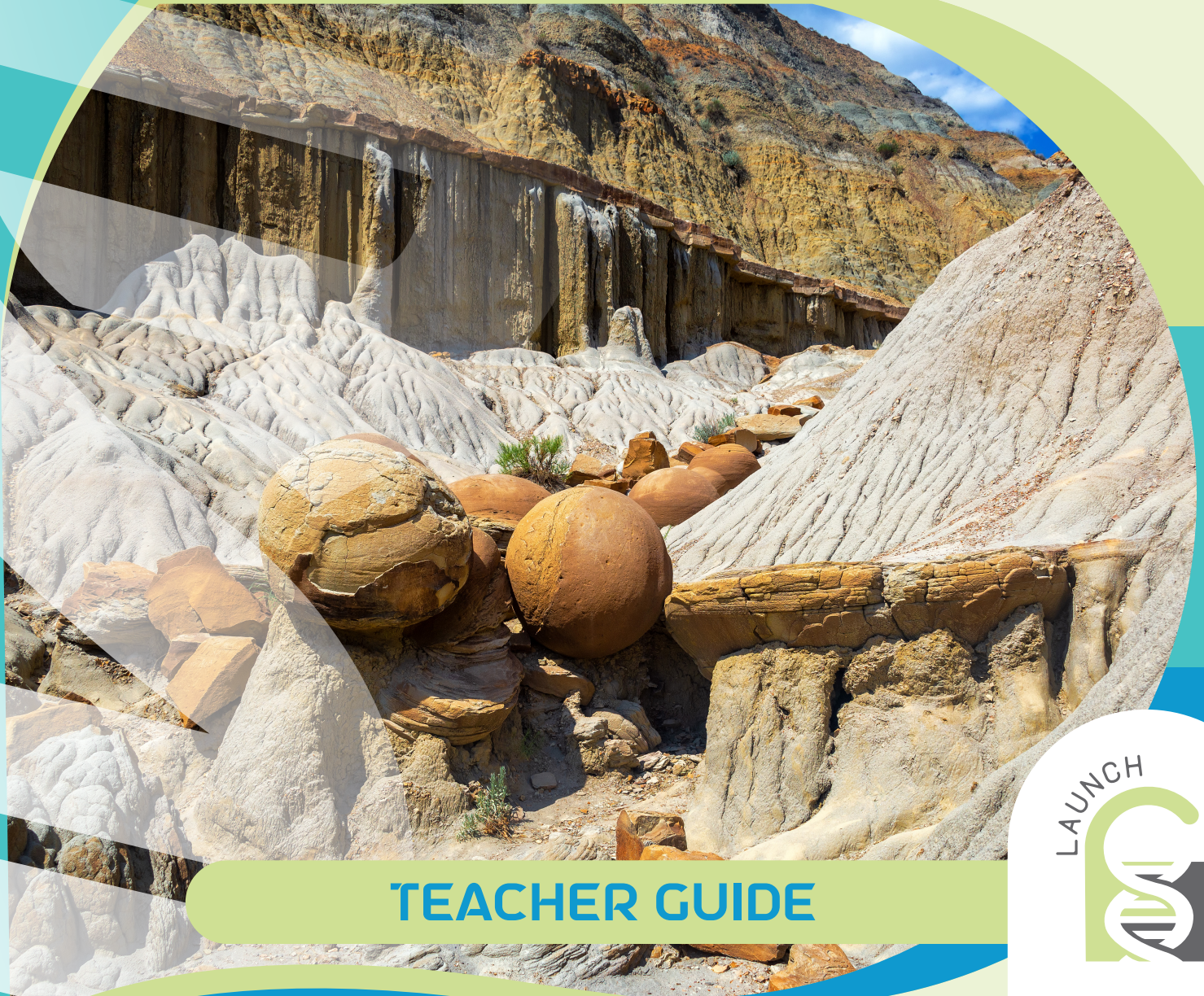


READING THE ROCKS



TEACHER GUIDE

LAUNCH



PLANNING

Here's a suggested schedule for this kit! The activities are designed to be completed in order, but you can decide when to do them over time. Required times are estimated.

ACTIVITY INFORMATION	SECTION (S)	TIME REQUIRED	DAY/ LESSON
ACTIVITY 1: EARTH'S HISTORY MYSTERY Sit back and read some stories to find out what geologists really do. Time required: 1 h	☐ Delightful Discoveries	60 minutes	Day 1
ACTIVITY 2: HIDDEN STORIES Make a model of rock layers to really dig into stratigraphy. Time required: 3 h	☐ Crayon Layers	75 minutes	Day 2
	☐ How to Read...Rocks	75 minutes	Day 3
	☐ Show What You Know	30 minutes	Day 4
ACTIVITY 3: EARLY EARTH Learn what Earth was like in its early days, including how the moon was made. Time required: 3 h	☐ Long Ago	90 minutes	Day 5
	☐ Making of the Moon	90 minutes	Day 6
ACTIVITY 4: A CHEMICALLY CHANGING EARTH Experiment with rusty nails to learn the roles of iron and oxygen in our understanding of Earth's history. Time required: 3 h	☐ Living and Non-Living	60 minutes	Day 7
	☐ Oxygen on Earth	120 minutes	Day 8
ACTIVITY 5: PAST AND PRESENT Think about how paleogeology fits into today's society in terms of the process of science and how it affects people. Time required: 5 h	☐ It's a Process	90 minutes	Day 9
	☐ People and the Past	90 minutes	Day 10
	☐ Scientific Article Study	120 minutes	Day 11
ACTIVITY 6: KEEP ON READING Extend your learning about rocks and early Earth. Time required: 30+ min	☐ It Must Rust!	90 minutes	Day 12
	☐ Say Hello to Cyanobacteria	90 minutes	Day 13
	☐ Super Study	30 minutes	Day 14

Total time: 15+ hours

CRAYON LAYERS

PREPARATION AND SUPERVISION

- In this hands-on activity, your student will model the process of rock layer formation using melted crayons.
- A model allows a student to understand and even manipulate a representation of a process or system.
- This will lead to a better understanding of the laws of stratigraphy when they read about them in the next section.
- You can assist your student with using the microwave to melt the crayons. Be sure they are patient and only microwave for the time indicated instead of trying to make it go faster by putting it in for a continuous period.



WARNING!

Sharp objects can cause injury. Don't cut or poke yourself.



THINK ABOUT IT!

? Question 1: How can the positions of rock layers be used to determine the rock layers' ages relative to each other? Use evidence from your model to support your ideas.

Answer:

- Rock layers that are on the bottom and have not been disturbed are older than the layers on top of them.
- In the model, wax layers that were laid down first (or were older) are the ones that show up on the bottom of the stack of layers.

How to Help:

- *Allow the student to simulate this part of the experiment or act it out so they understand how a layer must exist before something is added to it.*
- *If they are still struggling, you can use an analogy from the kitchen such as making a sandwich, layer cake, or lasagna.*

? Question 2: Think about the pebble you placed between the third and fourth layers. Was it older or younger than the third layer? What about the fourth layer? Explain.

Answer:

- The pebble was older than the third layer but younger than the fourth layer.
- The pebble was already present in the layers before the fourth layer formed, but it was laid down on top of the already-existing third layer.

HOW TO READ...ROCKS

Rock Laws

- This section details the laws of stratigraphy or "reading rocks."
- The laws may have scientific-sounding names, but each one relies only on logic such as whether something must exist before it can be built upon, intruded on, or broken.
- The following vocabulary terms are defined: strata, rock cycle, stratigraphy, rock record, Law of Original Horizontality, Law of Lateral Continuity, Law of Superposition, Law of Including Fragments, magma, intrusions, Law of Cross-Cutting Relationships, and the Law of Faunal Succession.

EARLY EARTH

Your student learned that rock layers reveal what happened to a specific region over time. Rock layers can also provide clues — and raise questions — about how Earth formed and what happened on Earth in its earliest days.

LEARNING GOALS:

- ✓ I can use evidence from rocks and minerals to describe the formation of Earth and its early history.

LONG AGO

6

Absolute Age

- In Activity 2, your student learned how stratigraphy is used in determining the relative ages of rocks. Now, they will find out how the absolute ages of rocks are determined.
- The following vocabulary terms are introduced: absolute age, radiometric dating, half-life, paleogeology, and geochronology.
- A brief overview of radiometric dating is provided.
 - A common misconception about radiometric dating is that it is unreliable. However, research has reliably shown that the rate of radioactive decay is constant even when people attempt to change it using various methods and conditions (such as changing the temperature, pressure, or water content). Therefore, the rate of radioactive decay is a valid indicator of how much time has passed since an object was formed.
- An example of the Grand Canyon is used to show how relative age and absolute age are often considered at the same time to solve a problem.



THINK ABOUT IT!

? Question 1: Why do you think many geologists use both stratigraphy and radiometric dating when possible?

Answer:

- Stratigraphy is used for determining relative age, while radiometric dating is used in determining absolute age.
- Relative dating can narrow down the possible range of ages and also help to build a complete geological history of an area.
- Absolute dating can determine the age of an entire set of rock layers or help place rocks and other objects that are no longer part of the strata.

How to Help:

- *You can use an analogy with your student by asking them to imagine a group of children (such as themselves and their family members or friends).*
 - *If they were to try to write a story about when they were all born, they would use a combination of finding out who is older and younger than others and when their birthdays are.*
 - *If they only knew who is older and younger, they would be unable to say how old the oldest and youngest ones are.*
 - *If they only knew birthdates and did not put them in order, they would lack a cohesive story.*



© Home Science Tools. All rights reserved.
Reproduction for personal or classroom use only.

Contact us at: www.homesciencetools.com/customer-service/

A Product of Homesciencetools.com

Kit	SU-READRK
Instructions	IN-READRKT
Revision Date	5/2021