Big Ideas

Resources

Books


Websites

*Exploring Geoscience Methods with Secondary Education Students*, by J. Ebert, S. Linneman, & J. Thomas,
Resources

General Books on Geologic History


General Websites on Geologic History

*Color-coded Continents!, US Geological Survey,* http://geomaps.wr.usgs.gov/parks/pltec/scpsselai.html. (Reconstructions of color-coded continental motions from 620 million years ago through the present; maps from C. Scotese.)

*Earth Viewer*, by BioInteractive at Howard Hughes Medical Institute, http://www.hhmi.org/biointeractive/earthviewer. (Free iPad app; an interactive paleogeographic atlas of the world; state and country overlays allows tracking the development of the Western States.)


*Paleogeography*, by R. Blakey, https://www2.nau.edu/rcb7/RCB.html. (The older, but free, version of the site.)


*Tour of Geologic Time*, University of California Museum of Paleontology, http://www.ucmp.berkeley.edu/help/timeform.php. (Online interactive geologic calendar exhibit.)

Geologic History of the Northwest Central


### Activities


Resources

Rock and Mineral Field Guides


General Books and Websites on Rocks


Rocks of the Northwest Central

Fossils

Resources

General Books on the Fossil Record and Evolution


Guides to Collecting and Identifying Fossils

Fossils of the Northwest Central


Fossils of the States of the Northwest Central


Idaho


Montana

University of Montana Paleontology Center, http://www.cas.umt.edu/paleontology/.

Nebraska
Discover your County's Fossils! A Virtual Journey Through the Paleontology Collections of the University of Nebraska State Museum, http://museum.unl.edu/research/vertpaleo/recounties/.

North Dakota

South Dakota

Wyoming
Resources

Books


Maps

*Color Landform Atlas of the US*, http://fermi.jhuapl.edu/states/states.html. (Low resolution shaded relief maps of each state.)

Websites

*OpenLandform Catalog, Education Resources*, OpenTopography, http://www.opentopography.org/index.php/resources/lidarlandforms. (High resolution topographic images that may be useful in teaching.)
*Teaching Geomorphology in the 21st Century*, On the Cutting Edge, Strong Undergraduate Geoscience Teaching, SERC, http://serc.carleton.edu/NAGTWorkshops/geomorph/index.html. (A set of resources for college level, some of which may be adaptable to secondary education.)

State-based Resources

Resources

Books and Articles


Websites

Handbook of Mineralogy, http://www.handbookofmineralogy.org. (Technical information on 420 minerals available as free individual pdfs.)

Mineral Data, Hudson Institute of Mineralogy, http://www.mindat.org. (Claims to be the world’s largest public database of mineral information.)


Minerals of the Northwest Central


See also Resources in Chapter 2: Rocks.
Resources

General Books on Glaciers


General Websites on Glaciers


Glaciers in the Northwest Central


Glacial Features of North Dakota, North Dakota State University, [https://www.ndsu.edu/nd_geology/nd_glacial/index_glacial.htm](https://www.ndsu.edu/nd_geology/nd_glacial/index_glacial.htm).


Resources

General Books on Energy


Richards, J., 2009, Wind Energy, Macmillan Library, South Yarra, Victoria, Canada, 32 pp. (For primary school age.)


General Websites on Energy

Energy Resources in the Northwest Central


**Resources**

**General Books and Articles on Soils**


**General Websites on Soils**


*Soil Survey Reports* (by state and county/parish), The Cooperative Soil Survey, [http://soils.missouri.edu/survey/selectstate.asp](http://soils.missouri.edu/survey/selectstate.asp)

*Soil Sustains Life*, Soil Science Society of America, [https://www.soils.org](https://www.soils.org)


*The Twelve Soil Orders Soil Taxonomy*, University of Idaho College of Agricultural and Life Sciences, [http://www.cals.uidaho.edu/soilorders/](http://www.cals.uidaho.edu/soilorders/)


**Soils of Specific Parts of the Northwest Central**


*Formation of the Nebraska Sand Hills*, by John W. Zupancic, 2001, [http://academic.emporia.edu/aberjame/student/zupancic2/Page1_home.htm](http://academic.emporia.edu/aberjame/student/zupancic2/Page1_home.htm)


*North Dakota's The Hell Creek Delta*, North Dakota Geological Survey, [https://www.dmr.nd.gov/ndfossil/Poster/FoxHills/Fox%20Hills.pdf](https://www.dmr.nd.gov/ndfossil/Poster/FoxHills/Fox%20Hills.pdf)


Resources

General Books and Articles on Climate


General Websites on Climate


Climate has Changed Throughout Earth’s History, National Park Service, http://nature.nps.gov/geology/nationalfossilday/climate_change_earth_history.cfm.


Global Climate Change: Vital Signs of the Planet, National Aeronautics and Space Administration, http://pmm.nasa.gov/education/websites/global-climate-change-vital-signs-planet. (Information about global climate change, including spectacular satellite images.)


Climate

Resources


Weatherunderground Maps, http://www.wunderground.com/maps. (A variety of types of weather maps, including surface, temperature, moisture, wind, cloud cover, precipitation.)

State- or Region-specific Climate Resources


Climate Change and Idaho, Environmental Protection Agency EPA 236-F-98-007f, September 1998, 4 pp., http://nepis.epa.gov/Exe/ZyPDF.cgi/40000PRA.PDF?Dockey=40000PRA.PDF.

Climate Change & The Data: Climate Change in Montana, http://deq.mt.gov/ClimateChange/Data/ClimateChangeInMontana.mcpx.


Climate Change and the Data, Climate Change in Montana, http://deq.mt.gov/ClimateChange/Data/ClimateChangeInMontana.mcpx.


Earth Hazards

Resources

General Resources


NASA Earth Observatory Natural Hazards Map, http://earthobservatory.nasa.gov/NaturalHazards/.


General Resources for Specific Areas of the Northwest Central


Floods


Earth Hazards

Tornados


Expansive soils


Landslides


Earthquakes

Earth Hazards

Resources

Volcanoes


Radon


Radon (Rn), United States Environmental Protection Agency (EPA), http://www.epa.gov/radon/; (Includes state radon maps with county-level data, http://www.epa.gov/radon/whereyoulive.html.)

Earth Hazards Teaching Resources


Resources

Field Geology Teaching Practices

Teaching in the Field, National Association of Geoscience Teachers, [http://nagt.org/nagt/teaching_resources/field/index.html] (Set of resources for teaching field geology.)

Guides to Fieldwork
(Mostly focused on post secondary education, but useful as references)

Coe, A., T. Argles, D. Rothery, and R. Spicer, 2010, Geological Field Techniques, Wiley-Blackwell, Chichester, UK, 336 pp. (This is a current standard.)
How to Read a Geologic Map, Wisconsin Geological and Natural History Survey, [http://wgrhs.uwex.edu/wisconsin-geology/bedrock-geology/read-geologic-map/]
Appendix

Resources

Following are some of the most commonly used and cited publications on science education standards and benchmarks.


Common Core State Standards Initiative, http://www.corestandards.org. (While not focused on science education directly, standards on math and non-fiction reading impact are importantly related.)


NGSS@NSTA Website, National Science Teacher Association, http://ngss.nsta.org/.

General Resources

On the Earth System Science of North America

Books and Websites

Maps (printed)

Maps (online)

Other General Resources on Earth System Science

Geologic time resources online
Janke, P. R., 2013, Correlated History of the Earth Chart (laminated), vol. 8, Pan Terra, Hill City, SD.
Dictionaries

Earth System Science Organizations
American Geological Institute, http://agiweb.org. (AGI is an umbrella organization representing over 40 other geological organizations.)
Natural Resources Conservation Service, http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/. (NRCS helps US farmers, ranchers and forest landowners conserve soil, water, air, and other natural resources.)
Paleontological Research Institution, http://priweb.org. (Publisher of this volume.)

General Earth Science Education Resources

Websites
Resources for Earth Science and Geography Instruction, by Mike Francek, Central Michigan University, http://webs.cmich.edu/ressci/.
SERC (The Science Education Resource Center) K-12 resources, http://serc.carleton.edu/k12/index.html. (Hundreds of classroom activities organized by grade level and topic as well as guidance on effective teaching.)
SERC Earth Exploration Toolbook, http://serc.carleton.edu/eet/index.html. (Collection of online Earth system science activities introducing scientific data sets and analysis tools.)

Science education organizations
National Association of Geoscience Teachers, http://nagt.org. (Focuses on undergraduate geoscience education, but includes active secondary school educators.)
Resources by State

Geologic maps of individual US states. (Digital geologic maps of US states with consistent lithology, age, GIS database structure, and format.)

Idaho
Books, Articles, and Maps

Websites
Columbia River Basalt Group Stretches from Oregon to Idaho, US Geological Survey,
Craters of the Moon National Monument and Preserve, Idaho,
Idaho Geology: A Convergence of Wonders, Idaho State Board of Education,

Montana
Books and Articles

Websites
Montana’s Earth Science Pictures, http://formontana.net/. (Run by an Earth science teacher. Includes both photos and good information.)

Nebraska
Books and Articles
Carlson, M. P., 1993, Geology, Geologic Time and Nebraska (EC-10), University of Nebraska, Lincoln, NE, 59 pp.
**Nebraska** During the Cenozoic Era, by Tracy D. Frank, [http://eas2.unl.edu/~tfrank/History%20on%20the%20Rocks/Nebraska%20Geology/Cenozoic/cenozoic%20web/1/Nebraska%20During%20the%20Cenozoic%20Era.html](http://eas2.unl.edu/~tfrank/History%20on%20the%20Rocks/Nebraska%20Geology/Cenozoic/cenozoic%20web/1/Nebraska%20During%20the%20Cenozoic%20Era.html).


**North Dakota**

**Books and Articles**

**Websites**
- Geology in North Dakota: Resources for Students, Teachers, Geologists, and the Public, North Dakota State University, [https://www.ndsu.edu/nd_geology/](https://www.ndsu.edu/nd_geology/).

**South Dakota**

**Books and Articles**

**Websites**
- Jewel Cave National Monument, South Dakota, [http://www.nature.nps.gov/geology/parks/jeca/index.cfm](http://www.nature.nps.gov/geology/parks/jeca/index.cfm).
- Mount Rushmore National Memorial, South Dakota, Park Geology, [http://www.nature.nps.gov/geology/parks/moru/](http://www.nature.nps.gov/geology/parks/moru/).

**Wyoming**

**Books and Articles**
Websites
The Teacher-Friendly Guide™
to the Earth Science of the Northwest Central US

Edited by Mark D. Lucas, Robert M. Ross, & Andrielle N. Swaby

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