

Exercise walk-through

4.2

Soil Formation and Erosion

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 What two processes form soil from rock?

[2]

2.2 Which soil horizon is the fertile topsoil?

[1]

2.3 Name one human activity that increases erosion.

[1]

Exercises 2.1-2.3

2.1 What two processes form soil from rock? [2]

2.1

- Weathering (of rock) and decomposition (of organic matter)
-

2.2 Which soil horizon is the fertile topsoil? [1]

2.2

- The A horizon (topsoil)
-

2.3 Name one human activity that increases erosion. [1]

2.3

- Any one: deforestation, overgrazing, plowing

Exercise 3.1

3.1 Soil erosion is most damaging because it removes the

[1]

☐

A C horizon (parent rock)

B fertile A horizon (topsoil)

C bedrock

D groundwater

Exercise 3.1

3.1 Soil erosion is most damaging because it removes the

[1]

☐

A C horizon (parent rock)

B fertile A horizon (topsoil)

C bedrock

D groundwater

3.1 B

- the fertile A horizon (topsoil)

Exercise 3.2 (a)

3.2 A farmer plows a sloped field and removes all vegetation.

(a) Explain why this increases erosion.

[2]

Exercise 3.2 (a)

3.2 A farmer plows a sloped field and removes all vegetation.

(a) Explain why this increases erosion.

[2]

(a)

- Removing plant cover exposes the soil, and roots no longer hold it; on a slope, water washes the loose topsoil away

Exercise 3.2 (b)

3.2 A farmer plows a sloped field and removes all vegetation.

(b) State one effect of the eroded soil on a nearby river.

[1]

Exercise 3.2 (b)

3.2 A farmer plows a sloped field and removes all vegetation.

(b) State one effect of the eroded soil on a nearby river.

[1]

(b)

- Sediment (and nutrients) enter the river, causing sedimentation or eutrophication

Exercise 3.3

3.3 Explain why soil is considered a slowly renewable (nearly non-renewable) resource.[2]

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3.3

- Soil forms extremely slowly (hundreds of years for a few cm), so once eroded it cannot be replaced within a human lifetime