

Particle Size - Soil sediment ranges from large to small size particles: gravel (large pebbles), sand, silt (like flour), and clay.

Study Card

Soil Properties

	Particle Size	Texture	Color	Retain Water
GRAVEL Soil	Largest (like pebbles)	Coarse	Grey	No
SAND Soil	Large (like salt)	Gritty	Light brown	Very little
SILT Soil	Small (like flour)	Silky Smooth	Light Grey	Yes
CLAY Soil	Smallest (like dust)	Sticky When Wet	Red or yellow	Too Much
TOPSOIL Soil	All Sizes	All Textures	Dark Brown or Black	Just Right

Study Card

Texture and Color



Study Card

Capacity to retain water

The ability of the soil to keep the water in the soil.

Study Card

Sandy soil holds less water than soils with smaller particles and, therefore, must be watered more frequently. Sandy soil also has a lower nutrient-holding capacity than other soil types and must be fertilized more often. Sand is often added to other soils to help with water drainage.

Study Card

Silt soil is a grey, silky smooth soil made of small particles from flooded river sediment rich in nutrients and minerals for plant growth. The fine texture of silt soil retains water well but may drain slowly depending on the exact clay-silt-sand ratio. However, silt soil is often added to other soils to improve nutrient quality.

Study Card

Clay Soil has an ultra-fine texture that allows it to retain a high level of moisture and nutrients and, in fact, sometimes too much. Clay soil drains poorly, compacts too easily, and plants often do not receive the amount of oxygen they need to grow and thrive.

Study Card

Topsoil is also called loam, which is a combination of soil types (40% sand, 40% silt, and 20% clay). Loam soils generally contain more nutrients and humus than sandy soils, have better infiltration and drainage than silt soils, and are easier to till than clay soils. Loam soils are gritty, moist, and retain water easily

Study Card

Soil chart

Soil Type	Particle Size	Texture	Color	Retain Water

Use these pieces to fill in the soil chart.

Grave	Holds a lot of water	Medium sized particles	Feels gritty	A combination of clay and sand	No
Sandy Soil	Large	Gritty	Light Brown	Very Little	
Silt Soil	Small	Silky Smooth	Light Grey	Yes	
Clay Soil	Smallest	Sticky when wet	Red or Yellow	Too Much	
Top Soil	All Sizes	All Textures	Dark Brown or Black	Just Right	

Smallest particles Largest particles Does not hold water well Gets sticky when wet

Use the pieces below to fill in the chart.

Silt Soil

Sandy Soil

Clay Soil

Smallest
particles

Largest particles

Does not hold
water well

Gets sticky
when wet

Holds a lot of
water

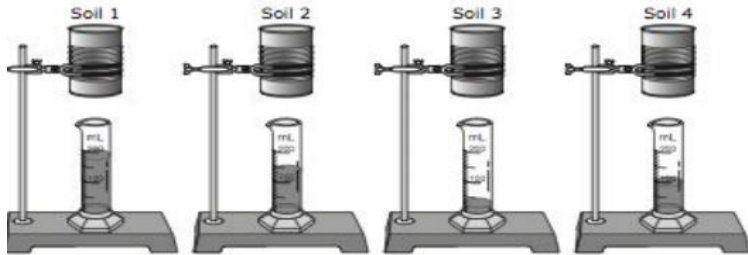
Medium sized
particles

Feels gritty

A combination
of clay and sand

See if you and your group can answer these questions using your study cards.

A student conducts an investigation using four identical cans, each with a hole in the bottom. The student fills each can with a different type of soil and then adds 200 milliliters (mL) of water to each can. The graduated cylinders in the diagram below show the amount of water that drains through the soil and out the bottom of each can.



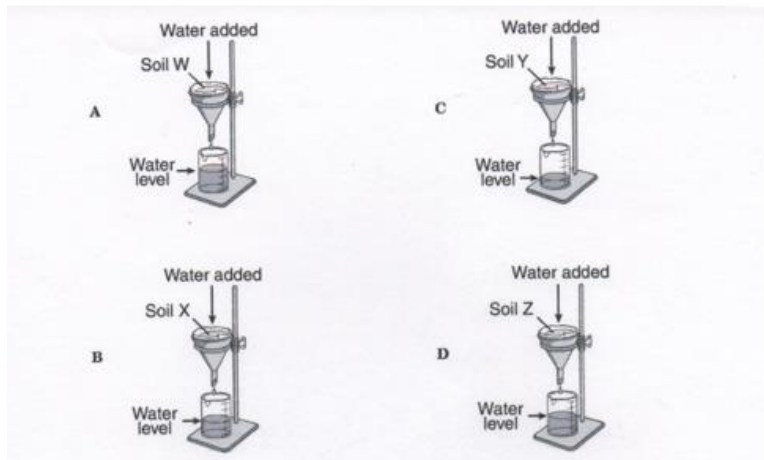
Some plants have roots that reach very deep underground. Which type of soil will most likely stop water from flowing to the deepest roots of these plants?

- F Soil 1
- G Soil 2
- H Soil 3
- J Soil 4

Several students investigate the characteristics of soil. The students observe samples of common soils. In one sample they observe that water drains through the soil easily. When they rub the soil between their fingers, it feels rough and scratchy, and its particles feel hard. The soil the students observed is most likely –

- F clay
- G silt
- H loam
- J sand

A student added 500 milliliters of water to equal amounts of four different samples of soil. In this investigation, which sample of soil held the most water?



How does the size of the soil particle affect the retention of water?

Examine properties of soils, including color and texture, capacity to retain water, and ability to support the growth of plants

Use the study cards to answer the following questions.

How does the property of soil affect plant growth?

A potato needs soil that is rich in nutrients, but also loose with good drainage. Which combination of soils would be best for growing a potato?

- Clay and Loam
- Sand and Clay
- Sand and Loam



Which soil held the most water?

- Potting Soil
- Sandy Soil
- Gravel
- Clay

Types of Soil	Amount of Water Collected (mL)
Potting soil	220
Sandy soil	250
Gravel	295
Clay	225

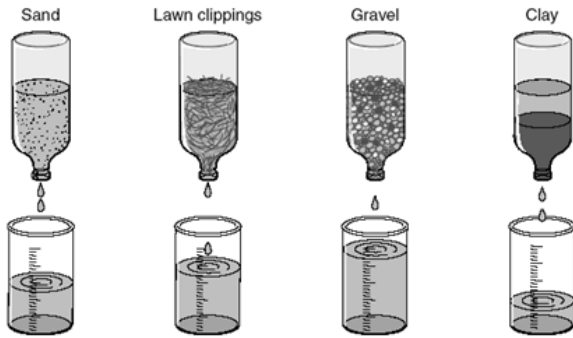
Which soil held the least water?

- Potting Soil
- Sandy Soil
- Gravel
- Clay

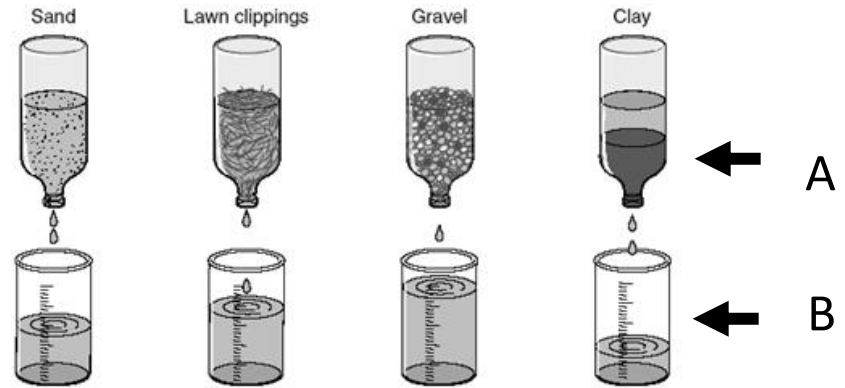
Types of Soil	Amount of Water Collected (mL)
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What property determines how much water a soil can hold?

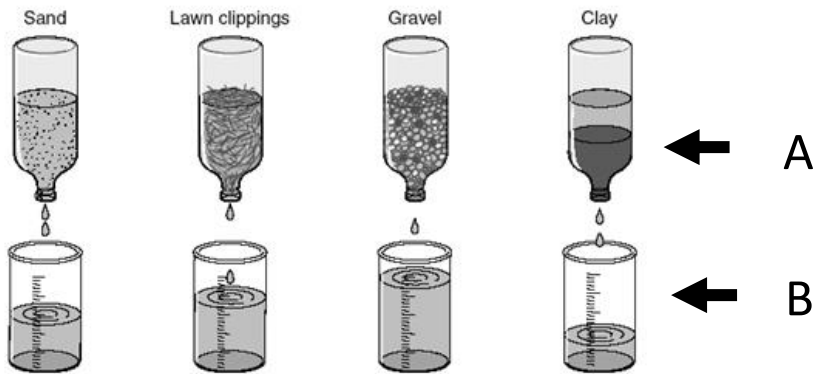
- Color
- Temperature
- Particle Size
- Odor



What part of the diagram represents where the water is being collected?



What part of the diagram represents where the water is being retained?



Which one of the soils has the smallest particles? Explain why.

