



YEAR 3



EARTH SCIENCE

TEACHER BOOKLET

LESSONS AND WORKSHEETS



Year / Level

Year 3

Science Strand

Earth & Space Sciences

Unit Title

Rocks, Minerals & Soils –
Earth Science Solutions

Duration

7 lessons × 50 minutes

Unit Overview

Students investigate observable properties of rocks, minerals and soils; compare and classify Earth materials; explore why rocks and minerals are important resources; investigate relationships between soil properties and conditions that support plant growth; and use evidence from several sources to recommend solutions to soil problems. Learning culminates in an Earth Science Solutions Expo.

Achievement Standard

Relevant Year 3 achievement standard: Students describe the observable properties of soils, rocks and minerals and describe their importance as resources. They identify solutions that use scientific explanations. Students pose questions to explore patterns and relationships and make predictions based on observations; use scaffolds to plan safe investigations and fair tests; use familiar classroom instruments to make measurements; organise data and information using provided scaffolds and identify patterns and relationships; compare findings with others, consider fairness, identify further questions and draw conclusions; and communicate ideas and findings for an identified purpose using scientific vocabulary when appropriate.

Unit Rationale

This inquiry-rich sequence moves from direct observation and classification to investigation, evidence-based explanation, problem solving and communication. Students repeatedly use the Science Journal to record concise evidence. Hands-on investigations, explicit modelling and visual supports make Earth science concepts concrete while building increasingly independent scientific thinking.

Key Concepts

- Rocks and minerals have observable properties.
- Observable evidence can be used to compare and classify Earth materials.
- Properties help explain why rocks and minerals are useful resources.
- Soils have different properties and components that influence water holding, drainage and plant growth.
- Scientific questions, fair investigations, measurements, patterns and evidence support conclusions.
- Scientific knowledge and evidence can be used to propose and justify solutions to soil problems.

Year 3 Science

Earth Science

Lesson 1 – Rock Detectives

Identifying and describing observable properties of rocks and minerals.

LOOK
DISCOVER
INVESTIGATE
WONDER

Duration
50 minutes

Lesson Focus
Identifying and describing observable properties of rocks and minerals.

Learning Intention
We are learning to identify and describe the observable properties of rocks and minerals.

Success Criteria

- I can observe rocks and minerals carefully.
- I can describe observable properties using scientific vocabulary.
- I can ask a scientific question based on my observations.

Curriculum Links (Year 3 Science)

- AC9S3U02 – Describe and classify rocks, soils and minerals based on observable properties and their uses.
- AC9S3I01 – Plan and conduct investigations, including posing questions and identifying patterns in observations, and suggest explanations.

Key Vocabulary

- rock
- mineral
- geologist
- texture

- grain
- crystal
- lustre
- hardness

Resources

- Year 3 Earth Science Journal — Lesson 1: Rock Detectives
- Visual: What is a Rock? What is a Mineral? What Does a Geologist Do?
- Rock and mineral samples
- Magnifying glasses / hand lenses
- Water spray bottles
- Pencils

Resource Purpose

The visual explicitly introduces rocks, minerals, geologists and observable properties. Students then use real samples as evidence and record only the essential observations and question in the Lesson 1 Journal page.

Rock and Mineral Samples

Granite
Sandstone
Marble
Quartz
Pumice
Mica

Lesson Sequence (50 minutes)				
Time		Lesson Stage	Teacher Actions	Student Actions
0–5 min		Engage / Hook	Display several contrasting samples. Ask: What do you notice? What might make these samples different?	Observe, discuss and share initial ideas.
5–8 min		Introduce the Mission	Display the What is a Rock?/Mineral? visual. Read the Learning Intention and Success Criteria.	Listen and identify the properties they will investigate.
8–13 min		Explicit Teaching 1	Use the visual to define rock, mineral and geologist. Model colour and texture observations.	Identify evidence and practise vocabulary.
13–18 min		Explicit Teaching 2	Model grain/crystal size and lustre using contrasting samples.	Compare two samples and describe differences.
18–21 min		Explicit Teaching 3	Model a simple hardness observation and safe use of lenses/water spray. Turn an observation into an I wonder question.	Suggest observations and questions.
21–41 min		Journal Investigation	Students rotate through samples. Direct them to Lesson 1 in the Journal: Observe and Record, Describe Your Best Example, Ask a Scientific Question.	Observe 3 samples and record concise evidence.
41–45 min		Analyse and Discuss	Compare findings. Ask students to justify descriptions using what they observed.	Share evidence and compare samples.
45–48 min		Science Inquiry	Add strong student questions to the Rock Wonder Wall.	Record/refine one scientific question.
48–50 min		Exit Ticket	Prompt: Name one observable property and give evidence from a sample.	Give one evidence-based response.

Explicit Teaching

Scientific Idea:
Rocks are made of one or more minerals. Rocks and minerals can be described using observable properties such as colour, texture, grain/crystal size, lustre and hardness.

Board Model:

ROCK / MINERAL

→

OBSERVE

→

PROPERTY

→

EVIDENCE

Student Investigation

- Observe three samples.
- Record colour, texture, grain/crystal size, lustre and hardness in the Journal.
- Choose one sample and describe it using at least three scientific words.
- Develop one question from an observation.

Investigation Prompt:
What observable evidence can we use to describe and distinguish rocks and minerals?

Teacher Questioning

- What do you notice?
- What evidence supports that description?
- Which scientific word best describes this property?
- How could your observation become a question?

Expected Big Idea

Rocks and minerals have observable properties that scientists can use to describe them.

Connection to the Next Lesson

Next scientific question:
If rocks and minerals have different properties, how can scientists use those properties to sort and classify them?



LESSON 1 – ROCK DETECTIVES



VOCABULARY: rock • mineral • texture • lustre • crystal

1 OBSERVE AND RECORD



Sample	Colour	Texture	Grain / crystal size	Lustre	Hardness
1					
2					
3					



2 DESCRIBE YOUR BEST EXAMPLE

Choose ONE sample. Describe its observable properties using at least 3 scientific words.

3 ASK A SCIENTIFIC QUESTION

From your observations, what do you wonder about rocks or minerals?





Lesson 2 – Sorting Scientists

Comparing and classifying rocks and minerals and using patterns to develop questions.



Duration
50 minutes



Lesson Focus

Comparing and classifying rocks and minerals and using patterns to develop questions.



Learning Intention

We are learning to compare and classify rocks and minerals using observable properties and explore patterns and relationships.



Success Criteria

- I can compare observable properties.
- I can classify rocks and minerals using evidence.
- I can identify a pattern and pose questions about relationships.



Curriculum Links (Year 3 Science)

- AC9S3U02** – Describe and classify rocks, soils and minerals based on observable properties and their uses.
- AC9S3I01** – Plan and conduct investigations, including posing questions and identifying patterns in observations, and suggest explanations.



Key Vocabulary

- compare
- classify
- property
- pattern
- relationship
- granite
- quartz
- pumice



Resources

- Year 3 Earth Science Journal — Lesson 2: Sorting Scientists
- Visual: Compare Rocks and Minerals — Granite, Sandstone, Marble, Quartz, Pumice and Mica
- Visual: Classification Charts, Tables and Venn Diagrams — How to Use Them
- Samples or clear specimen images of granite, sandstone, marble, quartz, pumice and mica
- Magnifying glasses
- Pencils



Resource Purpose

The comparison visual provides consistent reference examples; the classification visual models how to organise evidence. The Journal captures only key properties, a pattern and two pattern/relationship questions.

Rock and Mineral Samples



Granite



Sandstone



Marble



Quartz



Pumice



Mica



Lesson Sequence (50 minutes)

Time	Lesson Stage	Teacher Actions	Student Actions
0–5 min	Engage / Hook	Display granite and pumice. Ask students to sort them without giving a rule.	Suggest possible sorting rules.
5–8 min	Introduce the Mission	Read LI/SC and explain that scientists classify using evidence.	Listen and identify the task.
8–13 min	Explicit Teaching 1	Use the comparison visual to model comparing two samples by the same property.	Identify similarities and differences.
13–18 min	Explicit Teaching 2	Use the classification visual to model a simple classification chart/table.	Suggest evidence-based groups.
18–21 min	Explicit Teaching 3	Model how a pattern can lead to a relationship question: Do shiny samples also tend to have visible crystals?	Develop possible pattern questions.
21–41 min	Journal Investigation	Direct students to Lesson 2 Journal. Students record key properties for six samples, identify one pattern, then pose two questions.	Compare, classify and record evidence.
41–45 min	Analyse and Discuss	Share different valid classification rules. Ask why groups may differ.	Justify classifications with evidence.
45–48 min	Science Inquiry	Refine pattern and relationship questions so they can be investigated.	Improve one question.
48–50 min	Exit Ticket	Prompt: What property was most useful for sorting today, and why?	Respond using evidence.



Explicit Teaching

Scientific Idea:

Classification depends on observable evidence. The same samples can be classified in different valid ways when the sorting rule is clear and supported by properties.

Board Model:



Student Investigation

- Investigate six named samples.
- Record only key observable properties in the Journal.
- Identify a pattern among samples.
- Pose one pattern question and one relationship question.

Investigation Prompt:

What patterns in observable properties help us classify rocks and minerals?



Teacher Questioning

- What is similar?
- What is different?
- What evidence supports your group?
- What pattern can you identify?
- How could that pattern become a relationship question?



Expected Big Idea

Scientists compare observable properties to classify rocks and minerals and identify patterns.



Connection to the Next Lesson

Next scientific question:

How do the properties of rocks and minerals make them useful resources?





LESSON 2 – SORTING SCIENTISTS



VOCABULARY: compare • classify • property • pattern • relationship

1 COMPARE THE SAMPLES



Granite



Sandstone



Marble



Quartz



Pumice



Mica

Sample	Key observable properties (colour, texture, grain/crystal size, lustre, hardness)
Granite	
Sandstone	
Marble	
Quartz	
Pumice	
Mica	

2 FIND A PATTERN



Which rocks or minerals have similar properties? What evidence shows this?

3 POSE QUESTIONS ABOUT PATTERNS AND RELATIONSHIPS



Pattern question: Do rocks/minerals with _____ also tend to

_____?

Relationship question: How does _____ relate to _____?





Lesson 3 – Earth's Hidden Treasures

Connecting the properties of rocks and minerals to their uses as Earth resources.



Duration
50 minutes

Lesson Focus
Connecting the properties of rocks and minerals to their uses as Earth resources.

Learning Intention
We are learning why rocks and minerals are important resources and how their properties relate to their uses.

Success Criteria

- I can identify uses of rocks and minerals.
- I can explain how a property makes a material useful.
- I can use a range of examples to explain why Earth resources are important.

Curriculum Links (Year 3 Science)

- AC9S3U02** – Describe and classify rocks, soils and minerals based on observable properties and their uses.
- AC9S3I01** – Plan and conduct investigations, including posing questions and identifying patterns in observations, and suggest explanations.

Key Vocabulary

- resource
- property
- use
- granite
- quartz
- graphite
- ochre
- basalt

Resources

- Year 3 Earth Science Journal — Lesson 3: Earth's Hidden Treasures
- Visual: Why Rocks and Minerals Are Important Resources
- Mystery objects or image cards (granite, quartz, graphite, salt, marble, basalt)
- Rock/mineral samples where available
- Magnifying glasses
- Pencils

Resource Purpose

The resource visual provides examples of everyday uses and First Nations knowledge. Mystery objects create a purpose for linking material → property → use. The Journal requires three strong examples rather than repeated copying.

Examples of Rocks and Minerals and Their Uses

Granite	Quartz	Graphite	Salt	Marble	Basalt
Strong and durable Used for buildings, benchtops and monuments.	Hard and clear Used in electronics, glass and jewellery.	Soft and slippery Used in pencils, lubricants and batteries.	Dissolves in water Used for food, preserving food and in many products.	Can be polished Used for buildings, sculptures and decorative items.	Hard and strong Used for roads, railways and construction.

Lesson Sequence (50 minutes)			
Time	Lesson Stage	Teacher Actions	Student Actions
0–5 min	Engage / Hook	Reveal a mystery object. Ask: What Earth material might this come from? Why might it have been chosen?	Predict material and useful property.
5–8 min	Introduce the Mission	Display the resource visual and unpack LI/SC.	Identify the property-use connection.
8–13 min	Explicit Teaching 1	Model granite or quartz: material → property → use.	Explain one connection.
13–18 min	Explicit Teaching 2	Contrast with graphite, salt, marble or basalt. Emphasise that different properties suit different purposes.	Compare uses and properties.
18–21 min	Explicit Teaching 3	Use the visual to introduce Aboriginal and Torres Strait Islander Peoples' knowledge and uses such as ochre, grinding stones and stone tools.	Identify how material properties support particular uses.
21–41 min	Journal Investigation	Direct students to Lesson 3 Journal. Complete three material → property → use examples and explain why rocks/minerals are important resources.	Record three examples and one First Nations example.
41–45 min	Analyse and Discuss	Ask groups to compare which properties make materials useful for different jobs.	Share and justify examples.
45–48 min	Science Inquiry	Ask: What would happen if a material did not have the property needed for its job?	Reason from property to function.
48–50 min	Exit Ticket	Prompt: Name one resource, one useful property and one use.	Give a connected example.

Explicit Teaching

Scientific Idea:
Different rocks and minerals are important resources because their properties make them suitable for different uses.

Board Model:

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MATERIAL → PROPERTY → USE → IMPORTANCE AS A RESOURCE
  
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Student Investigation

- Investigate mystery objects/material cards.
- Select three examples for the Journal.
- For each, connect a useful property to its use.
- Record one example of Aboriginal and Torres Strait Islander Peoples' knowledge/use of rocks or minerals.

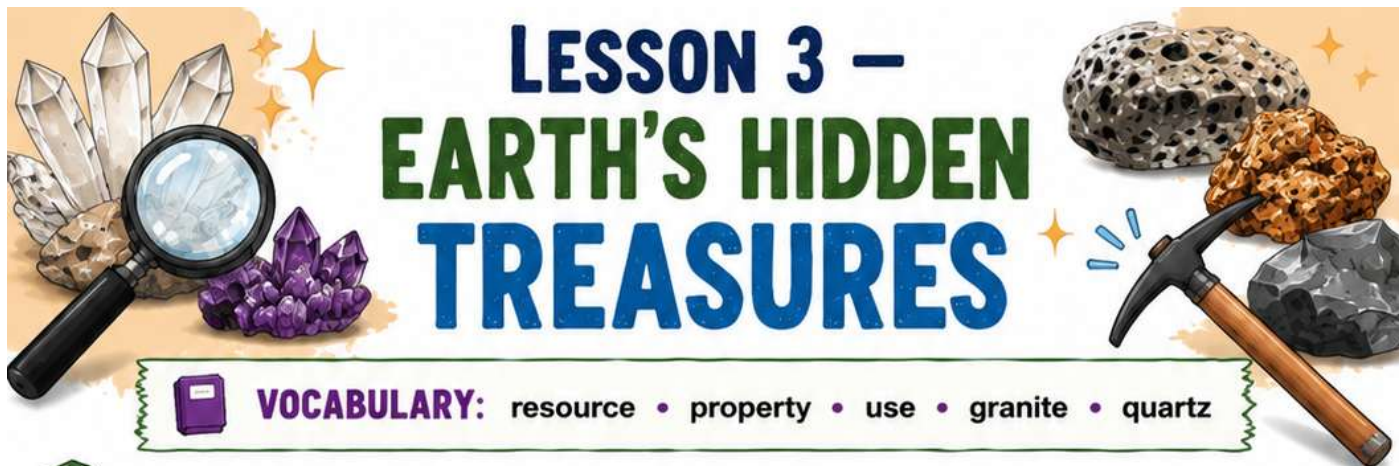
Investigation Prompt:
How does a rock or mineral property help explain why people use it for a particular purpose?

Teacher Questioning

- What is it made from?
- Which property makes it useful?
- Why was this material chosen?
- What evidence supports your explanation?
- How could this material be used differently?

Expected Big Idea
Rocks and minerals are Earth resources whose properties make them useful for many purposes.

Connection to the Next Lesson
Next scientific question:
Rocks break down and mix with organic material to form soils. How are different soils alike and different?



LESSON 3 – EARTH'S HIDDEN TREASURES


VOCABULARY: resource • property • use • granite • quartz

1 ROCK OR MINERAL → PROPERTY → USE

Resource	Use	Useful property	Why does the property suit the use?
Example 1			
Example 2			
Example 3			

2 RANGE OF EXAMPLES

Using your THREE examples, explain why rocks and minerals are important resources.



2

RANGE OF EXAMPLES



Using your THREE examples, explain why rocks and minerals are important resources.

3 FIRST NATIONS KNOWLEDGE

Record ONE example of Aboriginal and Torres Strait Islander Peoples' knowledge or use of rocks/minerals (for example ochre, grinding stones or stone tools).



Lesson 4 Soil Scientists

Observing, comparing and classifying soils,
then developing a soil-and-plant investigation question.

Small
clues make
a big
difference!



Learning Intention

We are learning that different soils have different observable properties and can be classified using evidence.



Success Criteria

- ✓ I can describe and compare soil properties.
- ✓ I can classify different soils using observable evidence.
- ✓ I can use information to develop a question about soil and plant growth.



Key Vocabulary

soil sand clay loam
silt humus texture
organic matter



Curriculum Links – Year 3 Science (AC9)

Science Understanding – Earth and space sciences

AC9S3U05: Earth's surface changes over time as a result of natural processes and human activity.

Science Inquiry Skills

Planning and conducting: AC9S3I01, AC9S3I02

Processing and analysing data and information: AC9S3I03

Evaluating: AC9S3I04

Communicating: AC9S3I05



Resources

- Year 3 Earth Science Journal – Lesson 4: Soil Scientists
- Visual: Soils Have Different Observable Properties – Sand, Clay, Loam and Garden Soil
- Sand, clay, loam and garden soil samples
- Magnifying glasses
- Clear jars with lids and water for soil jar test
- Spoons/trays
- Pencils



Resource Purpose

The soil visual supports vocabulary and comparison. Real samples and the jar test provide evidence for classification. The Journal records essential observations, one classification and one soil/plant relationship question.

Soils Have Different Observable Properties



Sand

- Large grains
- Feels gritty
- Drains quickly



Clay

- Very fine particles
- Feels sticky when wet
- Holds water well



Loam

- Mixture of sand, silt and clay
- Feels crumbly
- Holds some water, drains well



Garden Soil

- Contains organic matter
- Different sized particles
- Holds some water
- Looks dark



Explicit Teaching

Scientific Idea:

Soils differ in observable properties and components. Scientists can use these properties as evidence to compare and classify soils.

Board Model:



Lesson Sequence (50 minutes)

Time	Lesson Stage	Teacher Actions	Student Actions
0–5 min	Engage / Hook	Show two contrasting soil samples. Ask: <i>Are all soils the same?</i> What evidence can you see?	Observe and compare.
5–8 min	Introduce the Mission	Display the soil properties visual and unpack LI/SC.	Identify properties to investigate.
8–13 min	Explicit Teaching 1	Model observing colour, texture and visible components safely.	Use vocabulary to describe a sample.
13–18 min	Explicit Teaching 2	Model magnifying-glass observations and identify sand, silt, clay, humus/small organic matter where visible.	Compare components.
18–21 min	Explicit Teaching 3	Demonstrate the soil jar test and explain settling as a way to see different particle/components.	Predict what layers/components may appear.
21–41 min	Journal Investigation	Students investigate four soils and complete Lesson 4 Journal: observation table, classification groups/evidence and investigation question.	Observe, classify and record.
41–45 min	Analyse and Discuss	Compare classifications. Link properties to possible water holding/drainage and plant growth without giving Lesson 5 results.	Use evidence to explain groups and propose relationships.
45–48 min	Science Inquiry	Model: I notice loam feels... → I wonder which soil...? Refine soil/ plant questions.	Develop one investigable relationship question.
48–50 min	Exit Ticket	Prompt: How did you classify one soil? Give the property used.	Respond with evidence.



Student Investigation

- Observe sand, clay, loam and garden soil.
- Record colour, texture and visible components.
- Classify soils using one observable property and justify the grouping.
- Develop one question about a relationship between soil and plant growth.



Investigation Prompt

What observable evidence can we use to classify soils, and what questions does this raise about plant growth?



Teacher Questioning

- What do you notice?
- Which soils are most similar?
- What property did you use to classify them?
- How could this property affect water or plant growth?



Expected Big Idea

Different soils can be described and classified by observable properties, and those properties may affect how well they support plants.



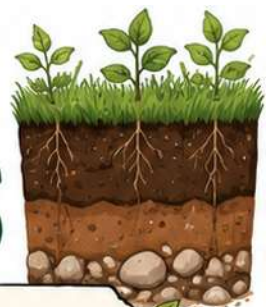
Connection to the Next Lesson

Next scientific question:

Which soil property might affect water availability or plant growth, and how could we investigate it?



LESSON 4 – SOIL SCIENTISTS



VOCABULARY: soil • texture • silt • humus • organic matter



1

SOIL OBSERVATION TABLE



Soil	Colour	Texture	What I can see
Sand 			
Clay 			
Loam 			
Garden soil 			

2

CLASSIFY THE SOILS



I classified the soils using this observable property: _____

Group 1	Group 2	Group 3

My evidence for this classification is:

3

DEVELOP AN INVESTIGATION QUESTION



Use today's information to write a question about a relationship between soil and plant growth.





**Year 3
Earth Science**

Lesson 5

Which Soil Works Best?

Planning and carrying out a fair soil investigation, then identifying patterns and relationships in results.



Same question.
New evidence!



Different soils.
Different results.

Learning Intention

We are learning to investigate relationships between soil properties and conditions that support plant growth.

Success Criteria

-  I can make a prediction using my own, others' and provided information.
-  I can collect and record investigation results.
-  I can explain a pattern or relationship using evidence.

Key Vocabulary

- prediction
- investigation
- evidence
- pattern

- relationship
- result
- drainage
- water

Curriculum Links – Year 3 Science (AC9)

Science Understanding – Earth and space sciences
AC9S3U05: Earth's surface changes over time as a result of natural processes and human activity.

Science Inquiry Skills
 Planning and conducting: AC9S3I01, AC9S3I02
 Processing and analysing data and information: AC9S3I03
 Evaluating: AC9S3I04
 Communicating: AC9S3I05

Resources

- Year 3 Earth Science Journal – Lesson 5: Which Soil Works Best?
- Visual: Which Soil Works Best?
- Sand, clay, loam and garden soil samples
- Equal containers/funnels or cups with drainage holes
- Measuring cups/cylinders and water
- Collection containers
- Timer
- Class graph display/board
- Pencils

Resource Purpose

The visual reminds students of the investigation sequence and discussion prompts. The Journal captures the question, evidence-based prediction, results, pattern, relationship and conclusion without duplicating a full method.

Soil Samples



Sand



Clay



Loam



Garden Soil

Our Investigation







Test
Measure
Record
Analyse
Conclude

Lesson Sequence (50 minutes)			
Time	Lesson Stage	Teacher Actions	Student Actions
0–5 min	 Engage / Hook	Revisit Lesson 4 questions. Display the <i>Which Soil Works Best?</i> visual.	Select/recall a testable question.
5–8 min	 Introduce the Mission	Unpack LI/SC and identify the class investigation question (e.g. which soil drains fastest/holds most water).	Identify what will be compared/measured.
8–13 min	 Explicit Teaching 1	Model a fair test: same amount of soil, same water, same container/time; only soil type changes.	Identify what must stay the same.
13–18 min	 Explicit Teaching 2	Model an evidence-based prediction using own observation + another group's observation + the provided visual/card.	Gather three sources for prediction.
18–21 min	 Explicit Teaching 3	Demonstrate measuring/recording one result and how results will contribute to a class column graph.	Practise reading the results table.
21–41 min	 Student Investigation	Groups conduct the test and complete Lesson 5 Journal question/prediction/results.	Measure and record results.
41–45 min	 Analyse and Discuss	Build/read the class graph. Ask for pattern, relationship, similarities and differences.	Use class evidence to identify patterns.
45–48 min	 Science Inquiry	Students complete pattern, relationship and conclusion in the Journal.	Write an evidence-based conclusion.
48–50 min	 Exit Ticket	Prompt: Which soil result best supports your conclusion?	State one result and what it shows.

Explicit Teaching

Scientific Idea:
A fair investigation can test how soil type affects water holding or drainage. Patterns in results provide evidence for relationships relevant to plant growth.

Board Model:

QUESTION

→

EVIDENCE-BASED PREDICTION

→

FAIR TEST

RESULTS

→

PATTERN / RELATIONSHIP

→

CONCLUSION

Student Investigation

- Use a question developed in Lesson 4.
- Build a prediction from three sources of information.
- Conduct a fair comparison of soil types.
- Record results and use the class graph to identify a pattern/relationship.
- Write a conclusion that answers the question.

Teacher Questioning

- What did we keep the same?
- What pattern can you identify?
- Which result is strongest evidence?
- How does the evidence support your conclusion?
- What might this mean for plant growth?

Investigation Prompt

What does our evidence show about the relationship between soil type and the condition we tested?

Expected Big Idea

Soil types behave differently. Fair-test results can reveal patterns and relationships that help us reason about which soils may better support plants.

Connection to the Next Lesson

Next scientific question:
If a soil has properties that make it difficult for plants to grow, how can scientific knowledge help us improve it?



LESSON 5 – WHICH SOIL WORKS BEST?



VOCABULARY: prediction • investigation • evidence • pattern • relationship

1 QUESTION AND EVIDENCE-BASED PREDICTION



Investigation question: _____

Evidence source	Evidence I will use
 My own observation	
 Another student/group's observation	
 Provided source (poster/card/book)	

Based on this evidence, I predict: _____



2 RESULTS



Soil type	Result
Sand	
Clay	
Loam	
Garden soil	



3 PATTERN, RELATIONSHIP AND CONCLUSION



Pattern I noticed: _____

Relationship between soil type and the result: _____

Conclusion – answer the investigation question using evidence: _____



Lesson 6 – Soil Problem Solvers

Year 3 Science

HEALTHY SOIL STRONG PLANTS!

Integrating evidence from different sources to explain a soil problem and justify a detailed solution.

Lesson Details

Duration: 50 minutes

Lesson Focus:
Integrating evidence from different sources to explain a soil problem and justify a detailed solution.

Curriculum Links (AC v9)

Earth and Space Sciences
AC9S3U06
Predict, identify and describe how natural changes and human actions can affect Earth's surface.

Science Inquiry Skills
AC9S3I01, AC9S3I02, AC9S3I03, AC9S3I04, AC9S3I05
With guidance, plan and conduct investigations, collect and record data, represent data in tables and simple graphs, compare with predictions and communicate findings using scientific language.

Learning Intention

We are learning to use scientific evidence from different sources to explain and solve a soil problem.

Success Criteria

- I can identify a soil problem.
- I can combine evidence from different sources.
- I can explain and justify a detailed soil solution scientifically.

Resources

- Year 3 Earth Science Journal — Lesson 6: Soil Problem Solvers
- Visual: Healthy Soil, Strong Plants! — Compost, Mulch, Worms, Organic Matter, Water and Mixing Soils
- Lesson 4 soil observations
- Lesson 5 investigation results/class graph
- Teacher-provided soil information cards or books
- Pencils

Key Vocabulary

- evidence
- solution
- nutrients
- compost
- mulch
- worms
- organic matter
- drainage

Resource Purpose

The Healthy Soil visual supplies possible solutions and scientific ideas. Students combine this new information with earlier investigation evidence and current knowledge in the Journal to create one justified solution.

Lesson Sequence — 50 Minutes			
Time	Lesson Stage	Teacher Actions	Student Actions
0–5 min	Engage / Hook	Present a scenario: A garden bed is dry/sandy/clayey/low in nutrients and plants are struggling. What could be wrong?	Suggest causes and solutions.
5–8 min	Introduce the Mission	Display Healthy Soil, Strong Plants! visual and unpack LI/SC.	Identify possible solutions.
8–13 min	Explicit Teaching 1	Model one solution, e.g. compost: adds organic matter/nutrients and can improve water holding/soil structure.	Connect solution to soil property/problem.
13–18 min	Explicit Teaching 2	Contrast mulch, worms, water or mixing soils. Ask which problem each would best address.	Compare solutions.
18–21 min	Explicit Teaching 3	Model integrating sources: Lesson 5 evidence + information card/visual + prior gardening knowledge → explanation → solution.	Identify evidence from three sources.
21–41 min	Journal Investigation	Students choose one problem and complete Lesson 6 Journal: source evidence, scientific explanation, recommended solution and justification.	Integrate evidence and write solution.
41–45 min	Analyse and Discuss	Pairs challenge each other: What evidence supports your solution? Would another solution also help?	Justify and refine recommendations.
45–48 min	Science Inquiry	Ask students to consider what evidence they would collect to check whether the solution worked.	Suggest a follow-up observation/test.
48–50 min	Exit Ticket	Prompt: State your solution and one scientific reason it should work.	Give concise justification.

Explicit Teaching

Scientific Idea:
Scientific solutions are stronger when they explain how the solution changes soil conditions and are justified using evidence from several sources.

Board Model:

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graph TD
    A[PROBLEM] --> B[EVIDENCE FROM SOURCES]
    B --> C[SCIENTIFIC EXPLANATION]
    C --> D[DETAILED SOLUTION]
    D --> E[JUSTIFICATION]
    
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Student Investigation

- Choose one soil problem.
- Use evidence from a previous investigation, new information and current knowledge/experience.
- Explain why the soil condition is a problem for plants.
- Recommend and justify a detailed solution.

Investigation Prompt:
How can evidence from different sources help us choose and justify the best solution for a soil problem?

Teacher Questioning

- What evidence supports your idea?
- How will your solution change the soil?
- Why should that help plants?
- Which source strengthens your explanation?
- Could another solution work as well?

Expected Big Idea

Scientific knowledge and evidence can be combined to explain soil problems and justify practical ways to improve soil conditions.

Connection to the Next Lesson

Next scientific question:
How can we communicate our strongest evidence and connected ideas about rocks, minerals and soils to an audience?





LESSON 6 – SOIL PROBLEM SOLVERS



VOCABULARY: evidence • solution • nutrients • compost • organic matter

1 DIAGNOSE ONE SOIL PROBLEM

Choose ONE: • Dry soil • Sandy soil • Clay soil • Poor nutrients

My soil problem is: _____



2 COMBINE EVIDENCE FROM A RANGE OF SOURCES



Source	Evidence
 Previous investigation	
 New information from a card/book	
 What I already know / experience	

3 EVIDENCE → SCIENTIFIC EXPLANATION → DETAILED SOLUTION

Scientific explanation — why is this a problem for plants?



My recommended solution is: _____

Explain HOW the solution will improve the soil and use the evidence above to justify it.



Lesson 7

Earth Science Solutions Expo – Assessment –



Lesson Focus

Communicating connected scientific ideas and evidence about rocks, minerals and soils for an identified audience.



Learning Intention

We are learning to communicate connected scientific ideas and solutions using evidence.



Success Criteria

- ✓ I can explain observable properties and resource uses.
- ✓ I can communicate my investigation findings and conclusion using evidence.
- ✓ I can justify a soil solution using information from different sources.
- ✓ I can connect ideas about rocks, minerals and soils using scientific vocabulary.



Resources

- Year 3 Earth Science Journal — Lesson 7: Earth Science Solutions Expo planning pages
- Student evidence from Journal Lessons 1–6
- Earth Science visuals/posters from the unit
- Poster paper or presentation/display materials
- Pencils/markers



Content Descriptors (AC v9)

AC9S3U03 Describe the characteristics of Earth's surface materials (rocks, minerals and soils) and describe how they are useful.

AC9S3U04 Investigate how natural processes and human activity can change Earth's surface materials.

AC9S3I01 Pose questions, make predictions, plan and conduct investigations, and compare results with predictions.

AC9S3I04 Communicate ideas, findings and solutions using scientific language and representations for different audiences.



Key Vocabulary

properties • resource • classify • evidence
relationship • prediction • solution • conclusion



Resource Purpose

The instructions poster makes the assessment sections and Evidence Check visible to students. The Journal planning pages provide structured evidence before students communicate their findings in a poster, presentation or display.



Lesson Sequence (Overview)

- 1 Introduce the Assessment
- 2 Section A: Rocks, Minerals & Resources
- 3 Section B: Soil Classification
- 4 Section C1: Investigation Question, Prediction & Results
- 5 Section C2: Analysis & Conclusion
- 6 Section D: Soil Solution
- 7 Section E: Connected Science Message





LESSON 7 – EARTH SCIENCE SOLUTIONS EXPO



VOCABULARY:

properties • resource • classify
evidence • relationship

ASSESSMENT

Use evidence from Lessons 1–6.
You may create a poster,
presentation or display.
Complete this planning page first.

HOW TO COMPLETE THIS PLANNING PAGE

A. ROCKS AND MINERALS



1. Describe observable properties of **ONE** rock and **ONE** mineral.

- Choose one rock and one mineral.
- Write down what you can see, feel or test (colour, texture, hardness, crystals, shine, layers, etc.).
- Use scientific words.



2. Using at least **THREE** examples, explain why rocks and minerals are important resources.

- Choose at least three different rocks or minerals.
- For each one, write what it is used for.
- Explain why its properties make it useful.
- Show how these resources help people in everyday life.



B. SOILS



Explain how you classified different soil types.
Include observable evidence.

- List the soil types you studied (e.g. sand, clay, loam, garden soil).
- Write the observable properties you used to group or classify them (colour, texture, grain size, how it feels, how water drains, etc.).
- Explain how the evidence helped you decide which soils belong together.



C. INVESTIGATION



1. My investigation question and prediction.

- Write a clear question about soil and plant growth.
- Write your prediction (what you thought would happen and why).



2. What pattern or relationship did the evidence show?
What is your conclusion?

- Describe the pattern you noticed in your results.
- Explain the relationship between your results.
- Write a conclusion that answers your question using evidence.



D. SOIL SOLUTION



State the soil problem, your detailed solution and the scientific explanation. Show how evidence from different sources supports your solution.

- State the soil problem you chose.
- Describe your solution in detail (what you would do, materials, how it works).
- Explain the science — why this solution will help the soil and plants (think about nutrients, water, air, organic matter, etc.).
- Use evidence from different sources (your investigation, others' observations, posters/cards/books, and what you already know).



E. CONNECTED SCIENCE MESSAGE

In 2–3 sentences, connect what you learned about rocks, minerals and soils. Use scientific vocabulary.

- Link rocks, minerals and soils together.
- Explain how they are connected in nature and how people use or care for them.
- Use at least three scientific words from the vocabulary list.



EVIDENCE CHECK



☐ observable properties of rocks, minerals and soils



☐ importance of rocks/minerals using a range of examples



☐ classification of different soil types using evidence



☐ questions about patterns/relationships in rocks and minerals



☐ a soil/plant question developed from information



☐ prediction using my observations + others' observations + a provided source

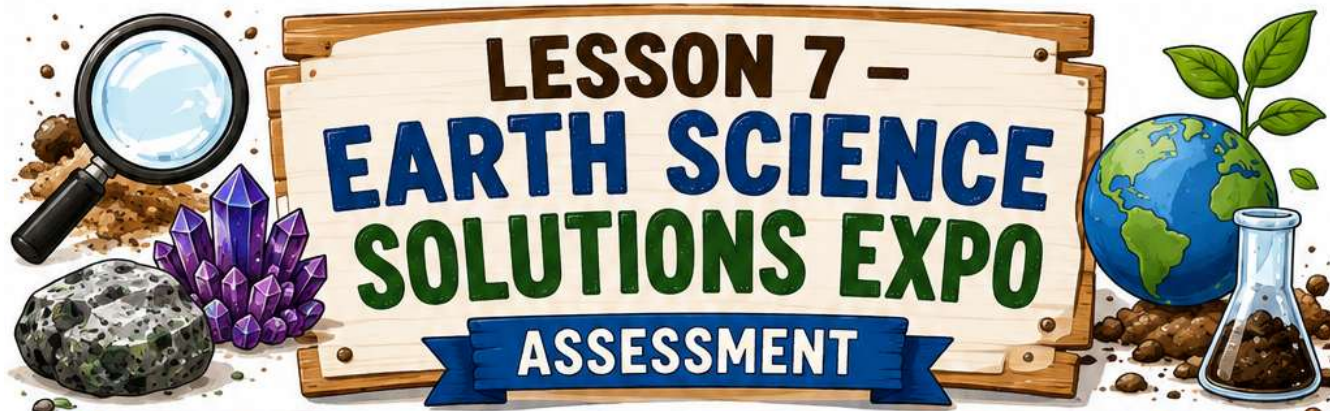


☐ detailed soil solution integrating a range of sources



☐ connected ideas and appropriate scientific vocabulary





VOCABULARY: properties • resource • classify • evidence • relationship



Use evidence from Lessons 1–6.
You may create a poster, presentation or display.
Complete this planning page first.



A. ROCKS AND MINERALS



Describe observable properties of **ONE** rock and **ONE** mineral.



Using at least **THREE** examples, explain why rocks and minerals are important resources.

B. SOILS



Explain how you classified different soil types. Include observable evidence.





LESSON 7 – EARTH SCIENCE SOLUTIONS EXPO

ASSESSMENT

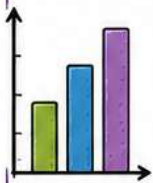


INVESTIGATION



My investigation question and prediction:

What pattern or relationship did the evidence show? What is your conclusion?





SOIL SOLUTION

State the soil problem, your detailed solution and the scientific explanation.
Show how evidence from different sources supports your solution.





CONNECTED SCIENCE MESSAGE

In 2–3 sentences, connect what you learned about rocks, minerals and soils.
Use scientific vocabulary.

