Soils

Major Concept: Weathering, Erosion, Decay of plants and animals
   Concept
   Skill

Vocabulary: residual soil Observation
   mature soil Lab skills
   humus
   porosity
   leaching
   root pry
   exfoliation
   transported soil
   subsoil
   horizon

Core Content
SC-M-2.1.4 Soil consist of weathered rocks and decomposed organic material from dead plants, animals, fungi, protists, and bacteria. Soils are often found in layers with each having a different chemical composition and texture.

Program of Studies
Grade 7 Earth/Space (Structure of the Earth System) Students will demonstrate...and examine characteristics of soils.

Soil pretest
Challenge

Growing up we all heard, “take off those shoes before you come in the house.” Or, “You have more dirt on you than in the yard.” Living in a rural community where agriculture is an important part of the economy it is common to hear phrases such as; “that sure is good dirt,” or “look how pretty that ground worked up.” People that depend on the land for their living are very aware of the importance of good soil. But what is good dirt/soil? What characteristics do farmers look for in good soil? What makes one type of soil better for growing a certain crop than another type of soil?

(Before I begin teaching this unit I always read passages from books about the dust bowl during the 30’s.)

Task #1

Days 1-4 read and discuss section on soils from textbook or handout. Do the hands on activities.

Task #2

Have each student to bring in a sample of soil from their yard or from somewhere close to where they live. Have hand lens and stereomicroscopes for each student to examine their soil. Have students to record observations on a chart pieces of plants pieces of insects/animals live insects rocks
Task # 3
Make a big chart of all the classes findings and have them mark the location on a county map of where their soil came from. Compare their findings. Can students see or find a pattern.
Task # 4
Have the county extension agent come to your classroom to do a presentation on soils. Have them demonstrate some of the test that they are asked to perform on soils.
Task #5
Have a local farmer or gardener come to your classroom and discuss with students what they think makes good soil.
Soils Pre-Test

1. The breaking off of rock pieces in curved sheets parallel to the rock's surface is ________
   a. oxidation    b. carbonation    c. root- pry    d. exfoliation

2. Rocks can be broken apart by ________
   a. organic activity    b. root- pry    c. frost action    d. all of these

3. The wearing away of rocks by solid particles carried by wind, water, and other forces is called ________
   a. exfoliation    b. abrasion    c. oxidation    d. gravity

4. Most chemical weathering is caused by ________
   a. air pollution    b. water    c. sulfuric acid    d. gravity

5. The decayed parts of plants and animals in soil are called ________
   a. humus    b. topsoil    c. residual soil    d. mature soil

6. If the minerals in a rock enable the rock to resist chemical weathering, the rock is described as ________
   a. stable    b. soluble    c. organic    d. residual

7. The solid rock layer beneath the soil is called ________
   a. transported soil    b. bedrock    c. residual rock    d. mature soil

8. The size of individual soil particles is called soil ________
   a. profile    b. horizon    c. texture    d. porosity

9. The process in which water washes minerals from one soil horizon to another is called ________
   a. leaching    b. oxidation    c. exfoliation    d. claying

10. Acid rain is rain that contains ________
    a. carbonic acid    b. sulfuric acid    c. carbon dioxide    d. plant acids

11. Most cracks and potholes in roads are caused by ________
    a. frost action    b. abrasion    c. root- pry    d. decomposition

12. Mosses and lichens are able to break up rock mostly because of ________
    a. root- pry    b. acid production    c. carbonation    d. exfoliation

13. Soil that remains on top of its parent rock is called ________
    a. residual soil    b. humus    c. transported soil    d. topsoil

14. Decaying plant or animal material in soil is called ________
    a. subsoil    b. talus    c. humus    d. nitrates
Soils Pre-Test

15. To which of the following does the term "soil texture" refer?
   a. chemical composition  
   b. percent humus  
   c. number of pore spaces  
   d. size of particles

16. A layer of soil is called
   a. profile  
   b. horizon  
   c. leaching  
   d. texture

17. How many layers does mature soil contain?
   a. 0  
   b. 1  
   c. 2  
   d. 3

18. Which of the following is the most fertile soil?
   a. grassland soil  
   b. mountain soil  
   c. tundra soil  
   d. forest soil

19. Fill in the correct terms in the spaces labeled a, b, c, and d.

   a. 
   b. 
   c. 
   d. 

20. ESSAY - Soil is created through the actions of natural earth forces. Soil is made of many different types of materials such as sand, clay, silt, and decayed matter.
   A. Identify three forces that cause soil to be formed.
   B. Explain how each of these forces produces soil.
Science Open Response Soils

Multiple Choice Number your paper 1-5 at the top

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Open Response

Spring is finally here. At least that is what the calendar says. Almost everyone is getting SPRING FEVER. Farmers are out in their fields, adults are out in their yards, and kids are outside whenever possible.

One of my favorite things to do this time of year is to work out in the yard with my flowers, roses, trees, plants, and shrubs. For each of these to grow and be healthy I need healthy soil.

A. Describe healthy soil.
B. Identify three (3) forces that cause soil to be formed.
C. Explain (in detail) how each of these forces produces soil.
Science Open Response Soils

Multiple Choice

1. The breaking off of rock pieces in curved sheets parallel to the surface is called
   a. oxidation  b. carbonation  c.______

2. Rocks can be broken apart by
   a. organic activity  b. root-pry  c.______

3. The wearing away of rocks by solid particles carried by water is called
   a. exfoliation  b. abrasion  c.______

4. Most chemical weathering is caused by
   a. air pollution  b. water  c.______

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1. The shape of an organism preserved in rock is called a(an) _________________.
   a. mold and cast     b. coprolite     c. imprint     d. petrification

2. Bodies of whole animals have been preserved in _________________.
   a. ice     b. tar     c. amber     d. all of these

3. Rocks formed from the piling up of layers of dust, dirt, and sand are called _________________.
   a. igneous     b. metamorphic     c. magma     d. sedimentary

4. The decay rate of a radioactive element is measured by a unit called _________________.
   a. period     b. era     c. half-life     d. unconformity

5. The animal used as an index fossil for the Paleozoic Era is the _________________.
   a. sago palm     b. dinosaur     c. trilobite     d. Eryops

6. A measure of how many years ago an event occurred or an organism lives is _________________.
   a. absolute age     b. relative age     c. decay time     d. sedimentary age

7. The thin outermost layer of the Earth is called the _________________.
   a. mantle     b. Moho     c. crust     d. core

8. The ability of a solid to flow is called _________________.
   a. ductility     b. plasticity     c. seismology     d. porosity

9. The layer that makes up most of the Earth’s mass and volume is the _________________.
   a. mantle     b. magma     c. crust     d. core

10. The crust of the Earth is made mostly of _________________.
    a. oxygen and silicon     b. iron and silicon     c. iron and nickel     d. copper and nickel

11. The boundary between the mantle and the outermost layer of the Earth is called the _________________.
    a. Moho     b. outer core     c. lithosphere     d. bedrock

12. The Earth’s inner core is made of _________________.
    a. oxygen and silicon     b. iron and nickel     c. iron and silicon     d. copper and nickel

13. Rocks can be broken apart by _________________.
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14. The wearing away of rocks by solid particles carried by wind, water, and other forces is called _________________.
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19. The size of individual soil particles is called soil _________________.
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20. The process in which water washes minerals from one soil horizon to another is called _____________.
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21. Metamorphic rocks with mineral crystals arranged in parallel layers, or bands, are _____________.
   a. clastic  b. intrusive  c. porphyritic  d. foliated

22. The way in which a mineral reflects light from its surface is its _________________.
   a. streak  b. luster  c. fracture  d. brilliance

23. The softest mineral in the Mohs hardness scale is _________________.
   a. fluorite  b. talc  c. diamond  d. calcite

24. The breaking of a mineral along smooth definite surfaces is called _________________.
   a. cleavage  b. fracture  c. splintering  d. foliation

25. Elements that have shiny surfaces and are able to conduct electricity and heat are called _____________.
   a. metals  b. nonmetals  c. ores  d. gemstones

Matching Vocabulary
26. igneous rock _____________.
27. sedimentary rock _____________.
28. metamorphic rock _____________.
29. fossil _____________.
30. lithosphere _____________.

   A. formed by the compacting and cementing of sediments or by other non-igneous processes at the Earth’s surface.
   B. remains or evidence of a living thing.
   C. formed from molten rock.
   D. part of the Earth’s surface covered by land; solid, topmost part of the Earth.
   E. changed in form as a result of chemical reactions, heat, and/or pressure.

Essay
31. Why is pyrite called “fool’s gold”? What tests can be performed in order to avoid being fooled?

32. Look at the rock on the desk. Design an experiment to determine the type of rock it is. Be specific about the kinds of test you use to determine the rock type. Describe the rock’s origin.