

HUDSONVILLE HIGH SCHOOL COURSE FRAMEWORK



COURSE / SUBJECT

Earth Science A

KEY COURSE OBJECTIVES/ ENDURING UNDERSTANDINGS Important ideas and core processes	UNIT PACING Names of units and approximate pacing	UNIT LEARNING TARGETS By the end of the unit, students will be able to...	STANDARD Which standards (i.e. common core, MMC, etc.) does this address?
<p>Minerals and natural resources are integrated throughout our society. How we acquire, use, reuse, and recycle them affects our world.</p>	<p>Unit 1: Mineral Resources 3 weeks</p>	<p>Understand/explain the following ideas/terms: Mineral luster streak hardness density cleavage fracture renewable non-renewable fossil fuels hydrocarbon coal formation peat lignite bituminous coal/anthracite petroleum and natural gas formation permeable, porous oil trap, source rock cap rock impermeable reservoir rock, tar sands oil shales ore/ mineral deposit igneous process hydrothermal process placer deposit nonmetallic mineral resources building material/ industrial material Alternate Energy (Advantage/Disadvantage) solar photovoltaic nuclear fission Uranium 235 hydroelectric Geothermal/hydrothermal</p>	<p>E2.2B Identify differences in the origin and use of renewable (e.g., solar, wind, water, biomass) and nonrenewable (e.g., fossil fuels, nuclear [U-235]) sources of energy</p> <p>E2.4A Describe renewable and nonrenewable sources of energy for human consumption (electricity, fuels), compare their effects on the environment, and include overall costs and benefits.</p> <p>E2.4d Describe the life cycle of a product, including the resources, production, packaging, transportation, disposal, and pollution.</p>

<p>Knowing how rocks form, what they are made of, and chemical make up are important for a complete understanding of how are world works.</p>	<p>Unit 2: The Rock Cycle 3 weeks</p>	<p>Understand/explain the following ideas/terms rock igneous sedimentary metamorphic intrusive extrusive crystal granitic andesitic basaltic ultramafic felsic mafic porphyritic phenocryst texture coarse-grained fine-grained glassy weathering erosion deposition lithification compaction cementation clastclastic sed rock chemical sed rock biochemical sed rock ripple marks mud cracks fossils metamorphism heat pressure reaction in solution contact metamorphism regional metamorphism Foliated non-foliated The rock cycle</p>	<p>E3.1A Discriminate between igneous, metamorphic, and sedimentary rocks and describe the processes that change one kind of rock into another.</p> <p>E3.1B Explain the relationship between the rock cycle and plate tectonics theory in regard to the origins of igneous, sedimentary, and metamorphic rocks.</p> <p>E3.1c Explain how the size and shape of grains in a sedimentary rock indicate the environment of formation (including climate) and deposition.</p> <p>E3.1d Explain how the crystal sizes of igneous rocks indicate the rate of cooling and whether the rock is extrusive or intrusive.</p> <p>E2.1e Explain how the texture (foliated, nonfoliated) of metamorphic rock can indicate whether it has experienced regional or contact metamorphism.</p>
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How the Earth moves and shifts creates hazards and surface features

Unit 3: Plate Tectonics
3 Weeks

Understand/explain the following ideas/terms:
layers by composition
crust
mantle
core
Layers by physical properties
Lithosphere
athenosphere
lower mantle
inner core
outer core moho
discovering layers with seismic waves
Earth composition
Plate Tectonics: continental drift
pangaea
Matching fossils
rock types
ancient climates
rejection of Wegener's hypothesis
sea-floor spreading
SONAR
Deep-Ocean Trench
Mid-Ocean Ridge
Rift Valley
Composition of Ocean Floor
Process of Sea-floor spreading
Eruptions/Movement/
subduction
Evidence of Sea-floor spreading
Magetic strips
Paleomagnetism
Earthquake patterns
Plates
Convection Currents
Divergent
convergent
O-C,O-O, C-C
Continental
Volcanic Arc
Volcanic Island Arc
Transform
stick-slip
Mechanisms of Plate Motion
Slab-pull
Ridge-Push
Mantle Plume

E3.3A
Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface.

E3.3B
Explain why tectonic plates move using the concept of heat flowing through mantle convection, coupled with the cooling and sinking of aging ocean plates that results from their increased density.

E3.3C
Describe the motion history of geologic features (e.g., plates, Hawaii) using equations relating rate, time, and distance.

E3.3d
Distinguish plate boundaries by the pattern of depth and magnitude of earthquakes.

E3.r3e
Predict the temperature distribution of the lithosphere as a function of distance from the mid-ocean ridge and how it relates to ocean depth.

E3.r3f
Describe how the direction and rate of movement for the North American plate has affected the local climate over the last 600 million years.

E3.2A
Describe the interior of the Earth (in terms of crust, mantle, and inner)

<p>It is important to understand how the movement of the earth causes hazards, which affect many of the societies in our world.</p>	<p>Unit 4: Earthquakes & Volcanoes 3 Weeks</p>	<p>Understand/explain the following ideas/terms: earthquake, fault, focus epicenter seismic waves offset/displaced, uplift fault scarp san andreas fault fault creep elastic rebound hypothesis aftershock/foreshock, body waves P-waves,S-waves, surface waves (L-wave) SeismographsSeismogram Travel Time graph Intensity magnitude richter scale moment magnitude modified mercalli scale seismic shaking liquefaction landslide/ mudflow, tsunamis seismic gap cross-braces base-isolators origin of magma, heat friction mantle rising mantle pressure decompression melting convergent boundaries divergent boundaries intraplate volcanism hot spot, Viscosity compostion, temperature dissolved gases lava flows, pahoehoe, Aa Pyroclastic materials volcanic ash shield volcano Cinder Cone caldera volcanic neck batholith pluton</p>	<p>E3.4A Use the distribution of earthquakes and volcanoes to locate and determine the types of plate boundaries.</p> <p>E3.4B Describe how the sizes of earthquakes and volcanoes are measured or characterized.</p> <p>E3.4C Describe the effects of earthquakes and volcanic eruptions on humans.</p> <p>E3.4d Explain how the chemical composition of magmas relates to plate tectonics and affects the geometry, structure, and explosivity of volcanoes.</p> <p>E2.2C Describe natural processes in which heat transfer in the Earth occurs by conduction, convection, and radiation.</p> <p>E3.4e Explain how volcanoes change the atmosphere, hydrosphere, and other Earth systems.</p> <p>E3.4f Explain why fences are offset after an earthquake using the elastic rebound theory.</p>
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