

Exercise walk-through

4.3

Soil Composition and Properties

AP Environmental Science

Soil

Soil forms slowly from weathering + decomposition, in horizons (O, A, B, C).

Erosion strips topsoil first; vegetation roots hold it in place.



Soil horizons: litter to parent rock

What soil is made of, and why it matters

texture

the mix of **sand, silt and clay** – coarse to fine

horizons

the layers soil builds as it ages: O (litter), A (topsoil), B (subsoil), C (weathered rock)

porosity

how much pore space the soil holds – how much water it can *store*

permeability

how fast water moves *through* it – sandy soil drains fast, clay holds water

Soil also holds organic matter, water and air. Texture sets porosity and permeability, and those two set what will grow.

Exercises 2.1-2.3

2.1 Which soil particle is the largest?

[1]

2.2 Which soil type holds the most water?

[1]

2.3 What is porosity?

[1]

Exercises 2.1-2.3

2.1 Which soil particle is the largest?

[1]

2.1

- Sand

2.2 Which soil type holds the most water?

[1]

2.2

- Clay

2.3 What is porosity?

[1]

2.3

- The fraction of empty (pore) space in the soil

Exercise 3.1

3.1 Sandy soil drains quickly because it has

[1]

☐

A small pores and low permeability

B large pores and high permeability

C no pores

D high water retention

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[1]

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A small pores and low permeability

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3.1 B

- large pores and high permeability

Exercise 3.2 (a)

3.2 A gardener compares sandy soil and clay soil.

(a) State which drains faster and which holds more water.

[2]

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[2]

(a)

- Sandy soil drains faster; clay holds more water

Exercise 3.2 (b)

3.2 A gardener compares sandy soil and clay soil.

(b) Explain why loam is often best for crops.

[2]

Exercise 3.2 (b)

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(b) Explain why loam is often best for crops.

[2]

(b)

- Loam balances drainage and water retention (and holds nutrients), so roots get enough water and air without waterlogging

Exercise 3.3

3.3 Explain the difference between porosity and permeability.

[2]

Exercise 3.3

3.3 Explain the difference between porosity and permeability.

[2]

3.3

- Porosity is how much empty space (water capacity) the soil has; permeability is how easily water flows through it