

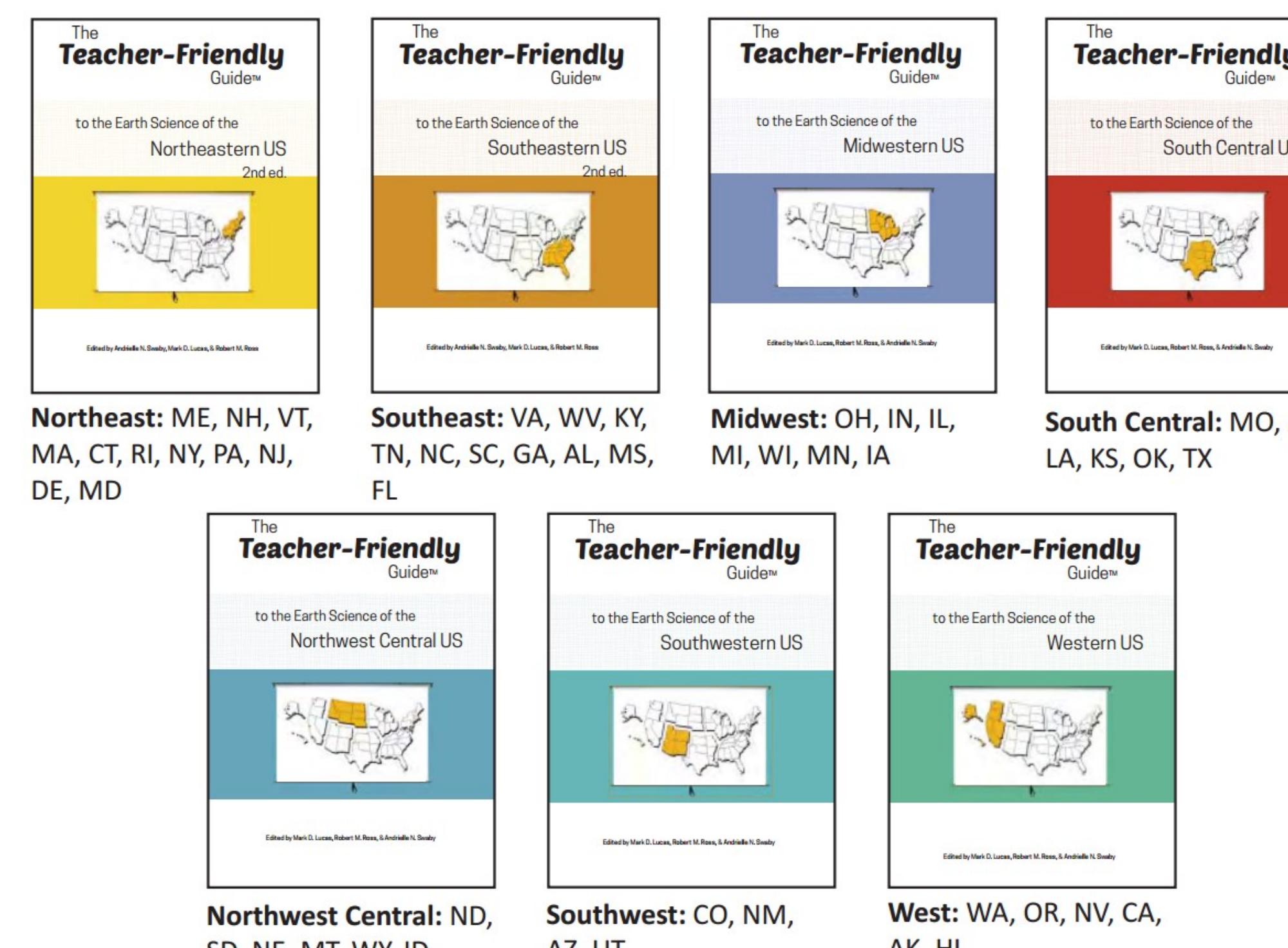
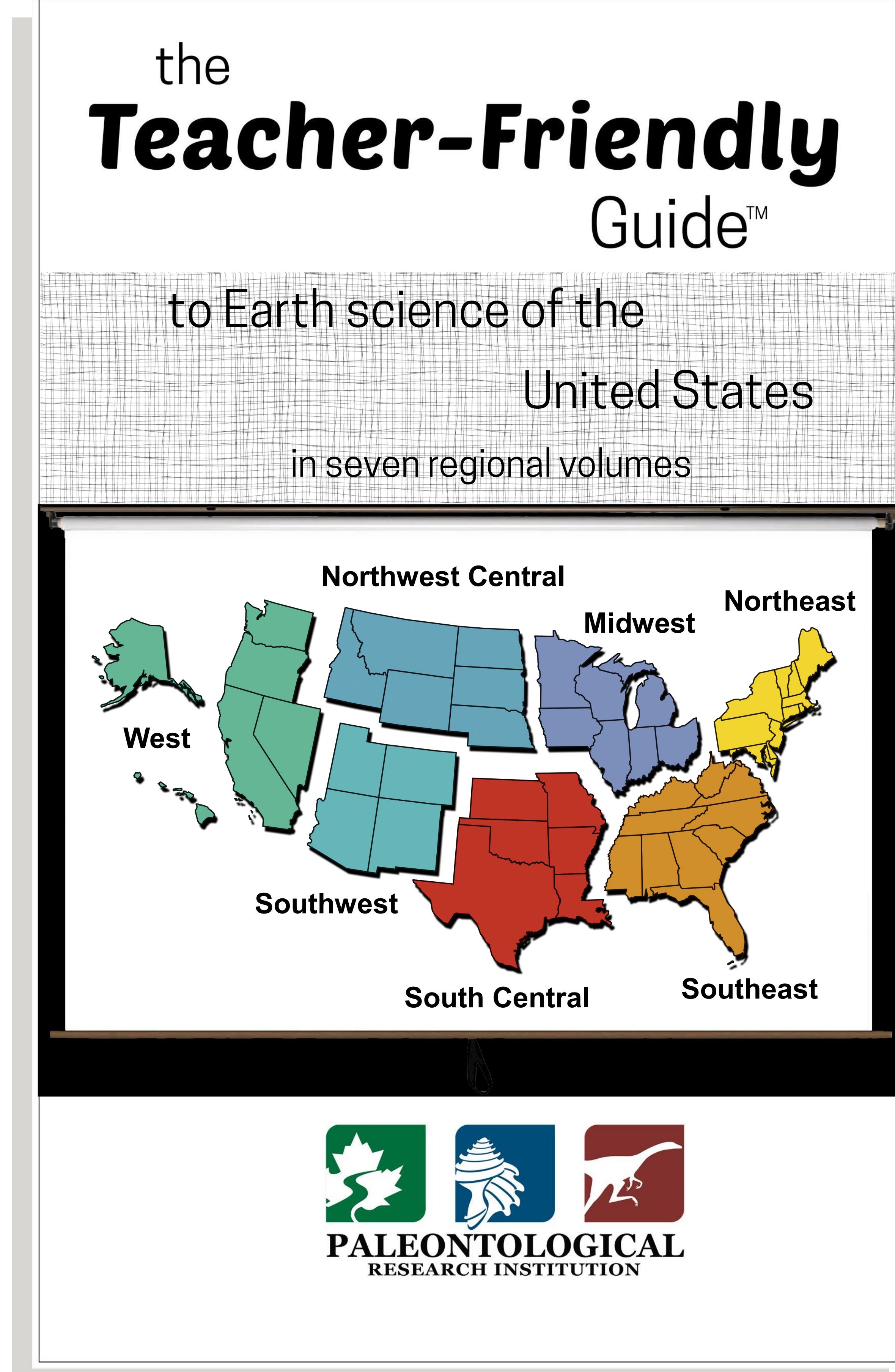
# A NEW NATIONAL SERIES OF “TEACHER-FRIENDLY GUIDES” TO REGIONAL EARTH SCIENCE: CONTENT FOR PLACE-BASED APPROACHES TO EARTH SYSTEM SCIENCE EDUCATION

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A deep understanding of why a place looks the way it does requires understanding of core ideas from several disciplines, application of cross-cutting concepts (such as scale, models, energy and matter, stability and change), and use of a variety of scientific and engineering practices. Thus place-based Earth system science is an outstanding case for full application of the three dimensions of the Next Generation Science Standards. In principle, **much of an Earth science curriculum could be taught through the lens of repeated reference to familiar local sites and sites approximately a day's drive from school.**

A stumbling block to such an approach is lack of teacher familiarity with the real-world Earth science around them, particularly for teachers teaching out-of-field and those with little previous fieldwork experience. **To meet this need, we have constructed a complementary program of “teacher-friendly” guides to regional Earth science ([teacherfriendlyguide.org](http://teacherfriendlyguide.org)) and uses of “virtual fieldwork” ([virtualfieldwork.org](http://virtualfieldwork.org)).**

The Teacher-Friendly Guides to regional Earth science consists of a set of seven Guides together covering all 50 states. Each Guide begins with cross-cutting Big Ideas, followed by a chapter on the geological history of the region: this set of concepts and major historical events together can explain many of the features of any given region, such as distribution of landforms, rock types, fossils, mineral resources, Earth hazards, and so on, each of which is represented by a chapter.



Each volume is available in three convenient forms at

[teacherfriendlyguide.org](http://teacherfriendlyguide.org):

- as hyperlinked webpages in color (free)
- as pdf downloads in color (free)
- as black-and-white printed books (for purchase)

Each Guide ends with a chapter on fieldwork, covering both basic concepts on doing fieldwork and ways to bring field exploration back to the classroom in the form of “virtual techniques” such as zoomable panoramic images, maps, and data.

To learn more about virtual fieldwork, visit  
[virtualfieldwork.org](http://virtualfieldwork.org).

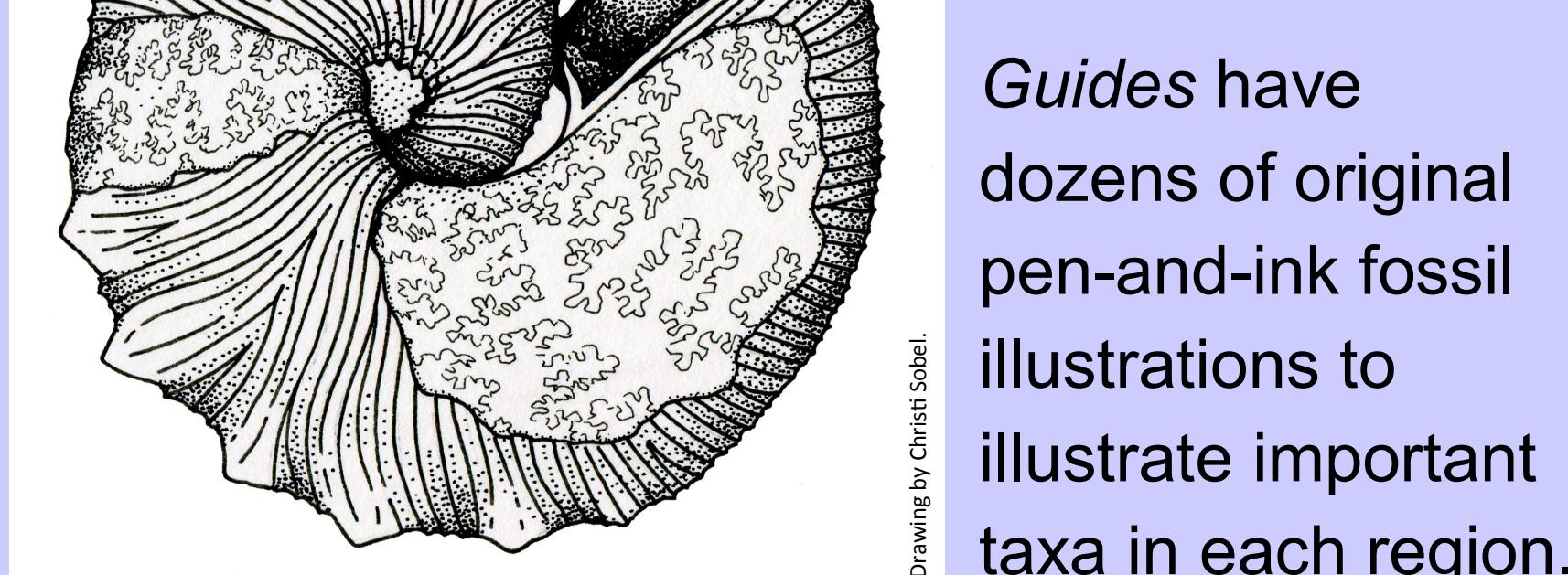
**Big Ideas & NGSS:** Each Guide begins with a chapter on Big Ideas in Earth system science and ends with an appendix on the Next Generation Science Standards. The first chapter of each Guide is about geologic history, because that history explains the geographic distribution of many other Earth science features within the region.

**Resource lists:** Every chapter includes a list of resources, both general and specific to the area of the Guide. Each Guide also contains a comprehensive glossary at the end, and a list of general resources such as books and maps that cover the geology of the US and the geographic area of the Guide.

## Chapters include:

- Geologic History
- Rocks
- Fossils
- Topography
- Mineral Resources
- Glaciers
- Energy
- Soils
- Climate
- Earth Hazards

Definitions of geological terms as they appear, & roll-over definitions on the website version



Guides have dozens of original pen-and-ink fossil illustrations to illustrate important taxa in each region.

**Teacher-Friendly Guides** are designed to make it easy to find information and illustrations as teachers need them.

Clear chapter page icons and headings

## 2 Rocks

### Regions 1–3

**reef** • a feature lying beneath the surface of the water, which is a buildup of sediment or other material built by organisms, and which has positive relief from the sea floor

**oil** • See petroleum. A naturally occurring, flammable liquid found in geologic formations beneath the Earth's surface and consisting primarily of hydrocarbons

**fault** • a fracture in the Earth's crust in which the rock on one side of the fracture moves measurably in relation to the rock on the other side.

**amphibole** • a group of dark colored silicate minerals, or either igneous or metamorphic origin.

**craton** • the old, underlying portion of a continent that is geologically stable relative to surrounding areas.

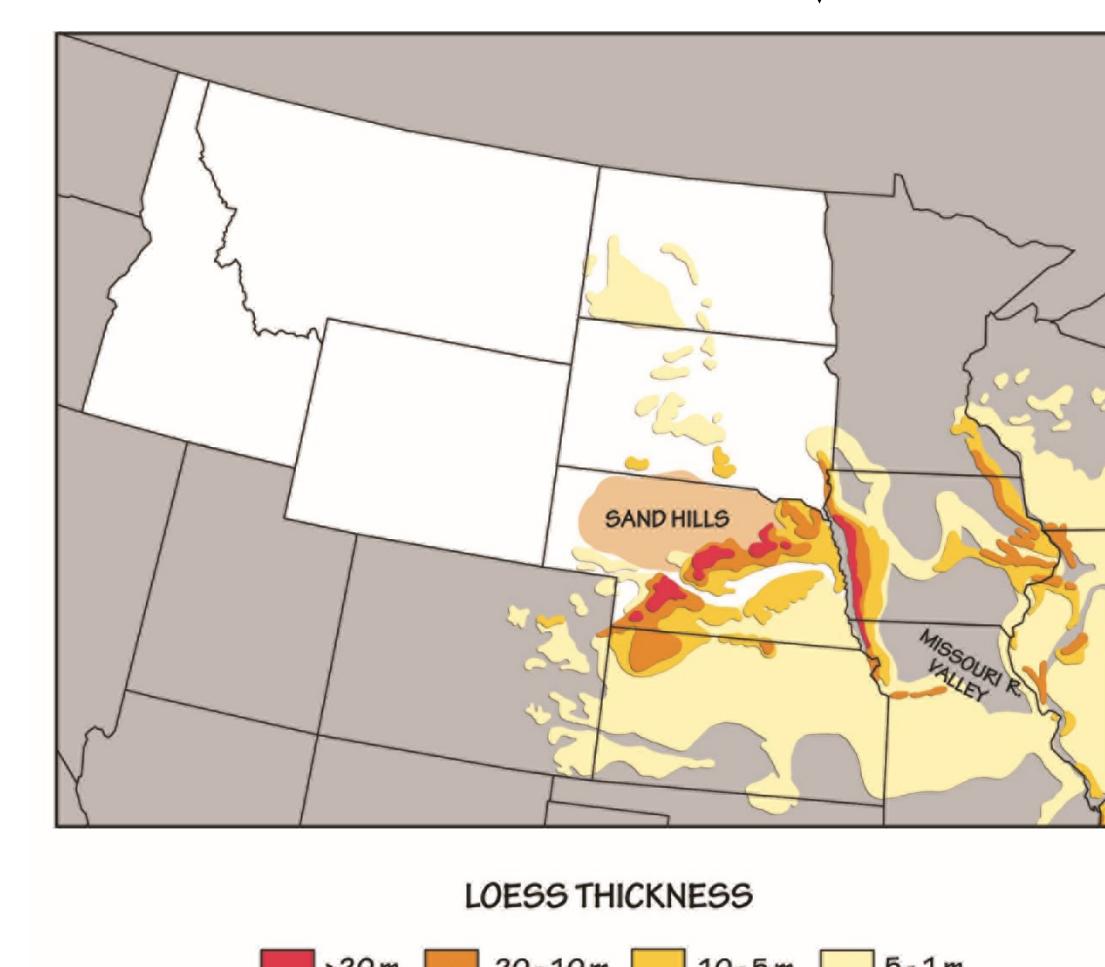


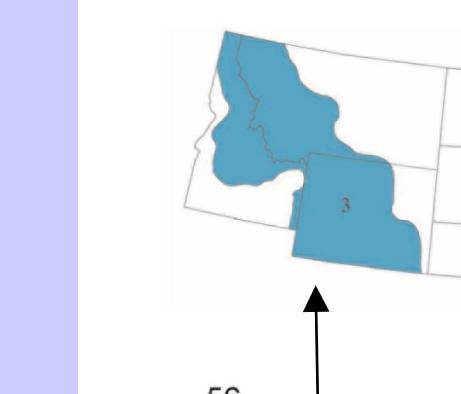
Figure 2.17: Loess deposits in the central US. (See TFG website for full-color version.)

### Rocks of the Rocky Mountains Region 3

The rocks of the Rocky Mountain region are the most varied in the Northwest, ranging from Archean gneisses—some of the oldest rocks found in the US—to Paleozoic reefs, oil shales, volcanic fields, and glacial till. This great variety of rock types is mainly a result of the Laramide and Sevier orogenies, which uplifted numerous discrete blocks of terrain along thrust faults that accommodated compressional shortening and thickening of the crust. The overlying sediments were subsequently eroded to expose deeper Precambrian rock, as well as Mesozoic and Paleozoic sedimentary formations. The thrust-faulted uplift also produced adjacent basins, which subsequently accumulated sediments eroded from the surrounding mountains.

The oldest rock found so far in the Rocky Mountain region is a 3.65- to 3.8-billion-year-old granite gneiss found in the Wind River Range. Other Archean-aged rocks, including gneisses, amphibolites, schists, and iron formations, are found throughout the uplifted ranges of Wyoming, Montana, and Idaho, including

See Chapter 1: Geologic History to learn more about mountain building during the Laramide and Sevier orogenies.



Map showing region of discussion

Cross-referencing throughout the Guide

Guides contain photographs of selected localities & specimens.



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