

Essential Question(s): Why is it important to understand the permeability and porosity of soil?			
Objective:	Materials/Resources	Essential Vocabulary	
ESS2.A: Earth Materials and Systems • Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.)	 samples of sand, Soil³, gravel, clay 5 graduated cylinders or canning jars (one for measuring water, 4 for funnels) 4 funnels (if you don't have funnels you can cut the top off of water bottles and invert) 4 coffee filters, stopwatch, water source Which Soil Holds the Most Lab Vocabulary Graphic Organizer, Vocabulary PowerPoint Hopscotch Vocabulary Game Direction sheet beanbags painter's tape index cards or post-it notes, Soil Percolation Lab 	 sand silt clay loam retain porosity permeability percolation percolation rate 	
Learning Experience			
Background Information: Soils ability to hold and retain water is determined by the amount of sand, silt, and clay.	 Engage: Activating Strategy: Soil Game Divide the class into 4 groups; sand, silt, clay, and water. Instruct the "sand" students to stand in a group with their arms extended touching fingertips. Ask water students to pass through the students (under arms). Next, have the "silt" students stand elbow to elbow. 		

Permeability is the rate that water can pass through soil. Porosity is the space in the soil that can hold air or water.	 Ask water students to pass through the students. Finally, have the "clay" students stand should to shoulder. Ask water students to pass through. In their science notebook, students answer the following questions. Which type of soil allowed water to pass through easily? Why? Which type of soil held water back? Why?
Student Misconceptions: Some students think that the larger particle, sand will hold more water.	 Explore: Activities: Which Soil Holds the Most? Divide the class into small groups to test 4 different soil samples. Prior to the experiment, have students observe the soil samples and hypothesize which sample will retain the most water. Students should record their hypothesis on their lab sheet. Students then work in groups to test each soil sample. Directions are listed on the Which Soil Holds the Most? Lab. After all groups have completed the lab, share results with the class. Was your hypothesis supported by the lab results?
	 Explain: Results: Vocabulary Graphic Organizer and Hopscotch Introduce the vocabulary terms porosity, permeability, percolation rate using the Vocabulary powerpoint. Students complete the vocabulary graphic organizer and paste into their science notebooks. If time and space allow, have small groups play Vocabulary Hopscotch.
	 Elaborate: Extending: Soil Percolation Lab Divide students into small groups to complete the Soil Percolation Lab.
	 Evaluate: Summarizing Strategy: Shrinking Summary Give your students approximately 3 minutes to write a summary of the day's learning/lesson.
	 Next, have students circle 10 of the most important words in their summary. (If students did not write this much, have them circle 5 words.) Now, using the circled words, write a one sentence summary of the lesson.

Differentiation Strategies		
Virtual Connections	STEAM Opportunities	
Water Moves in the Soil	 Plan and design a school garden. Use soil samples to determine help determine plants, watering needs, fertilizer, etc. 	
Assessment(s) Options:		
Teacher Reflection: (Next steps?)		
Resources:		