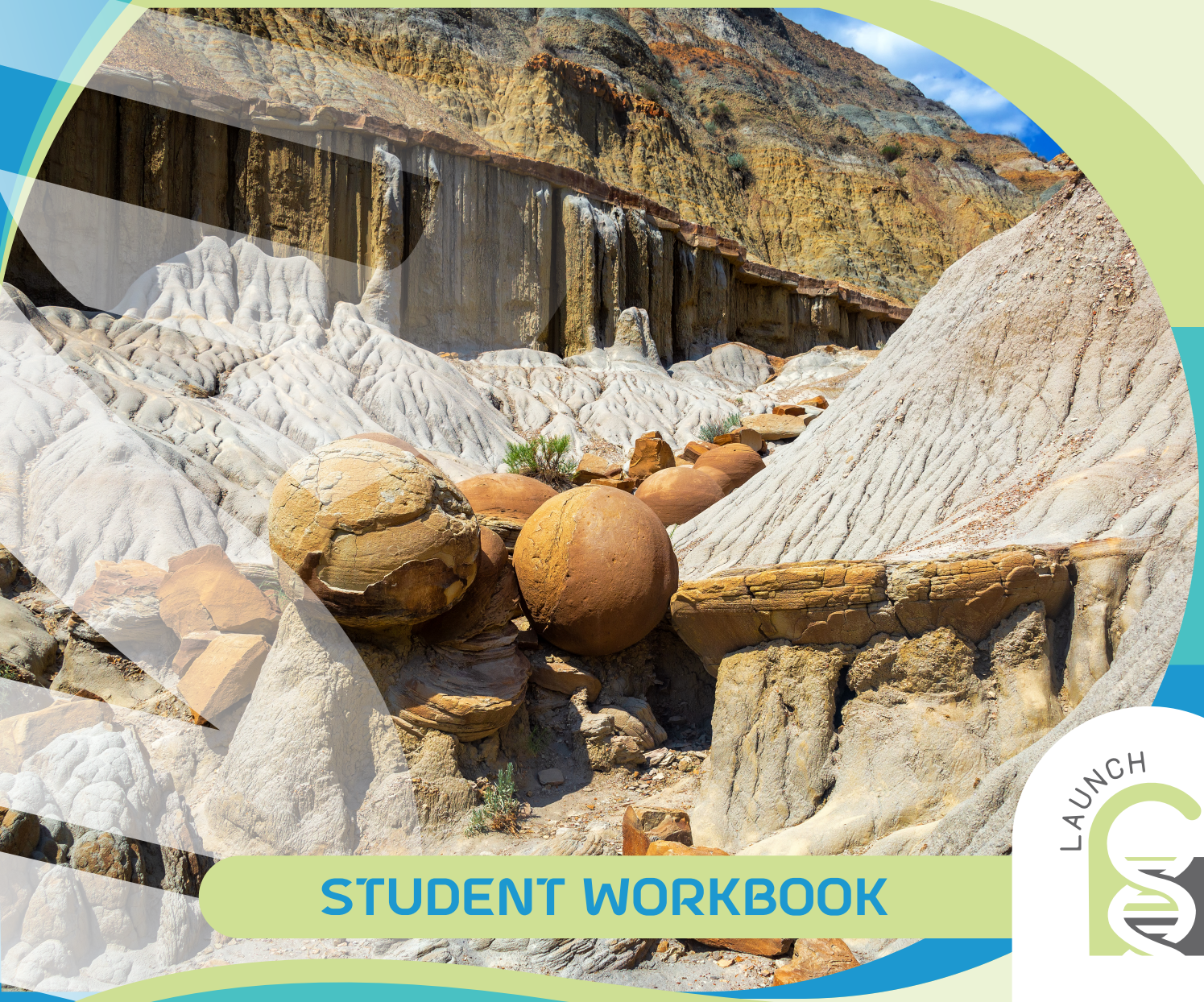
READING THE ROCKS



STUDENT WORKBOOK

LAUNCH

ACTIVITY 1

EARTH'S HISTORY MYSTERY

Sit back and read some stories to find out how geologists make exciting discoveries about Earth's past just by analyzing rocks and the objects and minerals in them.

1 DELIGHTFUL DISCOVERIES

One of the most fun parts of science is thinking about things in a different way – whether they are everyday objects, subjects we think are boring, or things we just take for granted.

What are your thoughts and feelings about these three categories?

ROCKS	GEOLOGISTS	HOW EARTH HAS CHANGED OVER TIME

Throughout this kit, you will learn more about all three of these categories, and hopefully it will allow you to think more deeply about what they are like, how they are connected, and what they have to do with your own life.

In this first activity, let's look at some situations in which geologists have made some important discoveries in rocks that changed how they thought about Earth's history.

OBSERVATION VS. INTERPRETATION

Throughout this kit, you will be presented with several instances of observation and interpretation, and it is important to understand the difference. Observation is the act of noticing or measuring something. Interpretation is the assigning of meaning to observations to explain something that happened. Think about what the geologists profiled in this activity were doing. Were they observing, interpreting, or both?

STORY 3: THE ALVAREZES AND THE IRIDIUM LAYER

Sometimes, geology discoveries are family events. Luis Alvarez was a physicist, not a geologist. In fact, he won a Nobel Prize in Physics in 1968 for designing a liquid hydrogen bubble chamber that allowed people to observe and measure interactions between electrically charged particles. Luis Alvarez had a son who was a geologist, Walter Alvarez, and they were both working at the University of California in 1980 when they went on a geology expedition to Italy.[5]

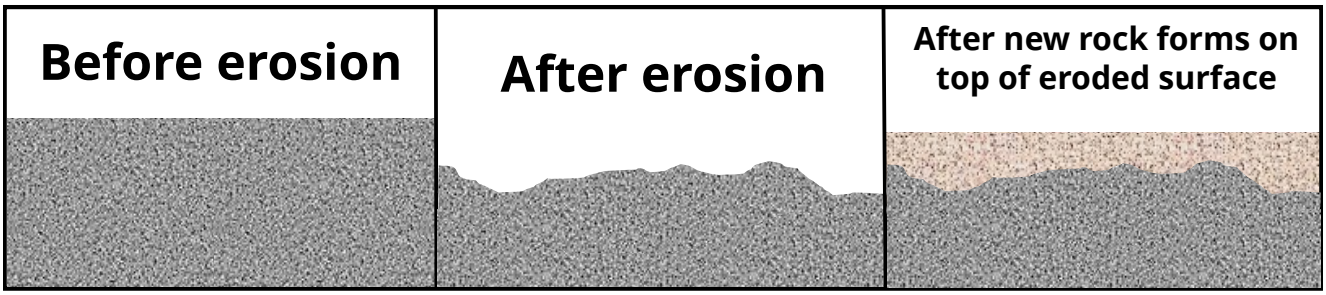
Along with their colleagues Frank Asara and Helen Michel, Luis Alvarez and Walter Alvarez spotted a thin layer of clay rocks in the rock layers they were studying. When they analyzed a sample of the rock, they found that it was rich in the element iridium. Iridium is not very common on Earth, but it is common on meteorites, asteroids, and comets.

The rock layer happened to be from about 65 million years ago, the time around when scientists at the time believed the dinosaurs went extinct. So, what did this mean? The Alvarez team proposed that the great dinosaur extinction was caused by an impact from an asteroid or comet. The iridium layer they discovered has since been found all over the world, indicating such an impact was a global event.

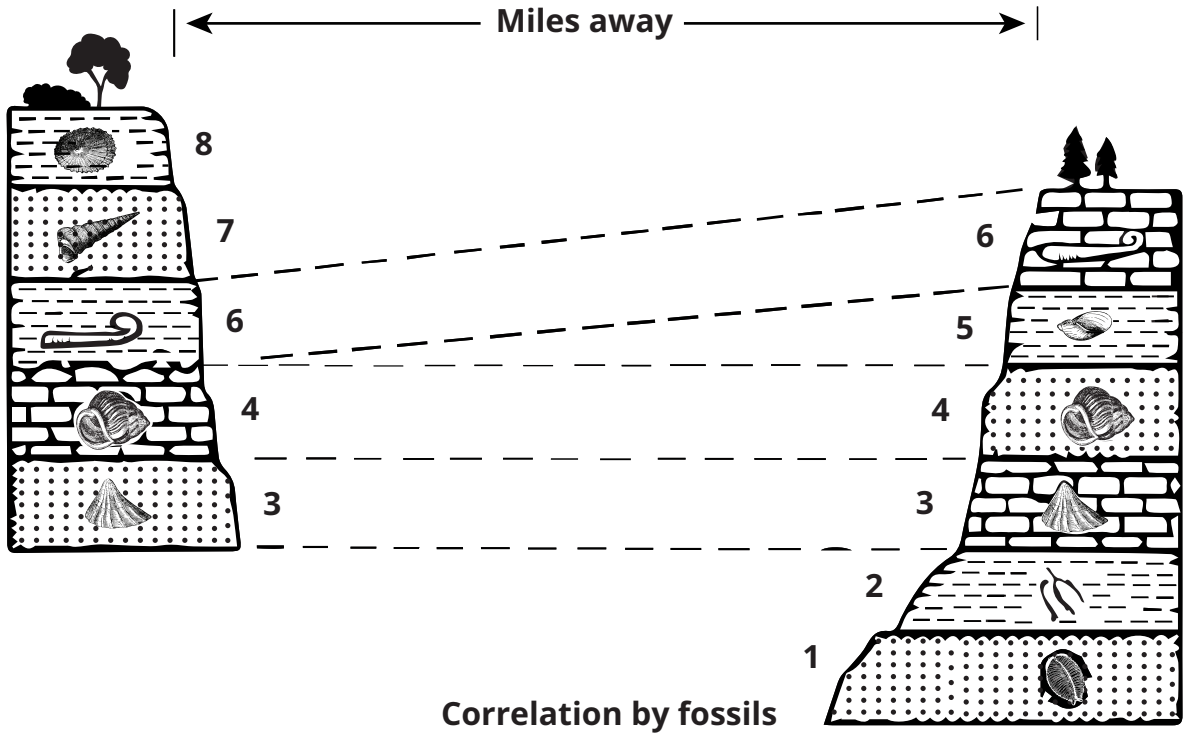
When Layers Are Not Flat

You may have noticed that in most of the photos of rock strata, the boundaries between layers are uneven or "messy" looking. Sometimes, the layers can also look tilted or folded. Although layers form in flat, horizontal layers, they can be affected by changes that happen later. These changes are called **unconformities** and may include several types of deformation, uplift, and erosion.

The most common type of unconformity results from erosion. Sedimentary rock layers on the surface (the youngest layers) can experience erosion from wind, water, glaciers, or gravity. This erosion causes the layer to have an uneven appearance. Layers that form on top of it form in horizontal flat layers, but the boundary between them and the eroded layer appears uneven or worn.



Erosion can even wear away whole layers in some areas, which may cause layers to be "missing" in the rock record. Stratigraphers must use the law of lateral continuity to compare that local strata to others that still have that layer if they want to determine what that layer was like. This is possible because the geologic histories of two areas may be similar but slightly different, with a relatively recent erosion event happening to one but not the other.



The Law of Faunal Succession is a helpful tool in determining how to match up rock layers from different regions when some layers are not present in one of the areas.

LAUNCH

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Kit	SU-READRK
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