Oakwood City School District
Earth Resources Science Standards

One goal of science education is to help students become scientifically literate citizens able to use science as a way of knowing about the natural and material world. All students should have sufficient understanding of scientific knowledge and scientific processes to enable them to distinguish what is science from what is not science and to make informed decisions about career choices, health maintenance, quality of life, community and other decisions that impact both themselves and others.

Earth Resources is a high school level course, which satisfies the Ohio Core science graduation requirements of Ohio Revised Code Section 3313.603. This section of Ohio law requires three units of science. Each course should include inquiry-based laboratory experience that engages students in asking valid scientific questions and gathering and analyzing information.

Earth Resources incorporates chemistry, physics and environmental science and introduces students to key concepts, principles and theories within geology. Investigations are used to understand and explain the behavior of nature in a variety of inquiry and design scenarios that incorporate scientific reasoning, analysis, communication skills and real-world applications.

Earth Resources Standards

Minerals

A. Atoms and elements
B. Chemical bonding (ionic, covalent, metallic)
C. Crystallinity (crystal structure)
D. Criteria of a mineral (crystalline solid, occurs in nature, inorganic, defined chemical composition)
E. Properties of minerals (hardness, luster, cleavage, streak, crystal shape, fluorescence, flammability, density/specific gravity, malleability)

Igneous, Metamorphic and Sedimentary Rocks

A. Igneous
    a. Mafic and felsic rocks and minerals
    b. Intrusive (igneous structures: dikes, sills, batholiths, pegmatites)
    c. Earth's interior (inner core, outer core, lower mantle, upper mantle, Mohorovicic discontinuity, crust)
    d. Magnetic reversals and Earth's magnetic field
    e. Thermal energy within the Earth
    f. Extrusive (volcanic activity, volcanoes: cinder cones, composite, shield)
    g. Bowen's Reaction Series (continuous and discontinuous branches)
B. Metamorphic
    a. Pressure, stress, temperature and compressional forces
    b. Foliated (regional), non-foliated (contact)
    c. Parent rock and degrees of metamorphism
    d. Metamorphic zones (where metamorphic rocks are found)
C. Sedimentary
    a. Division of sedimentary rocks and minerals (chemical, clastic/physical, organic)
    b. Depositional environments
    c. Evidence of past glaciers (including features formed through erosion or deposition)

d. Glacial deposition and erosion (including features formed through erosion or deposition)

D. Ocean
   a. Tides (daily, neap and spring)
   b. Currents (deep and shallow, rip and longshore)
   c. Thermal energy and water density
   d. Waves
   e. Ocean features (ridges, trenches, island systems, abyssal zone, shelves, slopes, reefs, island arcs)
   f. Passive and active continental margins
   g. Transgressing and regressing sea levels
   h. Streams (channels, streambeds, floodplains, cross-bedding, alluvial fans, deltas)

Earth's History

A. The geologic rock record
   a. Relative and absolute age
   b. Principles to determine relative age
      i. Original horizontality
      ii. Superposition
      iii. Cross-cutting relationships
   c. Absolute age
      i. Radiometric dating (isotopes, radioactive decay)
      ii. Correct uses of radiometric dating
   d. Combining relative and absolute age data
   e. The geologic time scale
      i. Comprehending geologic time
      ii. Climate changes evident through the rock record
      iii. Fossil record

Plate Tectonics

A. Internal Earth
   a. Seismic waves
      i. S and P waves
      ii. Velocities, reflection, refraction of waves

B. Structure of Earth (Note: specific layers were part of grade 8)
   a. Asthenosphere

b. Lithosphere
c. Mohorovicic boundary (Moho)
d. Composition of each of the layers of Earth
e. Gravity, magnetism and isostasy
f. Thermal energy (geothermal gradient and heat flow)

C. Historical review (Note: this would include a review of continental drift and seafloor spreading found in grade 8)
   a. Paleomagnetism and magnetic anomalies
   b. Paleoclimatology

D. Plate motion (Note: introduced in grade 8)
   a. Causes and evidence of plate motion
   b. Measuring plate motion
   c. Characteristics of oceanic and continental plates
   d. Relationship of plate movement and geologic events
   e. Mantle plumes.