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Iowa Rocks, Minerals, & Fossils

I. Rock Types & Geologic History

1. Identify the difference between a mineral and rock.

Mineral - naturally occurring, inorganic solid with a definite composition and an orderly arrangement of atoms

Rock - composition of many minerals ~~or~~ and/ once-living organisms derived from the crust of the Earth

2. Identify the three types of rocks that can form and examples of types found in Iowa.

1. Igneous Rock - solidification of molten material from within the Earth
   Examples : Granite, Gabbro, Basalt
2. Sedimentary Rock - transportation, accumulation, & deposition of sediments
   Examples : Limestone, Sandstone, Shale
3. Metamorphic Rock - formed by alteration of rocks by pressure, heat, or both
   Examples : Quartzite

3. Describe the geologic history of igneous rock formations in Iowa.

Glacial Plucking

- Only found beneath sedimentary rock layers + glacial deposits at great depths. Large deposit within 100 ft. of surface in Pocahontas County. Most igneous rocks are large boulders brought by glaciers during Great Ice Age

4. Describe the geologic history of sedimentary rock formations in Iowa.

When glaciers covered Iowa, they left behind huge loads of clay, sand, gravel, + boulders - known as glacial drift (500-600 ft. thick in some places - most less than 200 ft.)

Driftless Area - glacial drift removed due to erosion (northeastern Iowa)

5. Describe the geologic history of metamorphic rock formations in Iowa.

The only metamorphic rock is quartzite, which is located in Lyon County.

- one of the hardest types of rocks
- solid quartz mass of cemented sand by silica

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II. Iowa Minerals & Rocks

1. Identify the name of each type of mineral and common uses.

1. Calcite - common mineral made of lime and carbon dioxide ($CaCO_3$)
   Uses : part of limestone + marble (construction, acid neutralizer, monuments)
2. Chert - variety of quartz with non-visible crystal structures
   Uses : arrowheads, stone tools, fire-starter
3. Galena - chief source of lead (lead sulfide); found in the Dubuque vicinity
   Uses : batteries, lead shot, lead sheeting
4. Gypsum - hydrous calcium sulfate mined near Burlington & Fort Dodge
   Uses : Sheetrock, plaster, paints, tile, soil neutralizer
5. Limonite - hydrous iron oxide; north of Waukon & south of Guthrie Center
   Uses : pigment, iron ore (low quality)
6. Pyrite - commonly known as "fool's gold"; common throughout the state
   Uses : sulfuric acid production, ornamentals, jewelry
7. Quartz - most common mineral of the state; composed of silicon dioxide
   Uses : glass-making, abrasive, crystal oscillators (watches, clocks, tv, computers, cell phones)
8. Sphalerite - most common zinc ore; a.k.a. - zinc blende, black-jack, mock-lead
   Uses : galvanized iron, brass, batteries, polished gemstone

2. Identify the name of each type of igneous rock and common uses.

1. Basalt - fine-grained dark gray or black; originally molten lava
   Uses : road base, concrete aggregate, asphalt pavement
2. Granite - consists of quartz, feldspar, & biotite mica; generally light-colored
   Uses : buildings, bridges, monuments, countertops, floor tile
3. Gabbro - darker & heavier than granite; contains iron minerals but no quartz
   Uses : ornamental stones, paving stones, countertops

3. Identify the name of each type of sedimentary rock and common uses.

1. Coal - plant material that accumulated in marshy areas and later covered
   Uses : electricity generation, steel production, cement, fuel
2. Chalk - fine-grained variety of limestone; soft enough to soil the fingers
   Uses : pH neutralizer, antacids, cleaner, polisher, toys
3. Conglomerate - cementation of rounded pebbles, cobbles, & boulders of sand or sil
   Uses : concrete aggregate, (not widely used)

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4. Dolomite - similar to limestone but more porous (fossil shells removed)

Uses : acid neutralization, feed additive, flux, (glass, bricks, ceramics)

5. Limestone - made of calcium carbonate; lime mud or cemented fossil shells

Uses : building material, glass + cement component, gravel roads

6. Oolitic Limestone - unusual variety of limestone resembling fish roe

Uses : quicklime (steel-making), slaked lime (sewage treatment), cement, mortar

7. Sandstone - cemented sand grains of quartz, silica, CaCO3, or iron oxide

Uses : ornamental fountains/statues, asphalt concrete

8. Shale - consolidated clay or mud; often splits into sheets

Uses : additive to cement + art clay products; landscaping

9. Siltstone - cemented silt; more fine-grained than sandstone / coarser than shal

Uses : road aggregate, curbing, decoration, facing stone

Not common construction materials.

4. Identify the name of each type of <u>metamorphic rock</u> and common uses.

1. Gneiss - foliated rock in which layers are of different mineral composition

Uses : flooring, countertops, gravestones, ornamental stones

2. Quartzite - quartz rock transformed from sandstone by cementation with silica

Uses : countertops, flooring, roof tiles, railway ballast (rail between tiers)

3. Schist - closely spaced foliated planes than gneiss; splits into flaky slabs

Uses : construction aggregate, building stone, decorative sto

III. Iowa Fossils

1. Define the term fossil.

99.9% of all organisms are extinct

<u>Fossil</u> - preserved or mineralized remains or imprint of an organism that lived long ago

(Preservation = Ice, Tree Sap, Peat Bogs, Tar Pits, Quicksand)

2. List nine examples of common <u>invertebrate</u> fossils found in Iowa.

1. Brachiopods 2. Bryozoans 3. Conodonts
4. Corals 5. Crinoids 6. Graptolites
7. Mollusks (Cephalopods, Gastropods) 8. Sponges 9. Trilobites

3. List nine examples of common <u>vertebrate</u> fossils found in Iowa.

1. Early Bear 2. Bison 3. Early Caribou
4. Fish Teeth 5. Early Elk 6. Early Horse
7. Mammoth (Teeth + Tusks) 8. Mastodon (Teeth + Tusks) 9. Early Musk Ox

Early Peccary