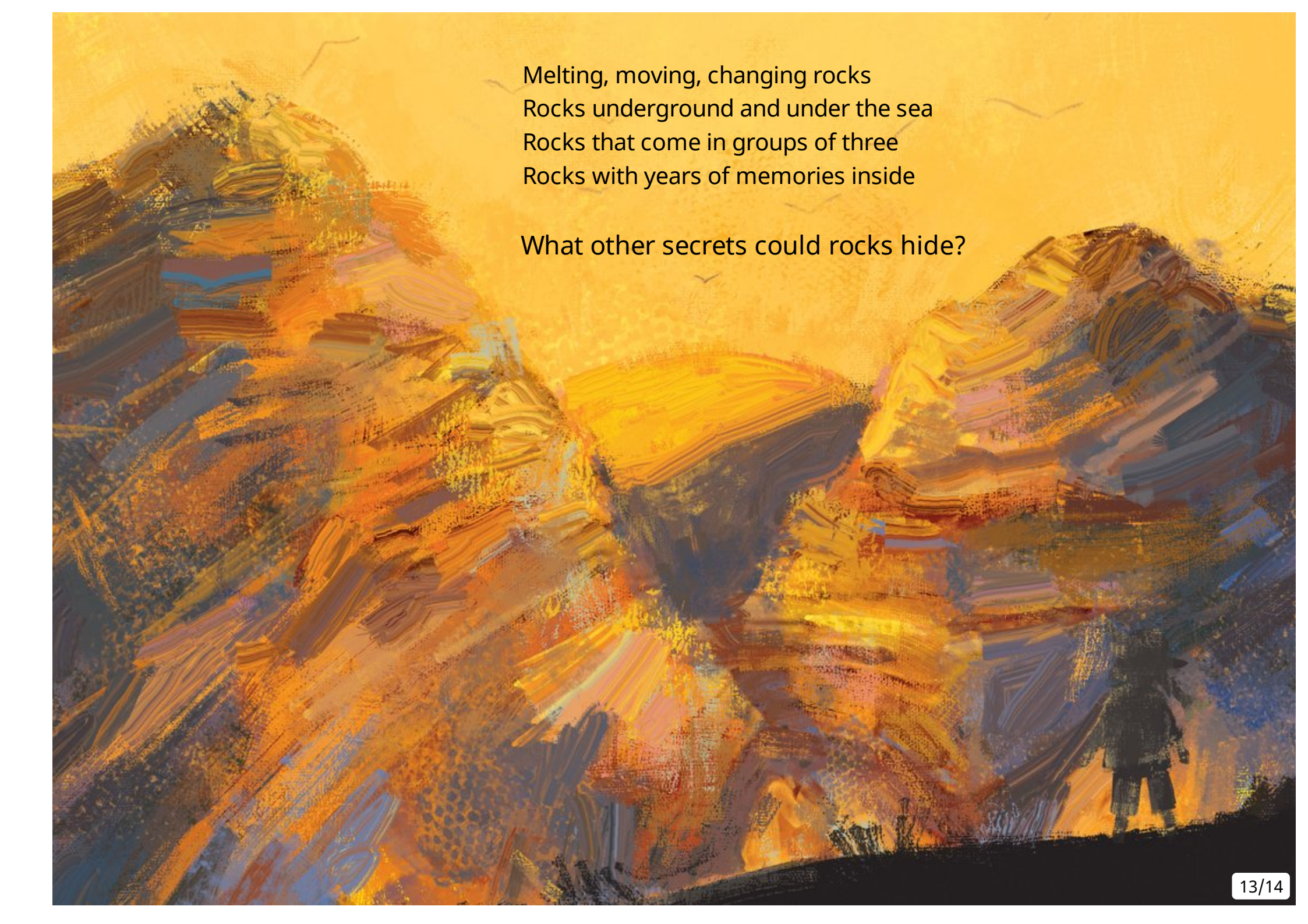


Secret No. 6. **ROCKS ARE ALWAYS CHANGING**

Rocks break down and pile up. Some become new rocks. Some melt. They become sand and soil and seabed. But all of this happens very slowly, over millions of years.

The Lalbagh rock has changed too. First, it was one kind of rock. Now it's another kind. Sometimes, it was solid. Sometimes, it was molten. It looks like a hill now but, once, it was underground.



The background is a textured painting of a landscape. It features large, rounded rock formations in shades of yellow, orange, and brown. The sky is a pale, hazy yellow. In the lower right corner, a small, dark silhouette of a person wearing a hat and a long coat stands on a dark, silhouetted hill. The overall style is expressive and somewhat abstract, with visible brushstrokes and a warm, golden light.

Melting, moving, changing rocks
Rocks underground and under the sea
Rocks that come in groups of three
Rocks with years of memories inside

What other secrets could rocks hide?

Keep a rock diary

Whenever you see a new rock, look at it carefully. You can start collecting rocks too, but make sure you are allowed to take them. Write down the answers to these questions:

- Where did you find this rock?
- Is the rock rough or smooth?
- Is the rock hard? Does it crumble when you press it?
- Does it have a colour? Or bits of different colours?
- Does it have stripes or some other pattern?
- Does the rock sparkle?
- Does it have layers?
- Do you know what kind of rock it is?
- Are there other rocks nearby? Do they look the same?

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The Secrets of Rocks

(English)

Rocks are everywhere — under the ground, above the ground, and even at the bottom of our oceans. But where do rocks come from? What are they made of? If rocks could talk, they would share many secrets.

This is a Level 4 book for children who can read fluently and with confidence.



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