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About 2.4 billion years ago, the Earth's atmosphere had very little oxygen. Cyanobacteria began photosynthesis, releasing oxygen into the air. This oxygen helped clean the Earth's air. With more oxygen available, many different life forms were able to live and grow. This release of oxygen by cyanobacteria is known as the "Great Oxidation Event."

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K2.5.7 Cyanobacteria Coexisted with Bacteria

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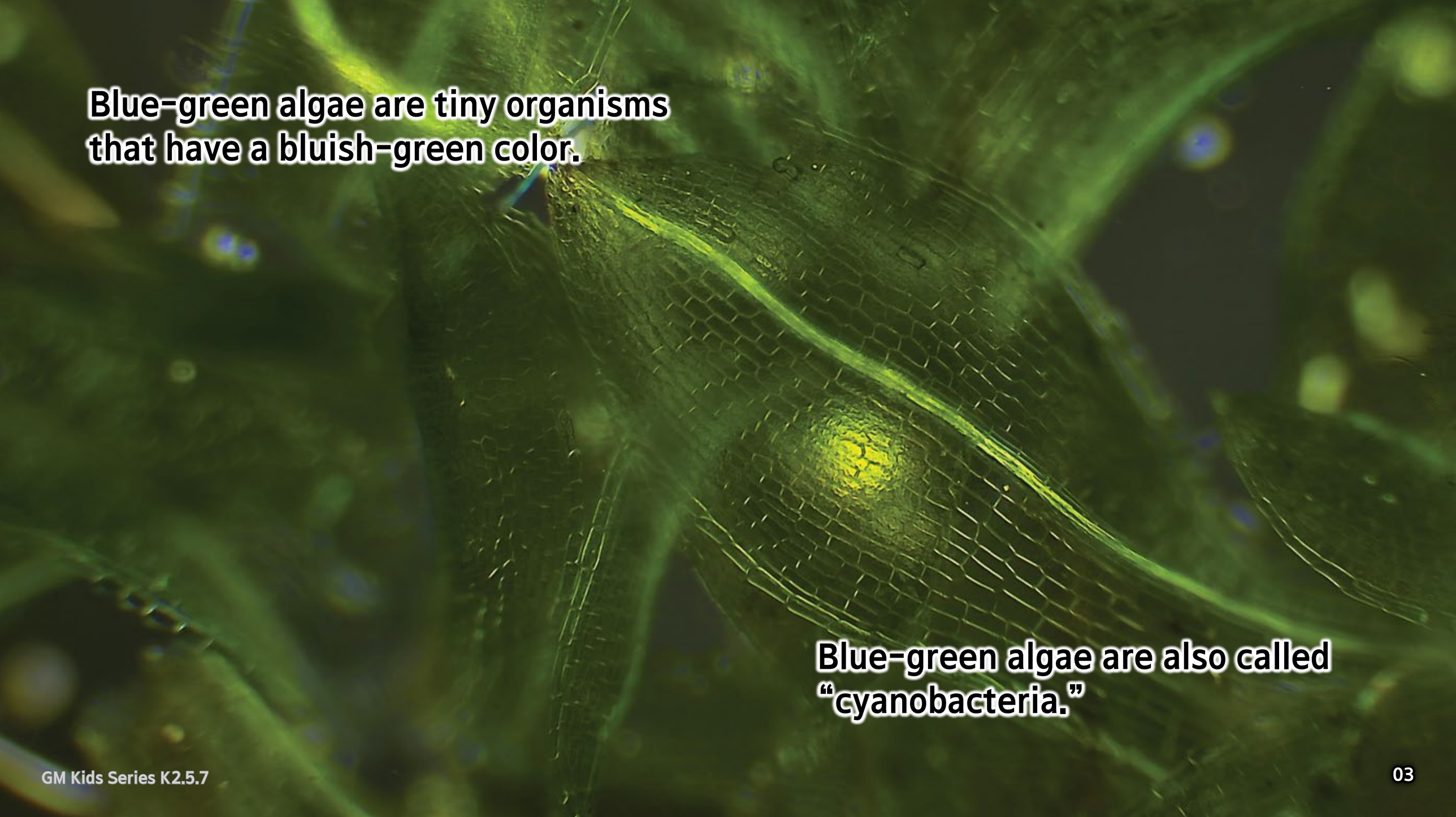
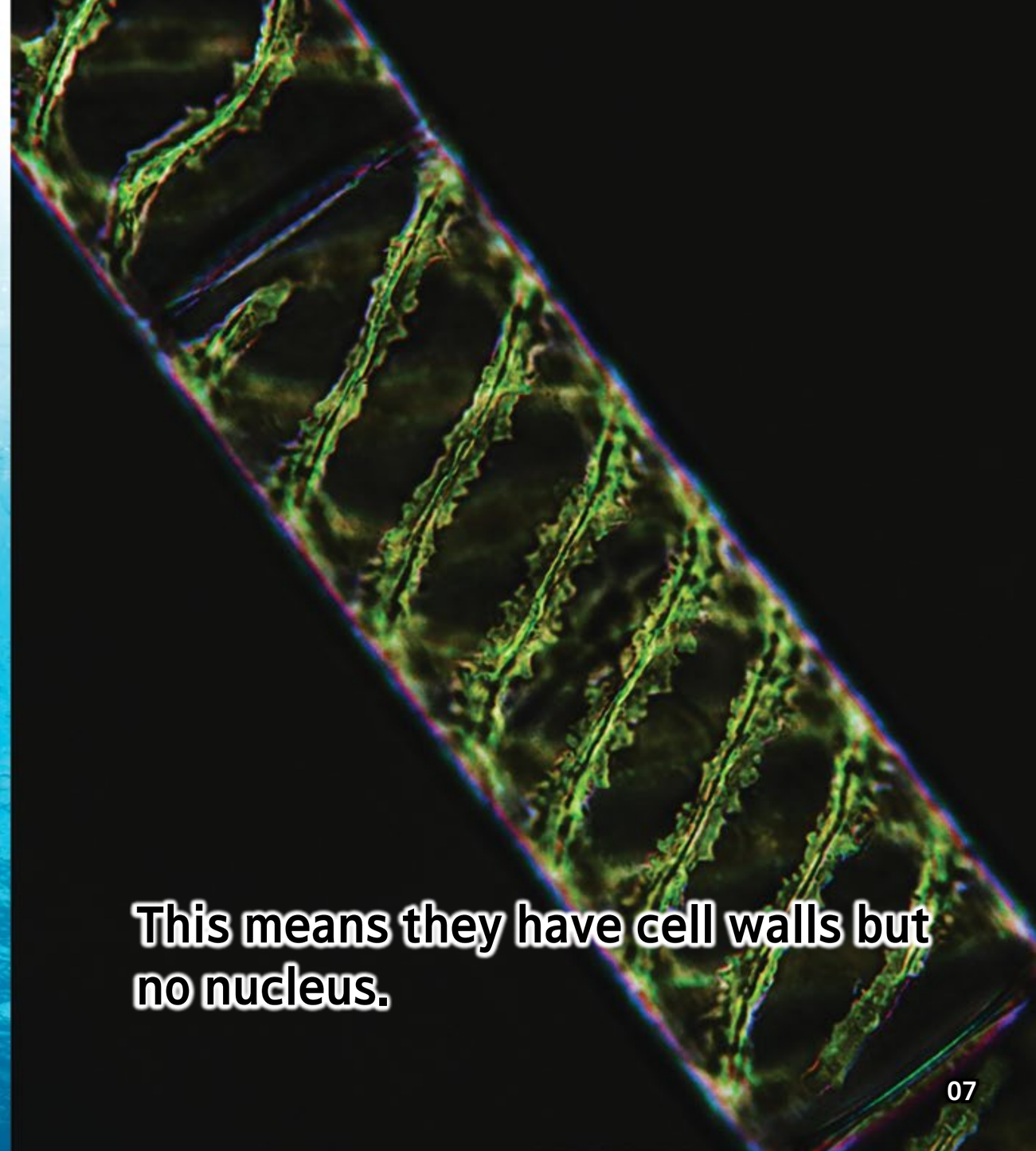

Blue-green algae are tiny organisms
that have a bluish-green color.
Blue-green algae are also called
“cyanobacteria.”

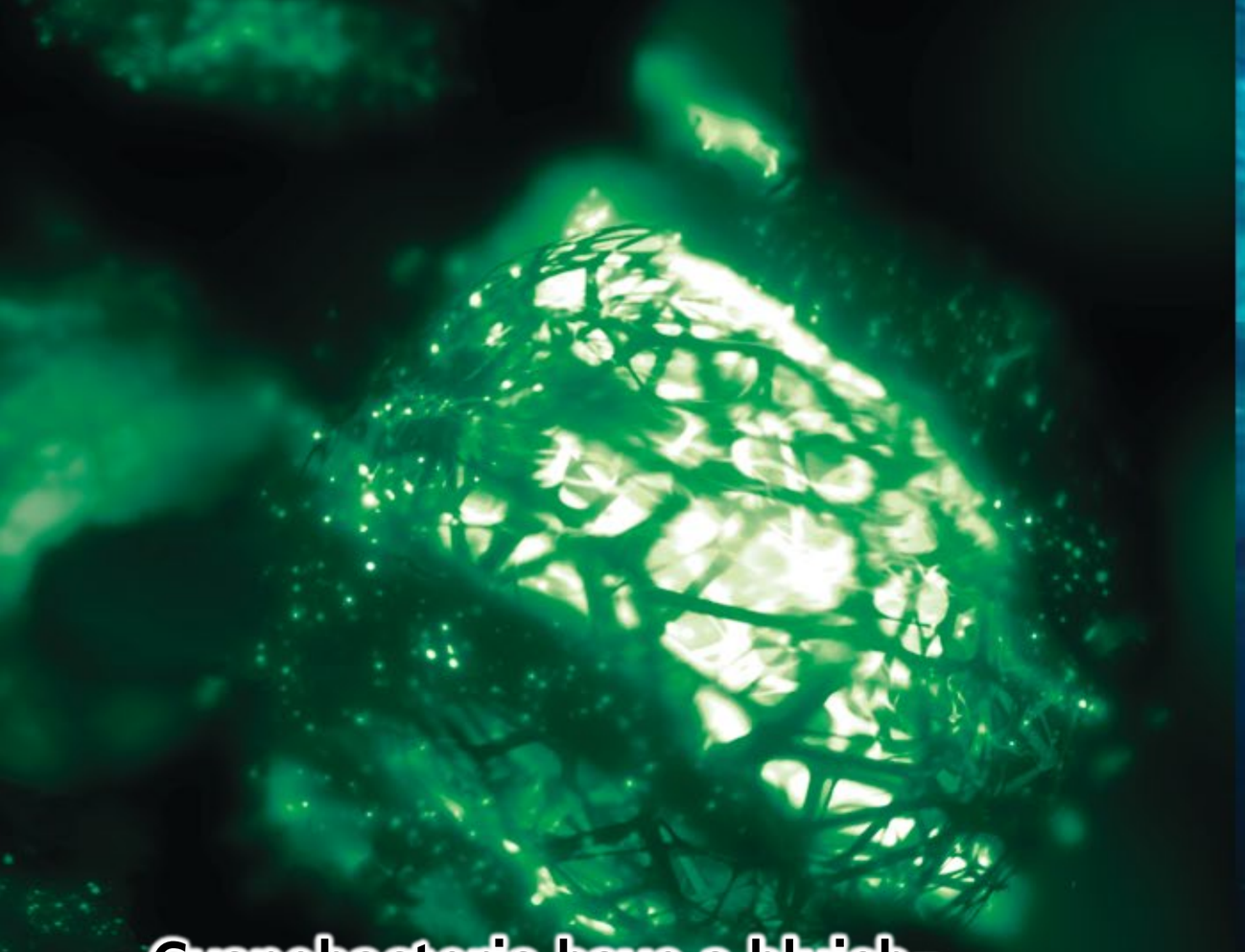
Cyanobacteria have been living Earth for about 3.5 billion years. They are close friends with other bacteria.

Bacteria are tiny unicellular organisms. Bacteria can live almost anywhere.

Cyanobacteria live inside water or mud. They are prokaryotic organisms.

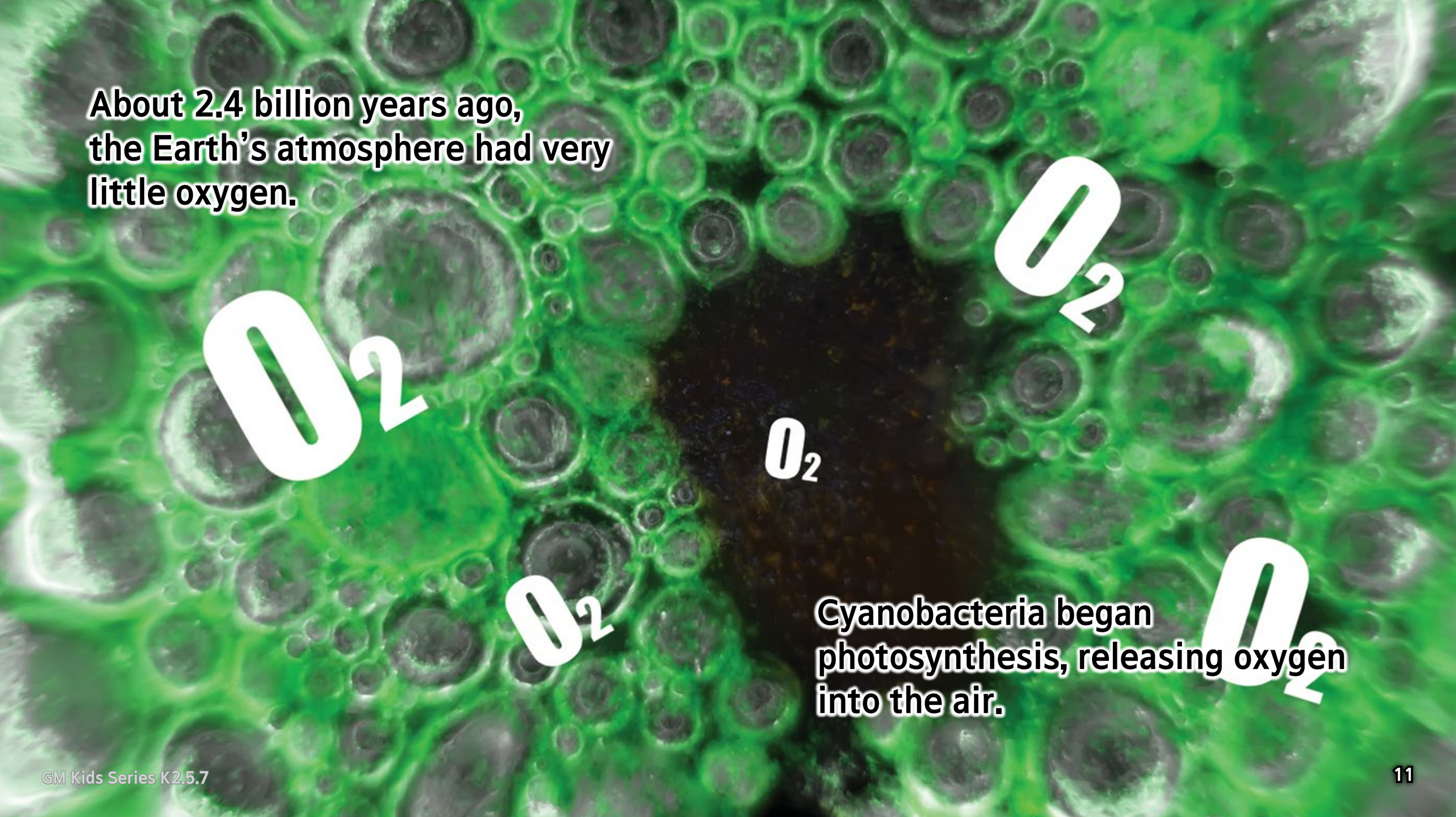


This means they have cell walls but no nucleus.



Cyanobacteria have a bluish-green color. They are blue-green in color because they perform photosynthesis.

Cyanobacteria use sunlight to make their own food. This process is called "photosynthesis."


About 2.4 billion years ago, the Earth's atmosphere had very little oxygen.
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Cyanobacteria began photosynthesis, releasing oxygen into the air.

This oxygen helped clean the Earth's air.

With more oxygen available, many different life forms were able to live and grow. This release of oxygen by cyanobacteria is known as the "Great Oxidation Event."

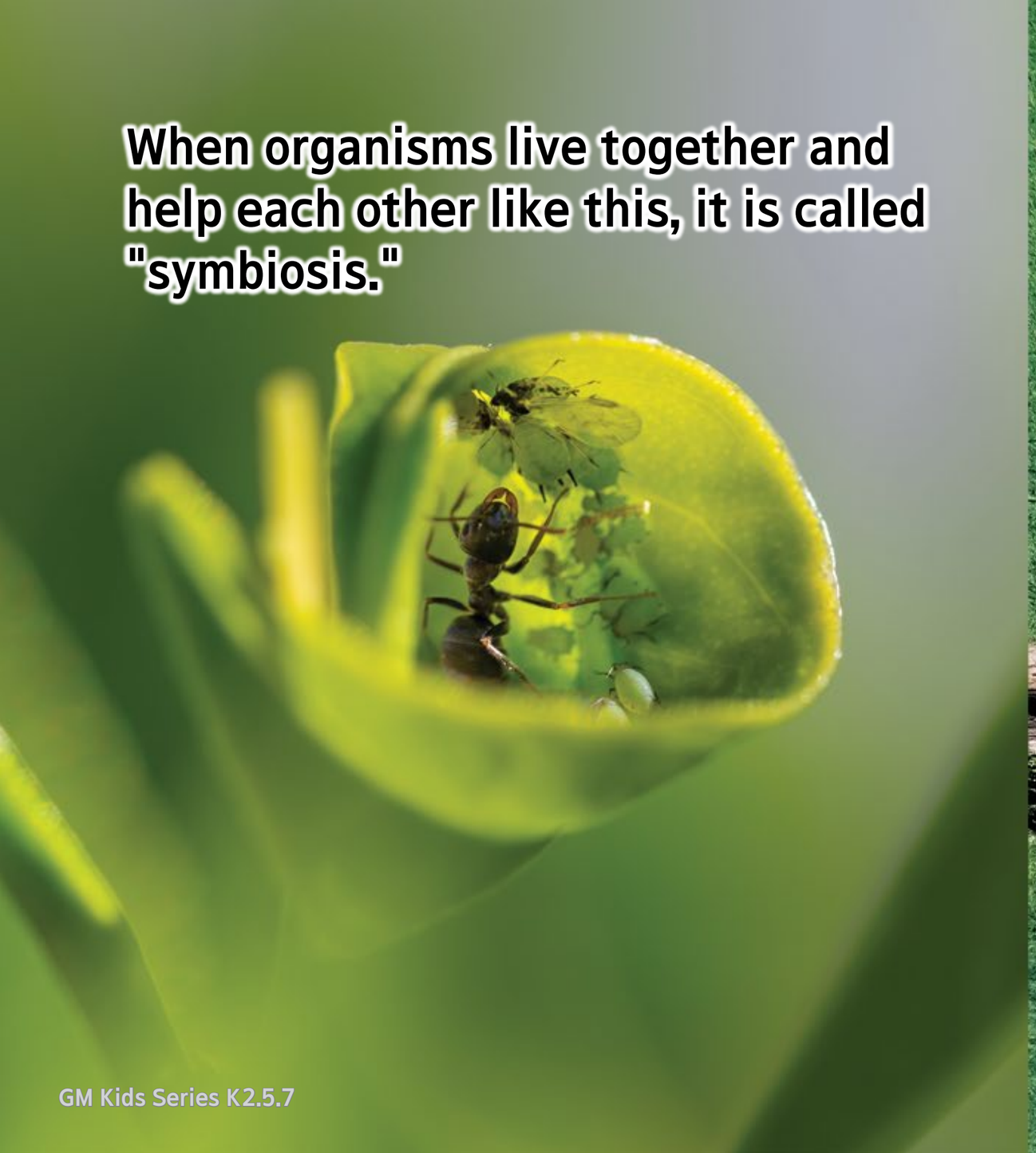
Cyanobacteria also help other bacteria.

Nitrogen-fixing bacteria change nitrogen from the air into forms that plants can use. Plants use the transformed nitrogen.

Cyanobacteria share the nutrients they make through photosynthesis to nitrogen-fixing bacteria.

In return, nitrogen-fixing bacteria provide the nitrogen that cyanobacteria need.

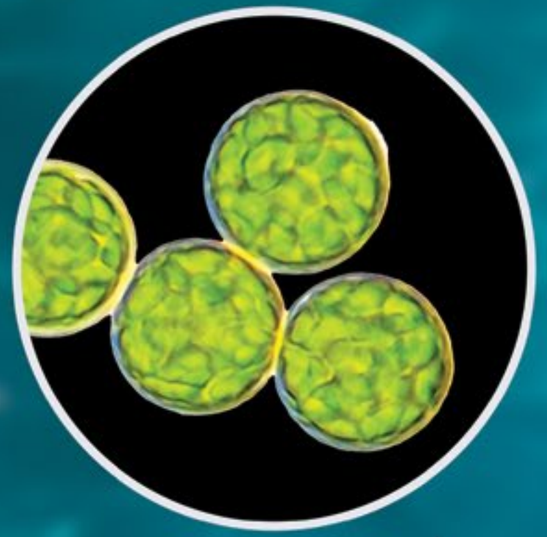
When organisms live together and help each other like this, it is called "symbiosis."



However, if too many cyanobacteria grow in the water, it can cause problems.

When cyanobacteria multiply too much, it creates a "red tide." Red tide is when the water turns red.

Red tide lowers the oxygen levels in the water, which can harm other living organisms.

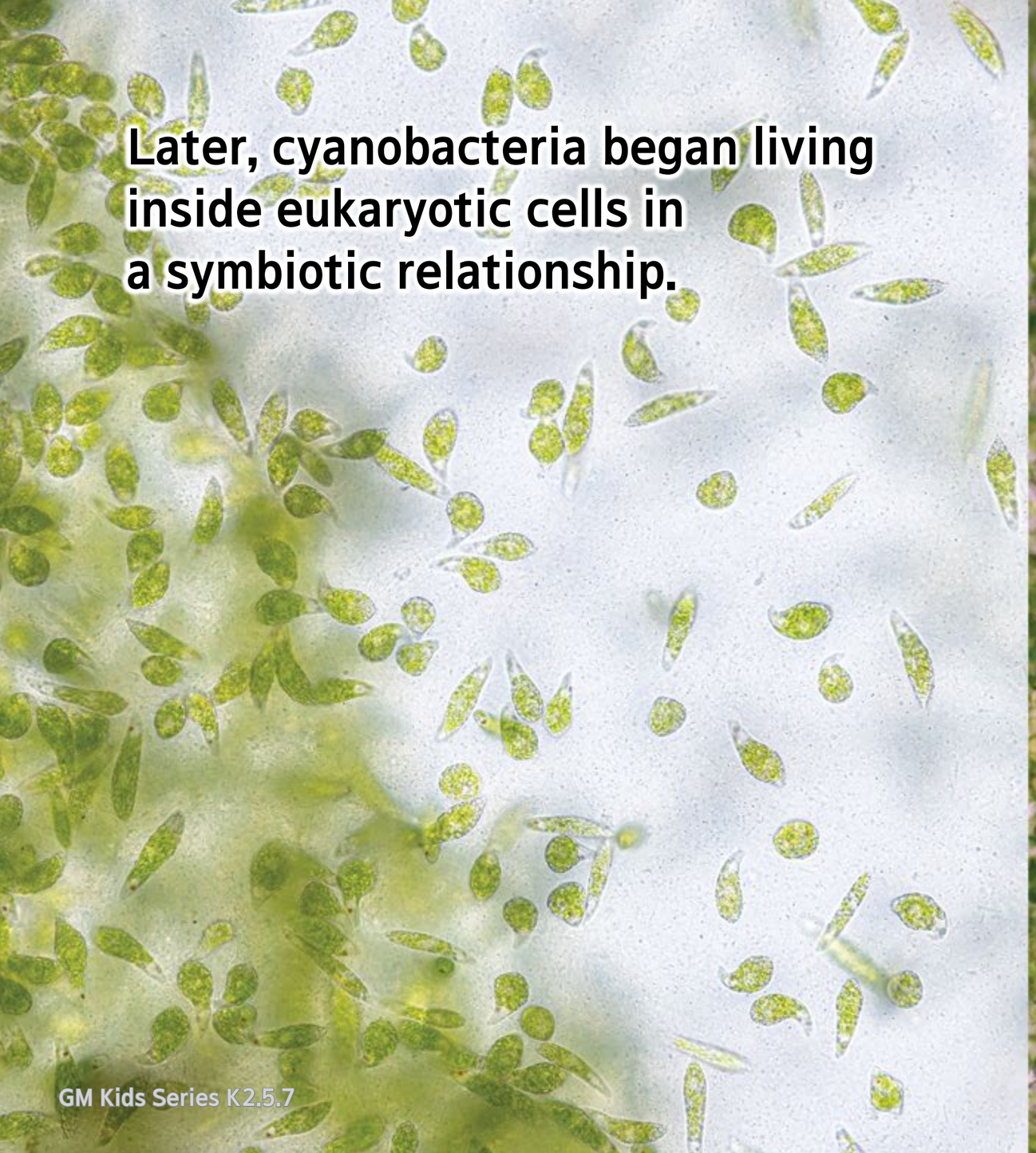


Cyanobacteria absorb nutrients in the water.

Cyanobacteria form the base of the ocean's food chain.

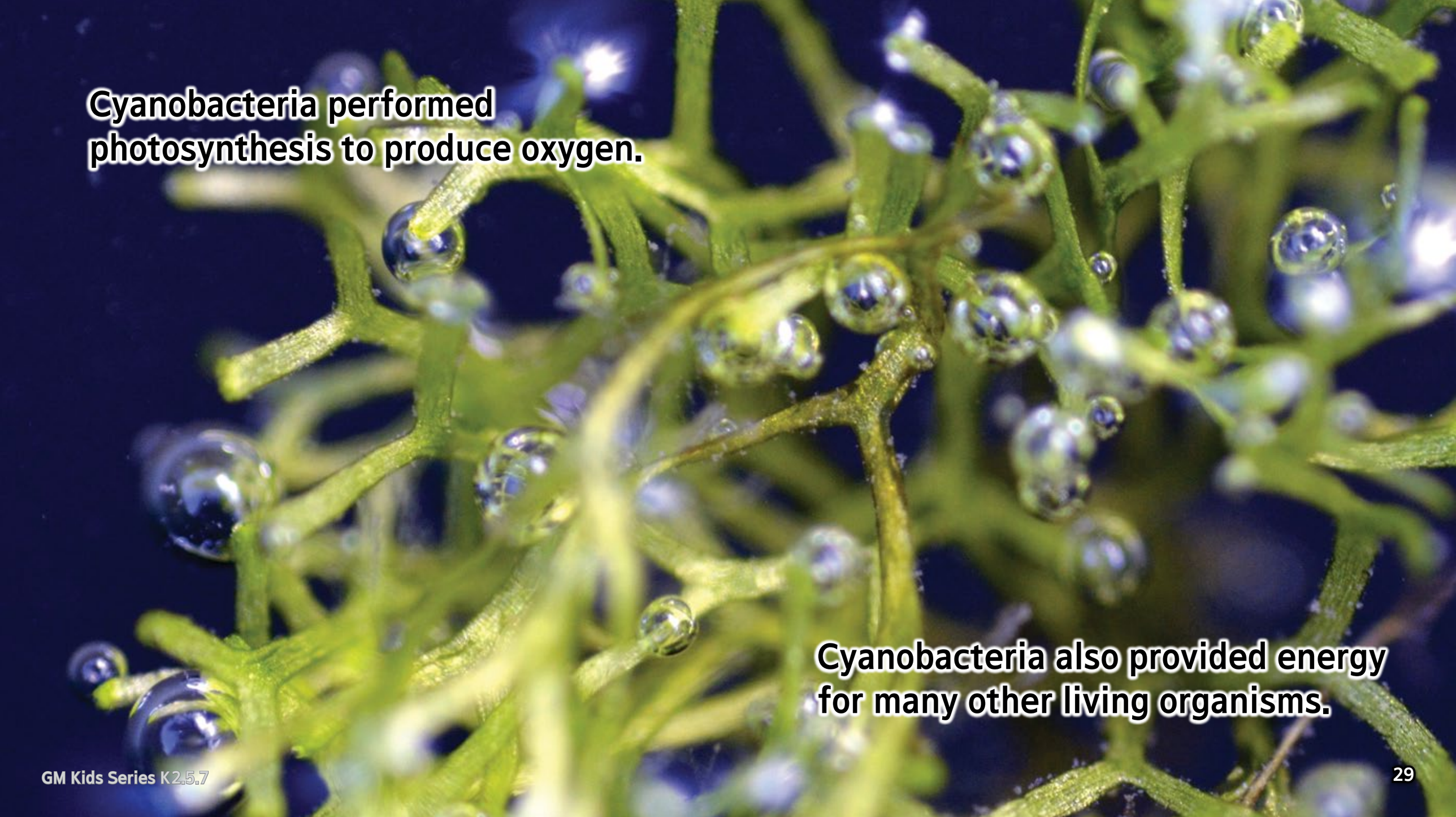
Chloroplasts in plants are descendants of cyanobacteria.

Long ago, cyanobacteria lived on their own.



Later, cyanobacteria began living inside eukaryotic cells in a symbiotic relationship.

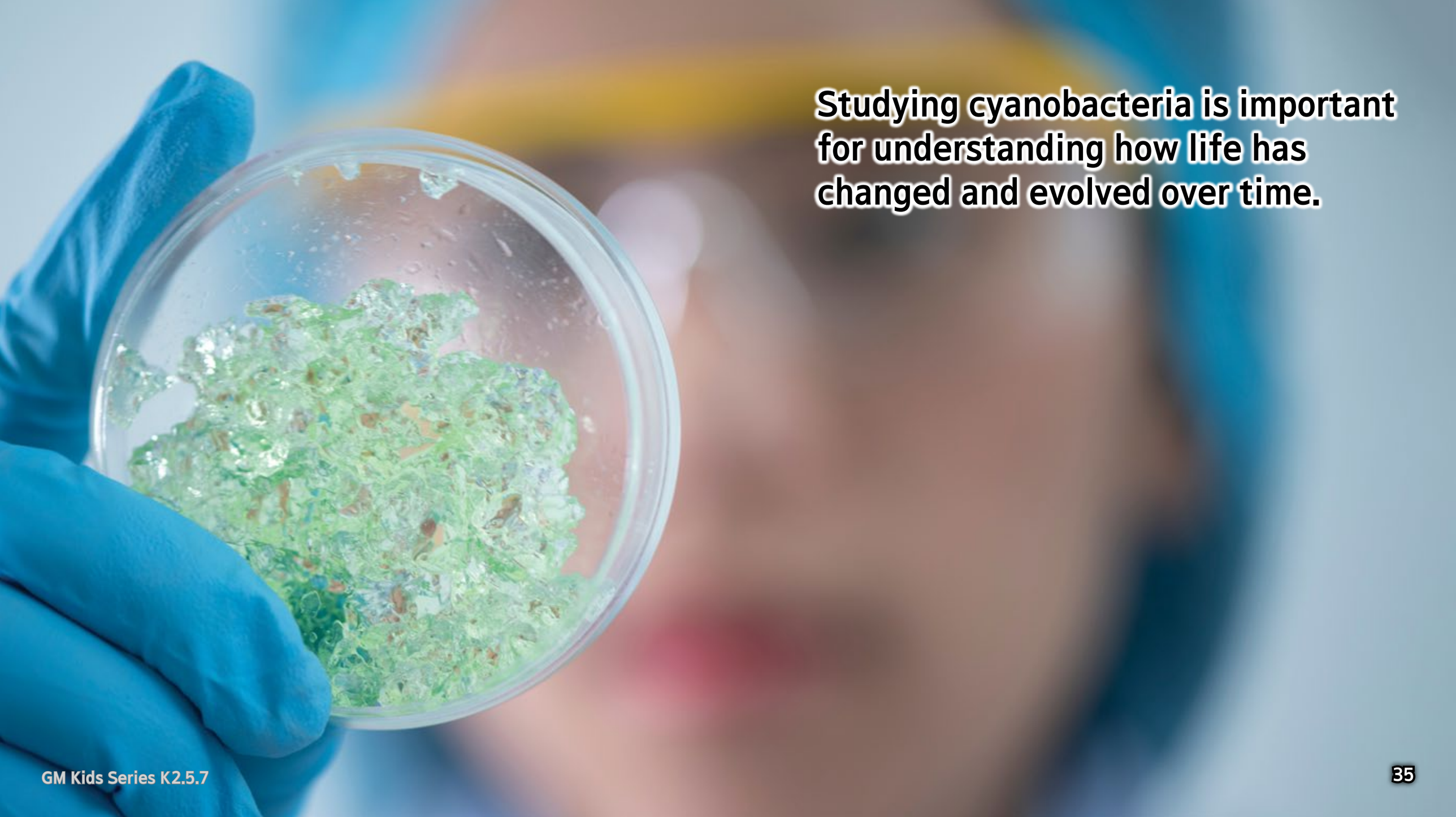
During this relationship, cyanobacteria evolved into chloroplasts. The process is called the "endosymbiotic theory."


Cyanobacteria performed
photosynthesis to produce oxygen.
Cyanobacteria also provided energy
for many other living organisms.


Cyanobacteria also formed symbiotic relationships with other bacteria.
These relationships helped nature in many ways through their cooperation.

Even today, cyanobacteria are important in both the ocean and freshwater environments.

Cyanobacteria also have a significant impact on humans.



Studying cyanobacteria is important for understanding how life has changed and evolved over time.