Soil is one of the most important materials found on Earth, as it promises stability to human civilization and hosts biological life as well as wealth of geologic information. Soil allows for humans to grow crops and build communities, as well as allowing animals and forests to thrive. With nearly 21,000 different soil types identified in the United States, it is important for our students to be able to distinguish between the basic components found within soil by using, texture, smell, and the size of particles. This month’s trade books express the importance of soil while also describing the differences and similarities of many common soils.

**This Month’s Trade Books:**

**Dirt**
By Steve Tomecek
Illustrated by Nancy Woodman
National Geographic 2002
ISBN 0-7922-8204-3
Grades K-3

Synopsis: A friendly mole leads us on a tour of soil as he goes on an adventure to show us different parts of his garden and the friendly creatures that live there. During the mole’s tour he explores what makes up soil and how it is made, shows what plants and animals live in the different layers of soil, how these layers change the further down he travels, how soil helps things grow, and its uses. This is a friendly colorful book that invites students to get excited and learn how important soil is to our lives!

**Soil**
By Christen Ditchfield.
Children’s Press 2002
ISBN 0-516-29368-0
Grades 4-6

Synopsis: Soil is an excellent book for young curious readers as it describes key concepts with great photographs. It allows students to explore one of our most important resources, soil, by learning what soil is, how it is formed, and the components found in soil. Soil guides students to understand how important it is to protect our soil from dangers such as pollution and expresses the importance of recycling. This book is a useful step for students who wish to investigate further after reading as it includes a useful experiment, online sites to visit, along with books and organizations. Soil is a great read for students!

**Curricular Connections:**
The importance of soil and its uses can be explored through *Dirt* by Steve Tomecek and *Soil* by Christen Ditchfield. Through reading these books and completing the activities presented here students will have a deeper understanding of soil, its many uses, and its importance to our Earth. In the National Science Education Standards, under content D in the Earth and Space Science standard, students in grades K-4 should be able to develop an understanding of properties of earth materials. This standard is addressed in the first activity as it focuses on similarities and differences of three different components found in soil, along with having students investigate the components when wet versus dry. In the National Science Education Standards, under content D in Earth and Space Science standard, students in grades 5-8 should be able to develop an understanding of the structure of the earth system. This standard is addressed in the second activity as it focuses on having students understand the different layers found within the ground in addition to understanding how soil forms and the importance of composition.

Link to soil Classification Chart: [http://www.acipco.com/international/engineering-data/p8image1.gif](http://www.acipco.com/international/engineering-data/p8image1.gif)

**Resources:**

**Other Useful Resources:**
“Soil.” National Science Resources Center [1996]: 17+.

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**Trade Book Activities on Next 2 Pages**
Trade Book-Inspired Investigations for Grades 4-6:

SOIL SHAKIN’

Purpose:
To allow students to explore the size properties of soil by separating a mixture using a column of water.

Materials:
For each group:
- Glass jar with tight lid – approximately 450 ml
- Sand - ½ cup per jar
- Silt – ½ cup per jar
- Clay – ½ cup per jar
- Water
- Straw
- 8 ½ x 11 sheet of cardstock paper (one for each student)

Procedure:
Begin by asking students questions to encourage a discussion of soil. Ask students if they think the size of soil particles is important; does it affect how soil acts during farming or thunderstorms? What if we stir up water and soil? Which particles descend down first and which ones float down slowly? Will it make layers? After discussing how soils form in place with the students, have students fill their jars with about 2/3 full of water. Next, pour the sand, silt and clay rich soil into the jar, until it is almost full. Alternatively, you could also use a soil sample from the school yard or nearby area. Have the students replace the lid securely and shake the jar vigorously for at least 30 seconds; then let the jar sit on the table. Make sure students know not to touch the jar while particles settle in the water, and also to allow enough time to let all the particles fall out of the water so that students are able to see the soil separated into the different layers of different sized components. Remind students that these layers are made of different size materials in the soil; the soil in the earth is not in layers of different sizes.

Once the particles have settled in place, ask students what they observed and discovered in the resulting layers. Have students individually hold their cardstock paper next to the jar and carefully draw lines at each layer and label them clay, silt, and sand. Have the students pour off any excess water off the top of the jar, making sure to not disrupt the soil layers. Carefully, using a straw as a pipette take out a portion of each layer to examine, have students study a sample from each layer to realize that they can determine the soil particles were separated by size. (The densest particles, sand, sank to the bottom, silt settled in the middle, and clay floated down slowly, forming the top layer. If the soil contained any organic matter it may float in the water or settle out last). Have students look back at their charts they created and see if their layers are in order predicted, according to their observations of particle size. Have the students discuss the soil particles and why the layers formed in a particular order. Students should now be able to demonstrate soil properties, among them being size properties and how that affects how soils form in place.
Trade Book-Inspired Investigations for Grades K-3:  

**GETTING YOUR HANDS DIRTY**

**Purpose:**  
To allow students to experiment and handle three different soil components, noticing similarities and differences in size, texture, and color between clayey, silty, and sandy soil materials.

**Materials:**  
Per group (preferably in pairs):  
- Clayey Soil  
- Silty Soil  
- Sandy Soil*  
- Spoon  
- Small plastic hand magnifier  
- Paper plates (7 inches in size)  
- Spray bottle containing water  
  *visit Local.com, type in different soil types to find a location nearest you to purchase soil components.

**Procedure:**  
Begin by asking students about soil. Are there different types, textures, or sizes of particles in soil? What are the uses of soil and why is it so important to our environment? Introduce Dirt by Steve Tomecek and read it aloud to your class, as it explains various soils and their importance. Once the book has been completed distribute each of the three labeled soils to each group. Have students use a spoon and place three spoonfuls of each material on different paper plates. Allow students to use their magnifying glass, and other senses such as touch and smell to fully examine each component. Ask students what each material looks and feels like (smooth, gritty, sandy), does it smell or make a sound when shook around on the plate? Record students’ observations on the board.

Now that students handled dry soil components, ask them to predict what might happen to each pile if water was added. Using the spray bottle, mist a small amount water onto the students’ samples, have students observe and note what happens. Have students try to roll the different materials into balls, discuss observations and any surprising findings. Did components feel lumpy or runny? The students should discover that wet clayey soil forms a clump, wet silty soil crumbles easily, and wet sandy soil runs through their fingers. Students should now be able to compare clayey, silty, and sandy soil when both dry and wet, and be able to reconnect back to the book Dirt in recognizing different types of soils and how they can change.