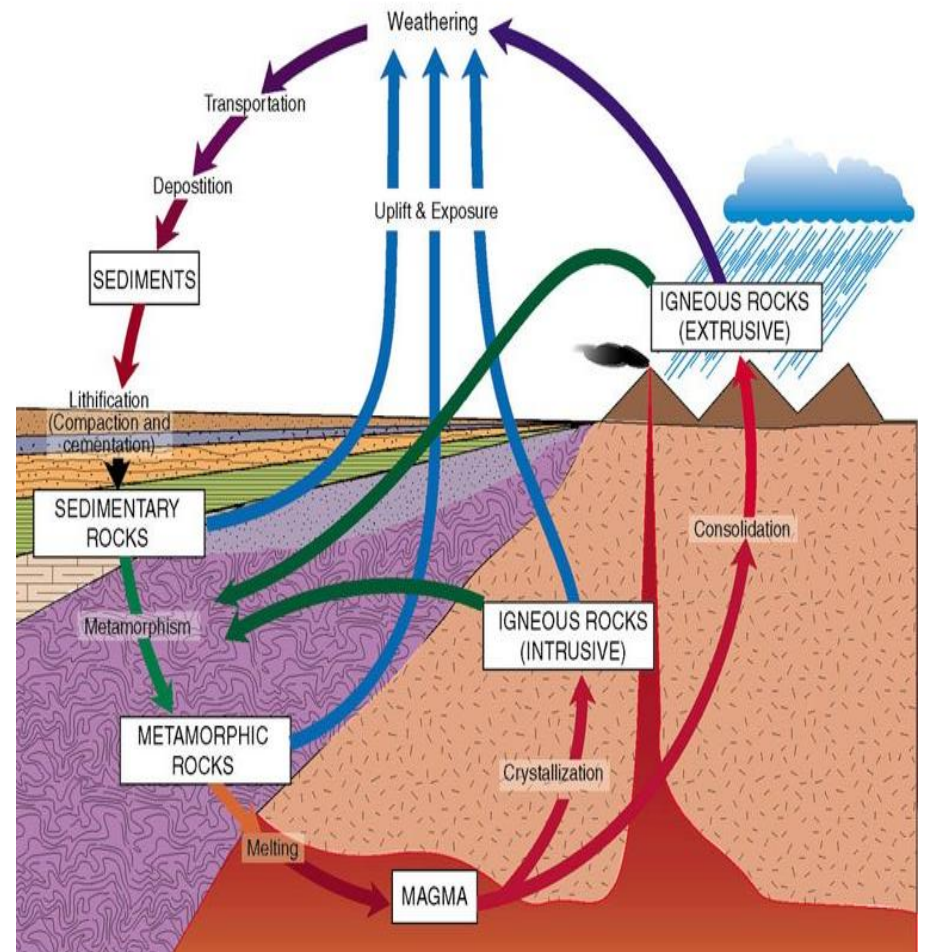


MY ROCK ID BOOK

Name: _____



The Rules

Oregon is composed of diverse geologic features. You can find unique rocks everywhere. But before you go, remember these simple rules:

1. **Always be respectful of protected and private land.** Collecting is not allowed in national parks, monuments and forests nor on Native American Reservations. You may not collect on private property without permission. It is your responsibility to contact BLM, state and local parks to determine if collecting is permissible at a given location.
2. **Fossils are protected.** It is illegal to collect vertebrate fossils on public land. You'll need to check the regulations for each area you visit when collecting invertebrate fossils and petrified wood.
3. **Remember your gear.** Always take gloves, a rock hammer, eye protection, hats, sunblock, and ample water for both drinking and rinsing your rocks.
4. **Dig carefully.** Don't take more than you need and pick up your trash.
5. **Know the potentially dangerous minerals.** Certain rocks contain arsenic, asbestos, lead, mercury and antimony or are radioactive. Know before you go.

Igneous Rocks

Igneous rocks are formed from the solidification of molten rock material. There are two basic types.

Intrusive igneous rocks crystallize below Earth's surface, and the slow cooling of the **magma** there allows large crystals to form. Examples of intrusive igneous rocks are diorite, gabbro, and granite.

Extrusive igneous rocks erupt onto the surface, where the **lava** cools quickly to form small crystals. Some cool so quickly that they form an amorphous glass. These rocks include andesite, basalt, obsidian, pumice, rhyolite, scoria, and tuff.

Porphyry refers to large-grained crystals (commonly feldspar or quartz) that are dispersed in a fine-grained silicate rich matrix. Larger crystals are called phenocrysts.

And Educational Display Exhibit relating to Geology could include polished, cut specimens, growing crystals, volcanoes, effects of weathering, geologic formations, time periods, etc. Educational display may not exceed 30" in width, 24" deep (front to back) and 36" high. Include explanation to the judge as outlined under Educational Display in fair book.

421 200 011 Geology Project Display, Junior

421 200 012 Geology Project Display, Intermediate

421 200 013 Geology Project Display, Senior

421 200 014 Geology Project Display, Club (two or more members working together)

Score card for Geology Educational exhibit will be the Educational Display Check Sheet (000-02), available at the County Extension office or on the State 4-H website at:
<http://oregon.4h.oregonstate.edu/special-events/state-fair/cm-natural-sci>

Recommended references for identification of specimens: National Audubon Society Field Guide to Rocks and Minerals of North America and Dictionary of Geological Terms, American Geological Institute, written by Robert L. Bates and Julia A. Jackson. Any identification of specimens using other sources is subject to disqualification by the judge.

Rock Box Instructions

At least 50% of the specimens must have been found by the exhibitor and at least five of the specimens collected during the current 4-H year. Put an asterisk on the label in front of the name of each specimen collected during the current 4-H year. The asterisk helps the judge determine if your display meets the criteria. Only the current 4-H year's specimens should have an asterisk. Polished or cut specimens must be exhibited under Geology Educational Display, with the exception of geodes specimens only which may be cut, but NOT POLISHED as part of a collection. Judging criteria are outlined on the Geology Exhibit Score Card (421-01), available at the county Extension office or on the State 4-H website at: <http://oregon.4h.oregonstate.edu/node/1857>

A Specimen Collection Geology Site Analysis Sheet is required for each specimen in Intermediate and Senior Geology collections. One sheet needs to be filled out for each of the new specimens collected for the current year. It is available on line at <http://oregon.4h.oregonstate.edu/node/1857>. Attach the completed sheets to the bottom of the collection box in an unsealed envelope for the judge to read at fair. See 4-H Geology Manual for further exhibit requirements.

421 100 011 Geology, Junior First Year Member, 10 specimens.

421 100 021 Geology, Junior Second and Third Year Member, 15 to 20 specimens.

421 100 012 Geology, Intermediate First Year Member, 15 to 25 specimens.

421 100 022 Geology, Intermediate Second and Third Year Member, 20 to 35 specimens.

421 100 013 Geology, Senior First Year, 20 to 40 specimens.

421 100 023 Geology, Senior Other Member, 25 to 50 specimens.

Andesite

- Fine-grained
- Usually light to dark gray, but can weather to various shades of brown.
- Rich in plagioclase and feldspar.
- Found in much of the Cascade Range



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Soapstone

- Composed primarily of talc.
- Feels soft and comes in white to gray, shades of green and yellow to brown.
- Found along rivers in Josephine County.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Diorite

- Salt and pepper appearance
- Rich in plagioclase, with lesser amounts of hornblende and biotite
- Intrusive version of Andesite
- Common along the Cascade Range and nearby rivers.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Gabbro

- Coarse-grained
- Black or dark green
- Rich in plagioclase and augite
- Intrusive version of Basalt
- Found at Mary's Peak



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Slate

- Fine-grained
- Composed of clay and micas and occur in sheet-like formations.
- Found in the Roseburg area.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Schist

- Composed of plate-shaped mineral grains result is a network of interlocking quartz grains of incredible strength.
- Commonly found along beaches and riverbanks.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

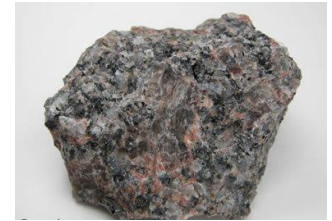
Location: _____

GPS: _____

Notes: _____

Granite

- Coarse-grained
- Red, pink, gray or white coloration with large dark mineral grains
- Rich in quartz and feldspar
- Found in road cuts and rivers along the Cascade Mountain Range.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Obsidian

- Amorphous volcanic glass
- Usually dark-colored
- Found at Little Glass Butte



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Quartzite

- Forms when sandstone is altered by metamorphic activity. The silica cements the sand grains together in a network of interlocking quartz grains of incredible strength.
- Commonly found east of Paulina and in the Wallowa Mountains.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Gneiss

- Forms by intense heat and pressure that causes the mineral grains to recrystallize into larger grains and segregates them into bands.
- Commonly found along beaches and riverbanks.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Pumice

- Amorphous glass
- Porous, lightweight, floats
- Usually light-colored: white, tan, light gray
- Found at Little Glass Butte



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Rhyolite

- Fine-grained
- Usually light-colored, pink or gray. Often contains vesicles that fill in with secondary minerals
- Found all along the Cascade Mountain Range



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Petrified A fossil formed when minerals in solution are deposited in the spaces between and within the cells of buried plant or animal remains. As the cells completely decompose, minerals fill the remaining gaps. The most common minerals in **petrified fossils** are quartz, calcite and iron compounds.



Metamorphic Rocks

Metamorphic rocks have been modified by heat, pressure, and chemical processes, usually while buried deep below Earth's surface. Exposure to these extreme conditions has altered the mineralogy, texture, and chemical composition of the rocks.

Foliated metamorphic rocks such as gneiss, schist, and slate, and soapstone have a layered or banded appearance that is produced by exposure to heat and directed pressure.

Non-foliated metamorphic rocks such as quartzite do not have a layered or banded appearance.

Fossils

Fossils are special sedimentary rocks that preserve the impressions or remains of organisms.



Imprint A fossil impressions formed from an organism leaving behind a trace or track. These tracks are preserved when the clay/silt dries slowly and is covered by other sediment. Plants can also leave imprint

fossils when they are covered by sediment. The plant tissue degrades, leaving an imprint of where the leaf once was.

Mold A fossil formed when sediment fills the inside or covers the outside of a dead organism, and the organism's remains decay leaving just the shape and texture of the animal in the rock.



Cast A fossil formed when minerals fill the cavity of a mold fossil and preserve a 3-dimensional replica of the original organism.



Scoria

- Very fine-grained (need a hand lens to see crystals)
- Porous, lightweight, does not float
- Usually dark-colored: black, dark gray, deep reddish brown.
- Commonly forms in cinder cone eruptions where gas bubbles permeate the basaltic magma near Prineville and Madras.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Tuff

- Compacted rock, ash and magma that may contain dust-size to boulder-size particles
- Formed when ejecta produced by a volcanic eruption cement together
- Found near Pleasant Valley and Little Glass Butte.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Shale

- Composed of silt and clay particles that have been cemented and compacted into a rock.
- Fissile - splits into pieces along the lamination layers
- Found near Roseburg.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Siltstone

- Composed of silt-sized particles that have been cemented and compacted into a rock.
- Comes in red, orange, yellow, green, purple, brown, gray, black and white.
- Commonly found around Roseburg.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Sedimentary Rocks

Clastic sedimentary rocks such as breccia, conglomerate, sandstone, siltstone, and shale are formed from mechanical weathering debris.

Chemical sedimentary rocks, such as rock salt, iron ore, chert, some dolomites, and some limestones, form when dissolved materials precipitate from solution.

Organic sedimentary rocks such as coal, some dolomites, and some limestones, form from the accumulation of plant or animal debris.

Breccia _____:

- Composed of large angular fragments particles (larger than two millimeters in diameter) cemented in a matrix of smaller particles or a mineral cement
- Found near rivers in Western Oregon.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Chert

- Composed of microcrystalline silicon dioxide (SiO₂)
- Breaks in conchoidal fractures
- Commonly found along the Coast Range in southwestern Oregon.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Sandstone

- Composed of sand-sized grains of mineral, rock or organic material that has been “cemented” and compacted together.
- Found all along the Pacific Coast



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Limestone

- Forms from shell and coral debris. It can also be a chemical sedimentary rock formed by the precipitation or evaporation of calcium carbonate water.
- Found near Huntington in Baker County.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

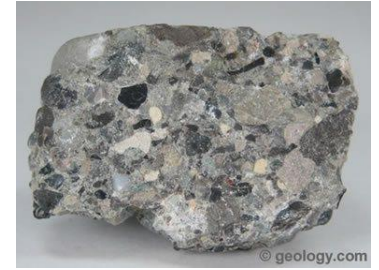
Location: _____

GPS: _____

Notes: _____

Conglomerate

- Composed of large rounded fragments particles (larger than two millimeters in diameter) cemented in a matrix of smaller particles or a mineral cement
- Found near rivers in Western Oregon.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Dolomite

- $\text{CaMg}(\text{CO}_3)_2$
- Soluble in dilute hydrochloric acid.
- Found in Grant County



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____

Iron Ore

- Composed of iron oxide: hematite (Fe_2O_3) and magnetite (Fe_3O_4) are important to iron and steel production
- Found all over Oregon. Tiny magnetite crystals may be collected by running a magnet over gravel or sand.



Specimen 1

Date found: _____

Location: _____

GPS: _____

Notes: _____

Specimen 2

Date found: _____

Location: _____

GPS: _____

Notes: _____
