

Project Ideas for Earth Science: Forces That Shape the Earth

Place-based education involves students in local culture, ecology, landscapes, opportunities, and experiences so that they can connect the science concepts they are learning to something that they know already, and to something that matters to them. Research shows that place based education helps students learn, invites students to become active citizens, transforms school culture, and connects schools with the community*. These project ideas are included to get teachers and students thinking about ways to make science education relevant to the place in which they live. This is only a starting place; the list is certainly not exhaustive, and teachers are invited to continue adding, sharing, and building the list.

These ideas were developed with the Yukon Flats School District in mind. Other districts using the SCAN curriculum resource should adapt the list of ideas to fit their own district and region.

*Place-based Education Evaluation Collaborative. 2010. The Benefits of Place-based Education: A Report from the Place-based Education Evaluation Collaborative (Second Edition). Retrieved 5/16/11 from <http://tinyurl.com/PEECBrochure>.

Project Idea: Mapping

What are some examples of questions students can investigate, and projects students can do, related to forces that shape the earth?

Learn to read and use topographic maps by doing orienteering exercises. Set up courses for others to follow.

Learn to use a compass and/or a GPS with a topographic map to navigate on land and on the river.

Find out the native names for local topographic features and landforms. Make a map featuring place names, using GIS technology if possible.

Use part of a topographic map of your area to make a 3-D model.

Delineate your watershed on a topographic map.

Make maps that show where different species of plants and animals occur.

Find out how engineers, biologists, meteorologists, geologists, and other scientists use maps.

Learn to use a GPS by geocaching.

Possible Resources:

Map Teach Project <http://www.mapteach.org/>

Orienteering information <http://www.4orienteering.com/>

How to Read a Map <http://www.map-reading.com/intro.php>

Land Navigation <http://www.map-reading.com/chap9.php>

Map Reading and Land Navigation http://www.wildernessmanuals.com/manual_1/index.html

Topographic Map Symbols <http://egsc.usgs.gov/isb/pubs/booklets/symbols/>

USGS Topographic Maps <http://topomaps.usgs.gov/>

What is GIS <http://conversecounty.org/gov-admin/gis/whatisgis.html>

Geocaching <http://www.geocaching.com/>

Alaska Satellite and GIS Data <http://www.gina.alaska.edu/>

Connections to other units and concepts: Year 1 Life Science Biodiversity (species mapping) Year 1 Earth Science Water Cycle (watershed mapping), Year 2 Life Science Interdependence

Project Idea: Changes in the topography

What are some examples of questions students can investigate, and projects students can do, related to the forces that shape the earth?

Identify landforms in your area that were formed by permafrost. Create a photographic guide to permafrost landforms.

Identify landforms (such as oxbow lakes) that were formed by the river.

Make models of landforms

Study aerial and satellite photographs to determine how the landscape has changed in recent years.

How does the landscape change when permafrost thaws?

How is an ice cellar built? How do changes in permafrost affect ice cellars?

Are there and lakes or ponds near your village that are disappearing? Why is that happening?

How has the river changed course over time? What is the topography at the head of the river? What is the topography at its mouth?

How has the river shaped the land around your village? Can you identify areas of erosion and areas of deposition?

Possible Resources:

High-Altitude Aerial Photography http://gcmd.nasa.gov/records/GCMD_EARTH_LAND_USGS_AK_HI_ALT_PHOT.html

Alaska Satellite and GIS Data <http://www.gina.alaska.edu/>

Rivers Landscapes and Processes <http://www.bbc.co.uk/schools/gcsebitesize/geography/riverswater/>

Ice Wedges, Polygons, and Pingos <http://arctic.fws.gov/permcycl.htm>

UAF Permafrost Outreach /Tunnel Man <http://ine.uaf.edu/werc/projects/permafrost/>

Connections to other units and concepts: Year 1 Earth Science, Rock Cycle, Water Cycle

Project Idea: Geologic Hazards

What are some examples of questions students can investigate, and projects students can do, related to forces that shape the earth?

What causes a landslide? Can you find examples of landslides in your village or along the river?

Where and when have earthquakes occurred in your region?

Create an earthquake preparedness plan for your village

How could ash from volcanoes impact your village?

What are ice jams and ice dams?

Can floods be predicted? How is the likelihood of flooding determined?

How can you prepare for or mitigate the effects of flooding?

What are hazards (sandbars, etc.) you might encounter when navigating the river?

What is a sinkhole and how does it form?

Find out about liquefaction– what happens when silt liquefies and what are the hazards associated with it?

What can make slopes unstable?

What hazards should be considered when locating a home or a building?

Possible Resources:

Alaska Earthquake Information Center <http://www.aeic.alaska.edu/>

Guide to Geologic Hazards in Alaska

http://www.dggs.dnr.state.ak.us/index.php?menu_link=engineering&link=geohazards&sub_link=hazards

Connections to other units and concepts: Year 1 Physical Science Properties of Matter (Ash), Year 1 Water Cycle