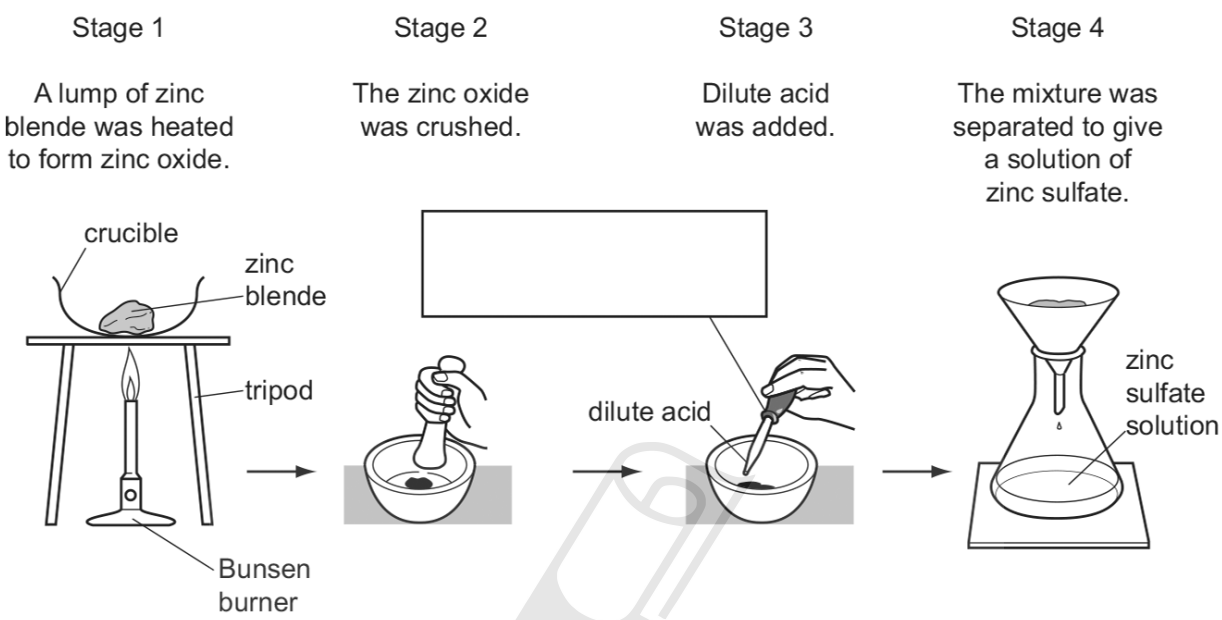
9.3 Extraction of metals

01. 0620_s12_qp_63 Q: 1

Zinc blende is an ore of zinc containing zinc sulfide, ZnS.
A student attempted to obtain a sample of zinc metal from this ore. The diagram shows the procedure followed in four stages.



(a) Complete the box to name the apparatus used. [1]

(b) Explain why the student should have carried out stage 2 before stage 1.

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..... [2]

(c) Identify the dilute acid used in stage 3.

..... [1]

(d) Name the process used in stage 4.

..... [1]

(e) Suggest how the student could have obtained a sample of zinc from the zinc sulfate solution.

..... [1]

[Total: 6]

02. 0620_s17_qp_63 Q: 4

Cassiterite is a naturally occurring form of tin oxide.

Describe how you would
- obtain a sample of tin from a large lump of cassiterite in the laboratory,
- determine the percentage by mass of tin present in cassiterite.

Tin is similar in reactivity to iron.

Your answer should include any apparatus and chemicals used and the conditions required.

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..... [6]

[Total: 6]

03. 0620_s19_qp_62 Q: 4

Azurite is an ore of copper which contains copper(II) carbonate. Azurite contains no other metal ions.

Plan an experiment to show how a sample of copper could be obtained from large lumps of azurite.

Your answer should include:

- descriptions of the reactions involved
- the expected observations.

You are provided with a large lump of azurite and common laboratory chemicals and apparatus.

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..... [6]

01. 0620_s12_ms_63 Q: 1

(a) teat/dropping pipette/dropper (1) **allow**: pipette [1]

(b) crushed ore would have larger surface area (1)
more zinc oxide would have formed/faster decomposition (1) [2]

(c) sulfuric (1) [1]

(d) filtration (1) [1]

(e) add magnesium (1) **allow**: electrolysis [1]

[Total: 6]

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02. 0620_s17_ms_63 Q: 4

	any 6 from: □ crush lumps □ pestle and mortar □ weigh cassiterite □ heat / reduce □ with carbon / CO / more reactive metal, e.g. Zn □ weigh tin □ (mass of tin / initial mass) □ 100 (%)	**6**

03. 0620_s19_ms_62 Q: 4

any **six** from:

M1	crush/powder azurite/ore/lumps		
M2	using a suitable method e.g. mortar and/or pestle, hammer		
M3	heat	add (dilute) acid	
M4	in crucible / test-tube / boiling tube / etc	suitable strong acid named	
M5	with carbon/coke /iron/zinc/ aluminium/magnesium/CO/ hydrogen	electrolysis (of solution)	add iron / zinc / magnesium / aluminium
M6	reduction / redox / displacement	pink / brown solid	displacement / redox
M7	brown / pink (solid forms)	at negative electrode/cathode	brown / pink (solid forms)

max 6