

SCIENCE MOM
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Lichen

Symbiotic
Super-tough
Photosynthetic



And NOT a plant!

LICHENS

At first glance, lichens might look a bit like moss. But don't be fooled! Lichens are not plants. In fact, they're not just *one* organism, they're *two*, or sometimes, even *three*. Lichens are fungi growing with a species of algae or cyanobacteria, living together in a symbiotic relationship.

This dual system is remarkably hardy and adaptable. Lichens can be found in every climate and continent on Earth, from the frozen deserts of Antarctica to the tropical jungles of the Amazon.

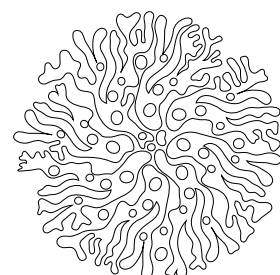
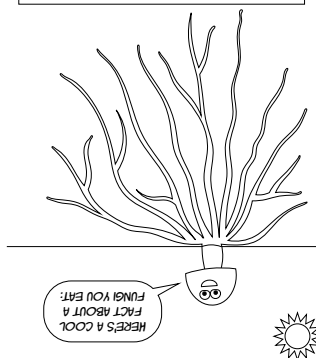
THE BASIC MODEL

PHOTOSYNTHETIC ALGAE OR CYANOBACTERIA PRODUCE SUGARS AND OTHER FOOD, WHICH THEY SHARE WITH THE FUNGI.



FUNGI MAKE UP THE OUTER SHELL, PROVIDING MINERALS, WATER, AND SHELTER FOR THE ALGAE.

A MUSHROOM IS JUST A SMALL PART OF THE FUNGUS - THE FRUITING BODY. MOST OF THE FUNGUS IS UNDERGROUND, A MASS OF THIN STRANDS CALLED HYPHAE.



SOME LICHENS ARE SO REGULAR IN THEIR CIRCULAR GROWTH THAT SCIENTISTS MEASURE THEIR DIAMETER TO DATE ROCKS. IT'S CALLED "LICHENOMETRY."



There are more than 15,000 species of lichen, and some of them are very long lived—thousands of years old!

Lichens can have an incredible variety of colors, from neon-yellow to orange, red, brown, gray or green. Lichens become dormant when dry, entering a state of hibernation or stasis. When they get wet, their color and shape change dramatically as the fungal filaments absorb water and the algae or cyanobacteria resume photosynthesis.

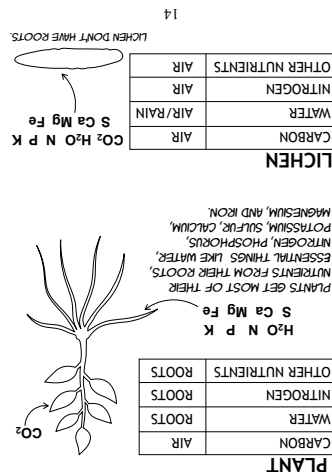
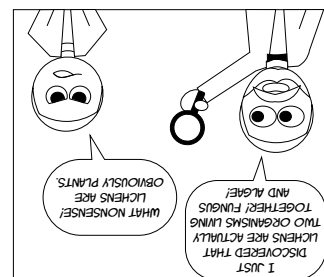
Other scientists didn't accept his idea easily. It took years of debate (and the proof of teasing out each individual member of the lichen carefully with a microscope) before this "dual hypothesis" was accepted. Once it was accepted, the concept was so novel and important it needed a new word. So in 1879, scientists coined the term *SYMBIOSIS*—"the living together of unlike organisms."

Lichens grow on bark and wood, rocks, soil, houses, underwater, even on cars or the backs of turtles! They can grow on anything that stays in the same place for a long time without moving.

They have an incredible variety of shapes, from flat round pods to antler-like tusks or thready filaments. But all lichens are relatively small, so to appreciate them, you have to get down close.

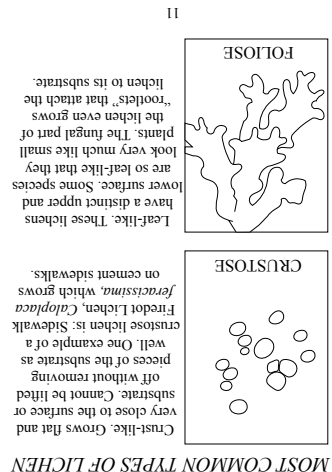
Next time you're outside, stop a moment to kneel down and peer at the rocks and logs and see what kinds of lichens you can discover.

In the late 1800s, a Swiss botanist named Simon Schwendener put forth the idea that lichens weren't plants, as commonly believed, but instead a dual organism of a fungus that had "enslaved" an algae.



Plants absorb their nutrients and minerals from the soil through their roots. Lichens absorb most of their minerals and nutrients from the air. This remarkable ability allows them to grow on any surface, but it also makes them very vulnerable to airborne pollutants. If there are high levels of lead, sulfur dioxide, or other toxic gases, the lichens will be some of the first organisms to be affected.

Sensitive to Air Quality



MOST COMMON TYPES OF LICHEN

B

A

A

X



B

C

C

D



F

E

E

D



E

G

G

X