

Science Lesson #15

Trees, Rocks & Bones

(The Lime Cycle)

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Introduction to Fables and Science

Today's Lesson

In the lesson *The Woods are on Fire!* we learned that wood and plants burn slowly - or oxidize - to turn into air as carbon dioxide. Then, in that same lesson, we learned that the metals (95 of them) of earth also go through a kind of burning. They combine with oxygen and carbon dioxide from the air and they also combine with water. As they do, they rust or oxidize and get crusty. This is how rocks are formed. And our bones are formed from carbon to be flexible like the trees - and mineral metals to be strong like rocks.

Five Metals our Bodies Love

Metals our Bodies Love

- Iron
- Calcium
- Magnesium
- Sodium
- Potassium

Everywhere we see trees and rocks - we are seeing 'burnt' metals. Metals like iron and magnesium love to 'burn' (combine) with oxygen to make rust. Metals like calcium, potassium, and sodium love to 'burn' if water touches them. If you ever get pure calcium metal, you can't leave it out in the air because the moisture in the air can catch it on fire. Pure potassium and sodium are even more dangerous! If they touch water, they can explode!! This is because they love to join with water so much that they give off great heat when they get together with water. This is why these are the great metals of our bodies. The calcium makes our bones and the potassium and sodium makes the main salts of the body. The calcium also makes the bones of the earth (the entire Appalachian Mountain Range is largely calcium carbonate - sandstone and marble). And the sodium and potassium are two main salts of the earth. If you ever heard the expression, "That person is the salt of the earth!" it means that they are good people - good for the whole group! So, what have we learned, here? That substances that combine very easily with

air and water (like wood, iron, magnesium, calcium, potassium, and sodium) are great for both our bodies and the earth's body!

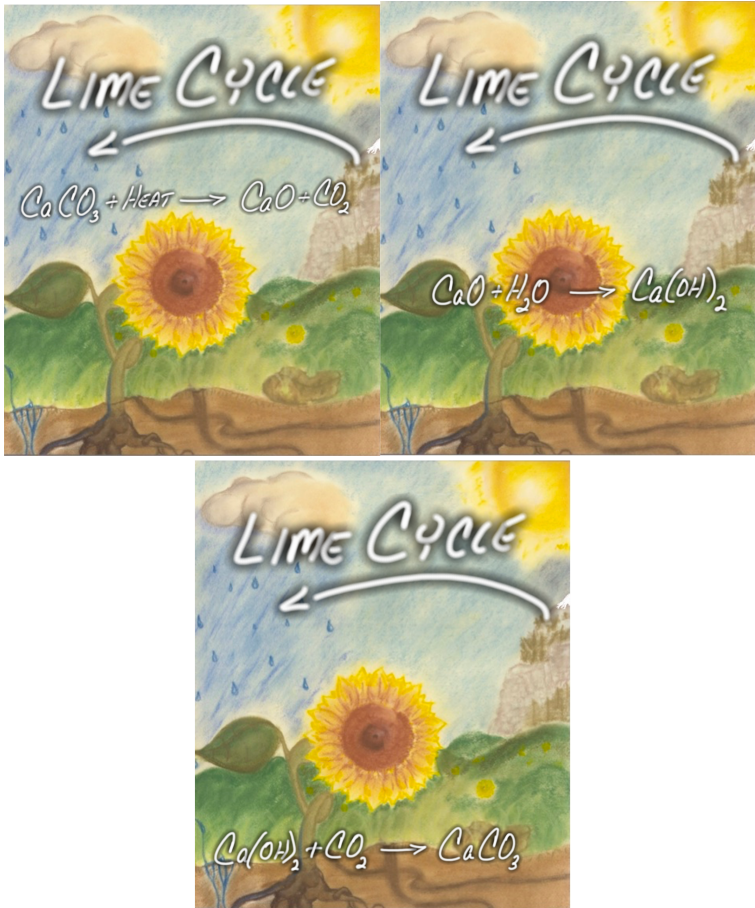
The Lime Cycle

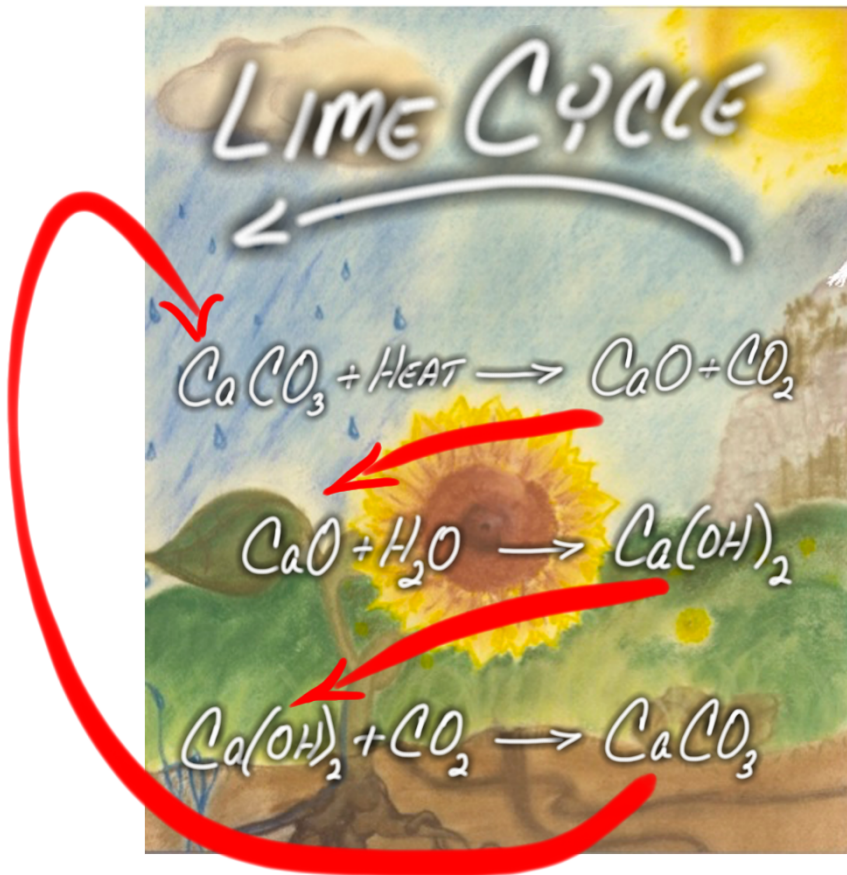
CaCO₃ ... Calcium Carbonate

- marble rocks & mountains
- sea shells
- bones
- cured cement
- cured plaster
- limestone
- stalactites/stagmites in caves
- dried, uncured cement
- dried, uncured plaster
- cloudiness in limewater test for CO₂

Let's Follow a Drop of Calcium in Water (Limewater)

as it makes a cycle through nature - first to our bones, then to earth's bones (mountains).





• Our Bones

- The Air cures **Limewater** to **Limestone** ...
- The Sun makes **Limestone** into **Quicklime** ...
- Rain turns **Quicklime** into **Limewater** ...
- **Limewater** helps the **grass** grow ...
- **Female** animals eat the grass ...
- **Milk** is made ...
- **We** drink the milk ...

- Milk makes our **bones** strong ...
- Our bones dissolve into **dust** ...
- **Rain** falls on the dust ...
- The wet dust becomes *limewater* ...
and so it starts again!

• Earth's Bones

- **Limestone** + Sun becomes **Quicklime** ...
- **Quicklime** + water becomes **Limewater** ...
- **Limewater** + air becomes **Limestone** ...
and so it starts again!

• The Lime Cycle

1. FIRING ... $\text{CaCO}_3 + \text{heat} \rightarrow \text{CaO} + \text{CO}_2$

[Limestone *becomes* Quicklime]

Examples of CaCO_3 :

marble rocks & mountains
sea shells
bones
cured cement
cured plaster
limestone
stalactites and stalagmites in caves
dried, uncured cement
dried, uncured plaster
cloudiness in limewater test for CO_2

2. SLAKING ... $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$

[Quicklime *becomes* Limewater]

Examples of CaO:

(not found in nature because it quickly combines with CO₂)

mortar (dry mix in sealed bag)

unslaked lime (or quicklime)

3. CURING ... $\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$

[Limewater *becomes* Limestone]

Examples of Ca(OH)₂:

lime

limewater

slaked lime

wet cement

wet plaster

[*\[Play video here to see live demonstration.\]*](#)

Here's a provocative thought...

So, if the leaves turn to air and soil, and the metals turn to rocks, then the earth is digesting the woods and mountains in a similar way to the humans and animals digesting food. One might compare the earth to a large version of us - or compare us to a small version of the earth! When the carbohydrates - the plants -

disappear, it is like the earth is digesting them, just as we do when we eat. The sedimentary rocks of the Appalachians are largely comprised of calcium. When this calcium is combined with carbon dioxide from the air, under the burning influence of the sun, it turns to calcium carbonate, just like the bones in our bodies. So, the mountains' bones are like our bones.

So ... once again, I have to wonder if the earth is a living being.

Here are some fables that deal with this whole idea: [[Fable #16](#)] [[Fable #40](#)] [[Fable #131](#)] (Bickart, 2020a, Volume 1; 2020b, Volume 2; 2020c, Volume 3).



#131 *The First Reasoning*



A four-year-old named Mikey was walking with his grandmother and older brother. Grandmother was walking the older brother to school, but Mikey was too young, so he just came along for the fun. As Mikey looked up at the Sun, he mentioned out loud that the Sun was shining on him in order to make him warm. His older brother was quick to correct, explaining that the Sun is not alive and that it cannot, therefore, do anything for him on purpose. His brother further explicated that when Mikey could REASON for himself, he would understand such things. Mikey looked up at his grandmother, staring into her face to see if this

could possibly be true. His grandmother was wise. She just smiled until the older brother went into the school. Then she told Mikey that his older brother was quite right about reasoning. She confirmed that Mikey would also learn to reason as he grew up. But then she bent down and whispered in a very excited tone, "But when you get to be my age, you'll think that maybe Mikey knows something, too!"

PERHAPS EVERYTHING IS ALIVE

The First Reasoning

Why Use Fables to Teach Science?

Conversation Starters

- Do you have memories of your childhood? What is one that you can remember right now?
- Do you wish you could still be like you were as a child in some particular way?
- Are you aware of your childhood beliefs? Can you recall one of them?
- What were things you believed as a child that you do not believe any more? Why have you stopped believing those ideas?
- Has a story or an individual ever caused you to change your mind about some belief?
- What do you think the grandmother in the story means when she says, “*But when you get to be my age, you’ll think that maybe Mikey knows something, too!*”?

References

- Bickart, J. (2020a). *Bickart’s Just-in-Time Fables (Volume 1)* (Vol. 1). Asheville, NC: Red Shirt Interactive Group.
- Bickart, J. (2020b). *Bickart’s Just-in-Time Fables (Volume 2)* (Vol. 2). Asheville, NC: Red Shirt Interactive Group.
- Bickart, J. (2020c). *Bickart’s Just-in-Time Fables (Volume 3)* (Vol. 3). Asheville, NC: Red Shirt Interactive Group.