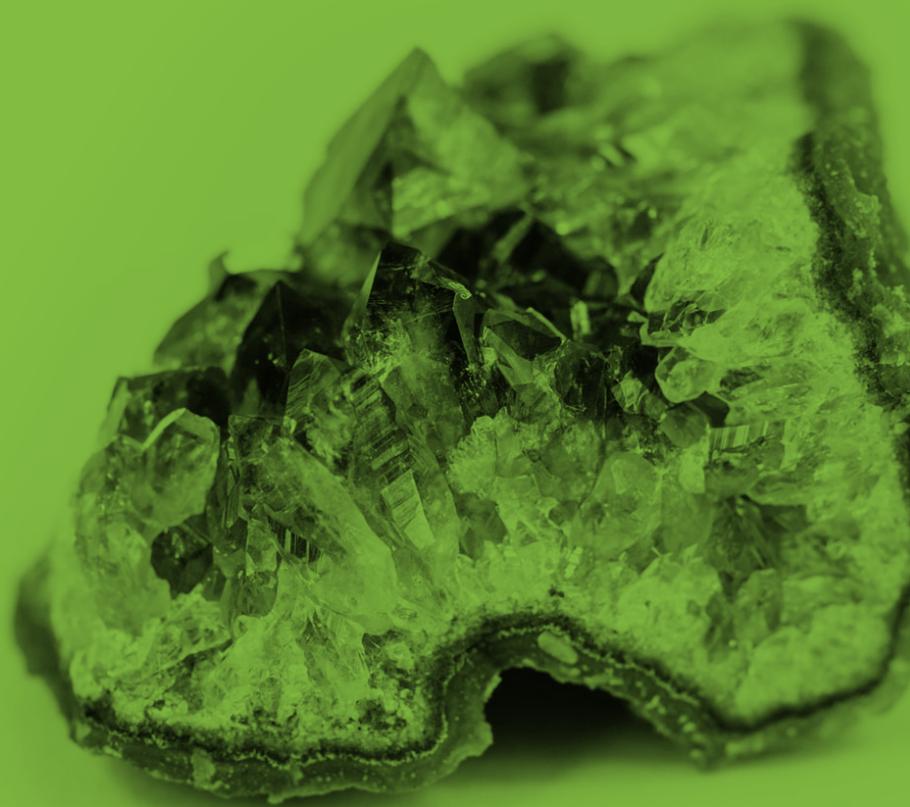


GCSE (9-1)

WJEC Eduqas GCSE (9-1) in
GEOLOGY

Practical Guidance Sheet 1



GCSE Geology Practical Guidance Sheet 1

Title: Identification of minerals using appropriate tests (colour, hardness streak, cleavage, lustre and reaction with cold 0.5 mol dm^{-3} hydrochloric acid)

Specification reference: 1.1a

Aim: To use physical and chemical testing to identify minerals.

Apparatus:



Mineral testing equipment:
Streak plate/unglazed tile to test the colour of powdered minerals.

Dilute hydrochloric acid ("bench strength" 0.5 mol dm^{-3}) in a dropper bottle to test if a mineral is a carbonate.

Copper coin (pre 1992 coins are 97% copper, post 1992 they are copper plated steel), hardness ~ 3.5 on Mohs scale.

Steel pin/needle (dissecting pin from Biology department or steel nail), hardness ~ 5.5 on Mohs scale.

Learners to also use own fingernail, hardness ~ 2.5 on Mohs scale.

Method:

Carry out the appropriate tests and record results.

Complete a table (similar to below) to logically record the results of observations.

Description and identification of mineral specimen X		
Colour		
Cleavage		
Hardness	mineral is scratched by	mineral is softer than
	mineral is not scratched by	mineral is harder than
	hardness of mineral is between and on Mohs hardness scale	
Streak		
Lustre		
Reaction with cold dilute HCl		
Conclusion: identification of mineral X		

Analysis:

1. Identify the mineral by appraising the results of the tests.
2. Compare the mineral identification reached with published results eg. Eduqas Mineral Data Sheet or other sources.

For example a completed table:

Description and identification of mineral specimen X		
Colour	grey	
Cleavage	mineral cleaves along 3 planes parallel to the edges of its cubic crystals	
Hardness	mineral is scratched by copper coin	mineral is softer than copper coin
	mineral is not scratched by fingernail	mineral is harder than fingernail
	hardness of mineral is between ~2.5 and ~3.5 on Mohs hardness scale	
Streak	light grey	
Lustre	metallic	
Reaction with cold dilute HCl	teacher advised me not to carry out this test	
Conclusion: identification of mineral X: GALENA		

Teacher/Technician notes

Appropriate tests listed in section 1.1a:

Colour: to be observed in natural light.

Cleavage: to be observed and described in terms of number of cleavage planes.

Hardness: tested by scratching the specimen with fingernail/copper, coin/steel pin, observations can be checked using a hand lens. To be described in relative terms (harder than/softer than and link to figures e.g. if a mineral is not scratched by a fingernail, but is scratched by a copper coin then it will have a hardness of ~2.5–3.5).

If a mineral cannot be scratched by steel it has a hardness > 5.5.

Streak: the colour of a mineral's powder, to be obtained by rubbing a mineral specimen on an unglazed white porcelain tile/streak plate. To be described using the colour of the powdered mineral (e.g. white, red-brown, grey), or a negative result if the mineral is harder than the tile and scratches it (e.g. scratches streak plate).

Lustre: the way the mineral reflects light, to be observed and recorded using descriptive terms (e.g. glassy, pearly, metallic, dull).

Reaction with cold dilute (0.5 mol dm^{-3}) hydrochloric acid: this is to test the mineral for carbonates (calcite is the only carbonate in the specification). Observations to be described in terms of positive reactions (effervesces/fizzes) to identify carbonates, or no reaction to identify non-carbonate.

Health and Safety

If acid has been applied, then the specimen should be washed afterwards to remove any remaining acid.

1. Sulphide minerals e.g. galena should not be tested with acid.
2. Learners should wash their hands after handling mineral specimens.

Rock forming minerals listed (as specified on the mineral data sheet) in specification section 1.1a:

quartz, feldspar, mica, augite, olivine, halite, calcite, haematite, galena, garnet.