Identifying Soil Particles

TOPIC:

Conservation

TARGET GRADE LEVEL:

3rd-5th

TIME:

30 minutes

Purpose:

Students will explore how soil impacts seed growth through the discovery of soil particle identification. Students will also learn the parts that make up soil and how important soil is to agriculture.

Materials:

- Apple Earth demonstration/cereal experiment
- Source search game
- Iowa Ag Today Issue 3 (1 per student or online version)
- Six clear cups (three of the cups have small holes in the bottom)
- Cereal (Trix is recommended)
- Oats
- Granola
- Soil Identification Demonstration video
- Soil Particles Worksheet
- Soil samples
- Soil dissection worksheet
- Newspaper

Important links:

- Iowa Ag Today Issue 3
  https://www.iowaagliteracy.org/page/file?path=Files%2Fwebsite%2Fiowa-ag-today%2FIALF_IAT_issue3_digital%20FINAL.pdf

- Virtual Field Trips: Chapter 2 Soil is the Foundation
  https://nutrientsforlife.org/for-teachers/video-library/

- Demonstration video link
  Part 1 Apple demonstration and soil dissection
  https://www.youtube.com/watch?v=Vq2JQdQ1YAs
  Part 2 Soil particle identification
  https://www.youtube.com/watch?v=V8rBoQpAfhc

Vocabulary:

1. *Natural Resource:* A natural resource is something that is found in nature and can be used by people**.** Earth's natural resources include light, air, water, plants, animals, soil, stone, minerals, and fossil fuels.
2. *Agriculture:* the science, art, or practice of cultivating the soil, producing crops, and raising livestock (animals for production)
3. Soil: loose upper layer of the Earth's surface where plants grow. Soil consists of a mix of organic material (decayed plants and animals) and broken bits of rocks and minerals.
4. *Loam:* balanced soil mixed with sand, silt and clay.
5. *Sand:* loose material consisting of rock or mineral grains (largest of the particle grains)
6. *Silt:* loose sedimentary material with rock particles (medium size of particle grains)
7. *Clay:* an earthy material that is sticky and easily molded (smallest size of particle grains).
8. *Organic matter/humus:* decayed plants and animals.
9. *Erosion:* The movement of soil.

Interest Approach- engagement:

Engage the students with the source search activity. In this activity students will learn that agriculture provides nearly all the products we rely on in any given day by participating in a relay where they match an everyday item with its "source." Pass out the photos and place the bowls (farm, natural resources, store and factory) in the front of the room. Ask the students to place their picture in the bowl they believe it came from.

*If you are doing this activity virtually, ask the students in a zoom to hold up the "source (farm, factory, store or natural resource) to a few of the product pictures.

Background- agricultural connections:

Natural resources are essential to our survival. We rely on soil, water, crops, animals, rocks, oil, etc.; for feeding, clothing, and sheltering our growing population. We currently have 7.6 billion people on our planet, but that number is predicted to increase by 2.5+ billion people by the year 2050. As numbers increase, our soil availability will decrease. Communities will expand and farmland will be developed. We will need to grow more food on less land while sustainably managing our resources.

Students will learn about the different soil particles and how they impact seed growth. We will begin a discussion on the importance of conservation through erosion prevention and management practices.

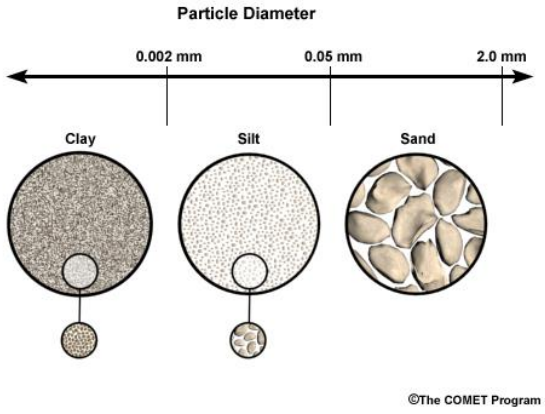
Sand is the largest particle of the three and water is quickly absorbed. Seeds planted in sand tend to need more water. The plant roots dig deeper into the ground searching for water.

Silt is the medium particle of the three and is a well-drained soil and doesn't saturate quickly.

Clay is the smallest of all three particles. Clay soil can become saturated quickly and tends to hold moisture for longer periods of time. Seeds planted in clay do not need to be watered as often.
Loam is a balanced mixture between all three types of soil particles (ideal for planting seeds).

Procedures:

1. Begin by showing the class the Apple Earth demonstration video
    - Imagine the Earth as an apple
    - "This apple represents the **planet Earth**."
    - *Remove and hold up the **3/4 piece**.* "Nearly three-quarters of the Earth is covered in **water**."
    - *Point to the remaining **1/4 of the apple**.* "The remaining quarter represents **land area**."
    - *Remove and hold up the **1/8 piece**.* "This section represents **uninhabitable land** including deserts, mountains, and polar regions that are not suitable for people to live or grow crops."
    - *Remove and hold up the **3/32 piece**.* "This section represents **habitable, but non-arable land**. People can live on this land, but crops cannot be grown because it is too rocky, hot, wet, or it has been developed."
    - *Remove and hold up the **1/32 piece**.* "Only 1/32 of the Earth's surface has the potential to grow crops. This section represents **arable land**."
    - *Point to the **top layer of dark brown soil**.* "This small section of **topsoil** represents all the soil on Earth upon which humans depend for food production."
2. Soil dissection: instruct the students to look at the soil sample, draw what they see and write a short paragraph about the different components (organic material or humus, rocks/minerals, air and water)



3. Watch the soil particles video (pause in the beginning and make a prediction- which cereal sample do you think represents; sand, silt and clay using the soil particles worksheet)
   Sand=cereal, silt=granola and clay=oatmeal.
4. Complete worksheet
5. Review with Iowa Ag Today Issue 3: Read natural resources and conservation practices.

Additional resources:

- 4 min cover crop FarmChat®: https://www.youtube.com/watch?v=HBrUheWkEWk&list=PL6fqYHxqQAn1tohm6nIKuE6g6173TPywO&index=3
- Peterson Farm Bros residue video https://www.youtube.com/watch?v=dawVo5L9-e0
- Nutrients for Life Video Library https://nutrientsforlife.org/for-teachers/video-library/

Organization Affiliation:

Morgan Hibbs, Linn County Farm Bureau

Credits:

- Nutrients for Life https://nutrientsforlife.org/
- NAITC Source Search Game https://agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=5&search_term_lp=Source%20search

Agriculture Literacy Outcomes:

T1.3-5.a Describe similarities and differences between managed and natural systems.

T2.3-5.c Explain how the availability of soil nutrients affects plant growth and development.

T4.3-5.b Distinguish between renewable and non-renewable resources used in the production of food, feed, fuel, fiber and shelter.

T2.3-5.c Explain how the availability of soil nutrients affects plant growth and development.

T1.3-5.e Recognize the natural resources used in ag practices to produce our food, fiber and fuel.

Iowa Core Standards:

3-LS4 Biological Evolution: Unity and Diversity (3-LS4-1, 3-LS4-2, 3-LS4-3, 3-LS4-4)

4-ESS2-1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.