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Copper metal is used for electric wires.

Open-cast mining of copper ore makes a very large hole.



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Suggest **one** environmental problem that is caused by open-cast mining of copper ore.

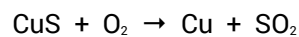
[1 mark]

any one from:

- eyesore
- destruction of habitats
- pollution of water
- dust pollution
- noise
- traffic pollution

Some copper ores contain copper sulfide, CuS.

Copper sulfide is heated in air to produce copper and sulfur dioxide.



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Suggest **one** environmental problem caused by heating copper sulfide in air.

[1 mark]

sulfur dioxide causes / leads to acid rain

TOP TIP :
you need to link sulphur dioxide (from the equation given) to acid rain here.

The amount of copper-rich ores is estimated to last only a few more years. New houses need several kilometres of copper wire.

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Explain why the need to use so much copper will cause a problem in the future.

[1 mark]

running out of copper (ores)

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WARNING :

you need to be specific here...

"use less copper" is insufficient without an example

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Suggest **two** ways in which society could overcome this problem.

[2 marks]

1 any two from:

- any specific example of using less copper

- reuse / recycle

2 allow do not throw copper / brass away

- use low-grade copper ores

- use other metals / materials in place of copper

Some information about four fuels is given in the table.

Fuel	Type	Heat released in kJ per g	Combustion products			Type of flame
			CO ₂	SO ₂	H ₂ O	
Bio-ethanol	Renewable	29	✓		✓	Not smoky
Coal	Non-renewable	31	✓	✓	✓	Smoky
Hydrogen	Renewable	142			✓	Not smoky
Natural gas	Non-renewable	56	✓		✓	Not smoky

From this information a student made two conclusions.

For each conclusion, state if it is correct **and** explain your answer.

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"Renewable fuels release more heat per gram than non-renewable fuels."

[2 marks]

incorrect / no or partially correct [1]

ignore references to hydrogen

bio-ethanol produces least energy

or

bio-ethanol produces 29 kJ [1]

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2

"Non-renewable fuels are better for the environment than renewable fuels."
(ignore incorrect / correct)

[2 marks]

any two from:

- hydrogen produces only H₂O (accept hydrogen does not produce harmful gases / CO₂ / SO₂)

- coal produces SO₂ (allow coal causes acid rain / respiratory problems)

- coal produces smoke (allow coal causes global dimming)

- both renewable and non-renewable fuels produce CO₂ (accept bio-ethanol and natural gas / coal produce CO₂ / global warming)

- (both) the non-renewable fuels produce CO₂ (accept coal and natural gas produce CO₂ / global warming)

- (both) renewable fuels produce no smoke (accept hydrogen and bio-ethanol do not produce smoke / global dimming)

- (both) renewable fuels produce no SO₂ (accept hydrogen and bio-ethanol do not produce SO₂ / acid rain)

(Total 9 marks)**End**