

Exercise walk-through

5.9

Impacts of Mining

AP Environmental Science

Harvesting resources

Take renewables no faster than they regrow – the **sustainable yield**

- **clearcutting** erodes; selective cutting sustains
- mining: acid drainage + tailings; reclaim afterward



Clearcutting: short yield, long erosion

Mining



Benches cut ever wider and deeper to reach the ore

Surface (strip) mining and mountaintop removal disturb the most land. Impacts:

- habitat destruction;
- **acid mine drainage** ;
- toxic tailings polluting water.

When easy deposits run out, mining goes **subsurface** – costlier and more dangerous. Coal follows the same path.

Exam tips

- Explain the **tragedy of the commons** – shared, unowned resources get overused – and how rules/ownership prevent it.
- Weigh the trade-offs of the green revolution, irrigation (salinisation, aquifer depletion), and mining/urbanisation.
- Compute an **ecological footprint** in “number of Earths” (footprint $\div$ biocapacity per person); it is measured **per person**.
- List the harms of **deforestation** (erosion, flooding, lost habitat, more CO₂).
- Define **sustainability** (meeting needs without harming future generations) and give sustainable methods (IPM, crop rotation, quotas).

Exercises 2.1-2.3

2.1 State one difference between surface and subsurface mining.

[1]

2.2 What is acid mine drainage?

[1]

2.3 What is reclamation?

[1]

Exercises 2.1-2.3

2.1 State one difference between surface and subsurface mining. [1]

2.1

- Surface mining removes overlying rock/soil (more habitat damage); subsurface mining tunnels underground (less surface damage)

2.2 What is acid mine drainage? [1]

2.2

- Acidic, metal-laden water from mines that pollutes streams

2.3 What is reclamation? [1]

2.3

- Restoring mined land (soil, vegetation, water treatment)

Exercise 3.1

3.1 Acid mine drainage harms streams by

[1]

☐

A raising their pH

B lowering their pH and adding toxic metals

C adding oxygen

D cooling the water

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3.1 Acid mine drainage harms streams by

[1]

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A raising their pH

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C adding oxygen

D cooling the water

3.1 B

- lowering their pH and adding toxic metals

Exercise 3.2 (a)

3.2 A company strip-mines a forested hillside.

(a) State two environmental impacts.

[2]

Exercise 3.2 (a)

3.2 A company strip-mines a forested hillside.

(a) State two environmental impacts.

[2]

(a)

- Any two: habitat destruction, soil loss, acid mine drainage, tailings pollution

Exercise 3.2 (b)

3.2 A company strip-mines a forested hillside.

(b) Suggest one way to restore the land afterward.

[1]

Exercise 3.2 (b)

3.2 A company strip-mines a forested hillside.

(b) Suggest one way to restore the land afterward.

[1]

(b)

- Reclamation – replace soil and replant vegetation

Exercise 3.3

3.3 Explain how acid mine drainage forms and why it harms aquatic life.

[2]

Exercise 3.3

3.3 Explain how acid mine drainage forms and why it harms aquatic life. [2]

3.3

- Water reacts with exposed sulfide minerals to form acid; this acidic, metal-rich water lowers stream pH, which is toxic to fish and other aquatic organisms