YEAR 4 - SCIENCE · ASSESSMENT

Waste Rock Stockpile Investigation

A3-EARTH practical summative · 25% due: End of Component 3 (Lesson 12)

Summative investigation for the Earth and space sciences strand, modelled on the SCSA Year 4 exemplar Waste Rock Stockpile task (Appendix C). Students plan and conduct a fair test of a design to reduce acid mine run-off from a model waste-rock stockpile (dyed salt in sand), record and compare results to an uncovered demonstration, and evaluate and improve their design. Completed over one 60-minute lesson, individually or in small groups. Assesses ULO3 (weathering and erosion) plus ULO5 and ULO6 (planning, conducting, processing) and ULO7. Weighting is a school convention (25% of four equally weighted summatives), not mandated by the syllabus.

Task

When people mine, they leave piles of leftover rock called **waste-rock stockpiles**. When it rains, water can wash acids and chemicals out of the pile — this is called chemical weathering and erosion, and it can pollute the soil and waterways. Your job is to plan and test a design that reduces how much washes out.

An uncovered stockpile lets lots of coloured 'acid' wash out when it rains. A good cover reduces how much escapes.

> **How this works:** you will build a model stockpile from sand with dyed salt inside. You plan a fair test of a cover or barrier, then 'make it rain' with water and see how much colour washes out compared with an uncovered pile. You may build in a small group, but complete your own planning sheet.

Part A — Plan your fair test

1. Write the **question** your investigation will answer.

2. Write your **prediction** and a reason.

3. Complete your fair-test plan.

Part of the test	What I will do
I will CHANGE	
I will MEASURE / OBSERVE	
I will KEEP THE SAME	

Part B — Safety

4. Name one **risk** and how you will manage it.

Part C — Design and result

5. Draw and label your design for reducing the run-off.

6. What happened when it 'rained'? How did the amount that washed out compare with the uncovered pile?

Part D — Explain and improve

7. Use what you know about **weathering and erosion** to explain *why* your design worked (or did not work), and how you would improve it.

Aim for your best work: keep your test fair, use science words (weathering, erosion, chemical), and give real reasons in your explanation. Scientists and engineers often try many designs before they solve a problem.

Rubric criteria (weights as a percentage of this assessment)

Criterion	Weight	Descriptor
Conducting, observing and recording	30%	High (5–6): Produces a clear labelled design, conducts the test, and records a careful observation comparing the run-off with the uncovered pile. Sound (3–4): Produces a labelled design and records what happened. Limited (1–2): Basic design and observation with little detail.
Planning a fair investigation	30%	High (5–6): Writes a clear question and reasoned prediction, and identifies what to change, what to measure/observe, and what to keep the same to make a fair test. Sound (3–4): Writes a question and prediction and identifies the variable to change and something to keep the same. Limited (1–2): With guidance, identifies a variable; the plan is incomplete.
Explaining results and improving (using science)	25%	High (5–6): Explains the result using correct weathering and erosion knowledge and proposes a sensible improvement, communicating clearly with scientific vocabulary. Sound (3–4): Explains the result with some science understanding and suggests an improvement. Limited (1–2): States what happened with little scientific explanation.
Identifying and managing risk	15%	High (4): Describes a safety risk and a sensible way to manage it. Sound (2–3): Describes a safety risk. Limited (1): Lists a risk with little detail.