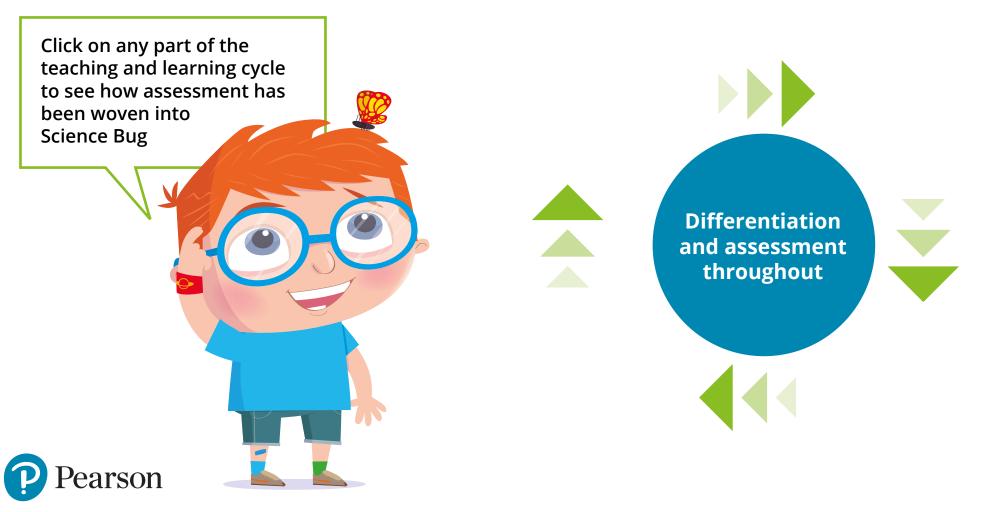
Assessment in Science Bug

science

We know that children construct their understanding of the world through **experience**. In order to make learning *real*, children need to explore, ask questions, and assess their understanding. We also know that **assessment is integral to ongoing teaching and children's progress**, and not something to be done in isolation. So we've built Science Bug on a robust teaching and learning cycle that puts children and **hands-on learning** at its heart, with formative and summative assessment embedded throughout.





1. Introduction and knowledge capture

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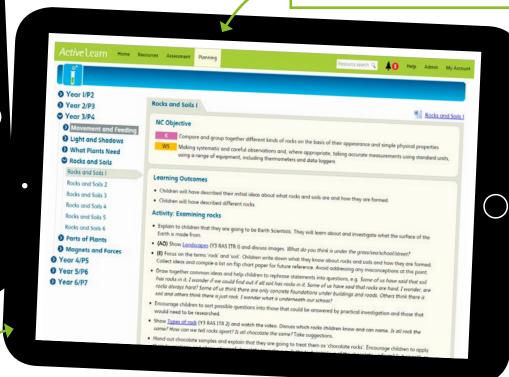
Sets the scene

Informal assessment of children's initial ideas



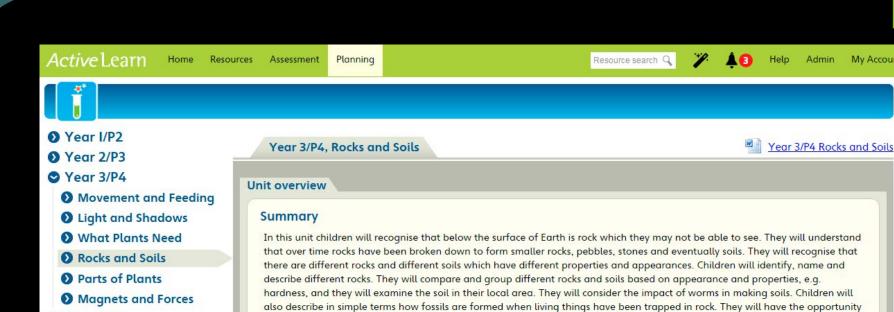
Unit overviews and learning expectations set the scene for what children will have learnt by the end of a unit.

Every lesson highlights formative assessment opportunities and evidence to show learning.



Every unit starts with a **knowledge capture activity** to assess what knowledge and idea/concepts children have at the beginning of the unit.





Working Scientifically, children will have the opportunity to make close observations and detailed comparisons of rocks and soils and they will investigate the appearance and some properties of rocks and soils. They will have the opportunity to set up simple comparative and fair tests. They will investigate how soils are formed, how animals make their habitat in soils, and the constituents of soil. This unit also offers the opportunity for children to consider risks and hazards involved in handling soils.

This Unit builds on Year I Identifying Materials, Year I Comparing Materials and Year 2 Uses of Materials.

to make a model fossil and look at the work of early palaeontologists, such as Mary Anning.

Expectations

By the end of this unit:

On Track

Year 4/P5

Year 5/P6

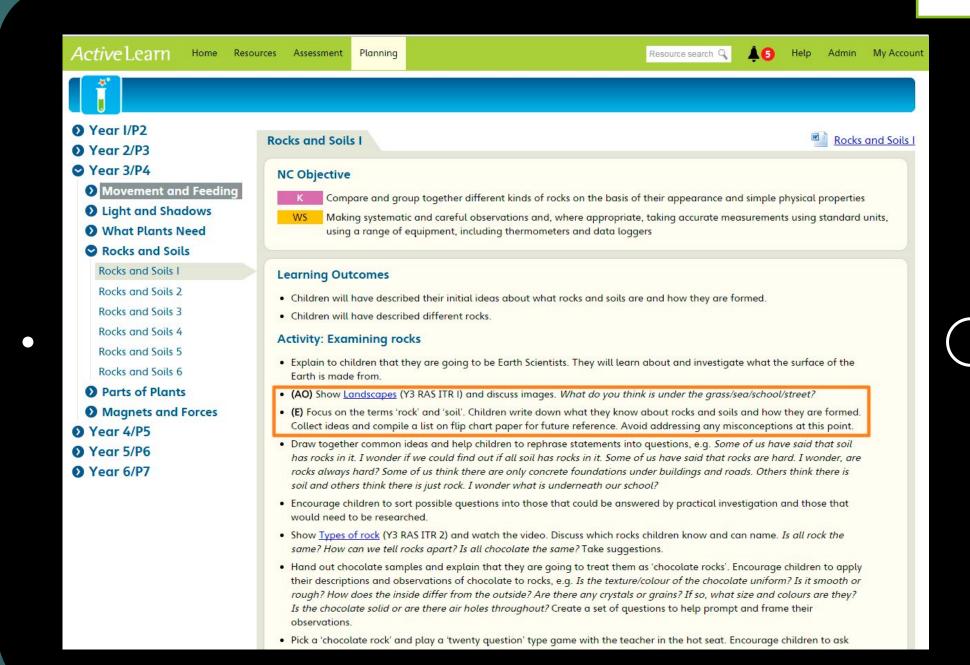
Year 6/P7

Children who are working at the expected standard will have recognised that there will always be rocks under the ground and in some places they will find soil as well. They will have compared and contrasted several types of soil and rock and will have grouped them together in different ways. They will have explained how soils are made from rocks and vegetation. They will have understood that different rocks and soils have different properties and they will have investigated some of these. They will have learned that fossils are found in rocks and will have described in simple terms how fossils are formed.

Exceeding

Children who have exceeded the expected standard will have described and explained how fossils are formed and will have described precisely the physical differences between different samples of rocks and soils. They will have explained how types of soil are dependent upon the types of rocks from which they have been formed. They will have recognised the long timescales involved in the formation of rocks and soils. They will have described the role of worms in keeping soil healthy.

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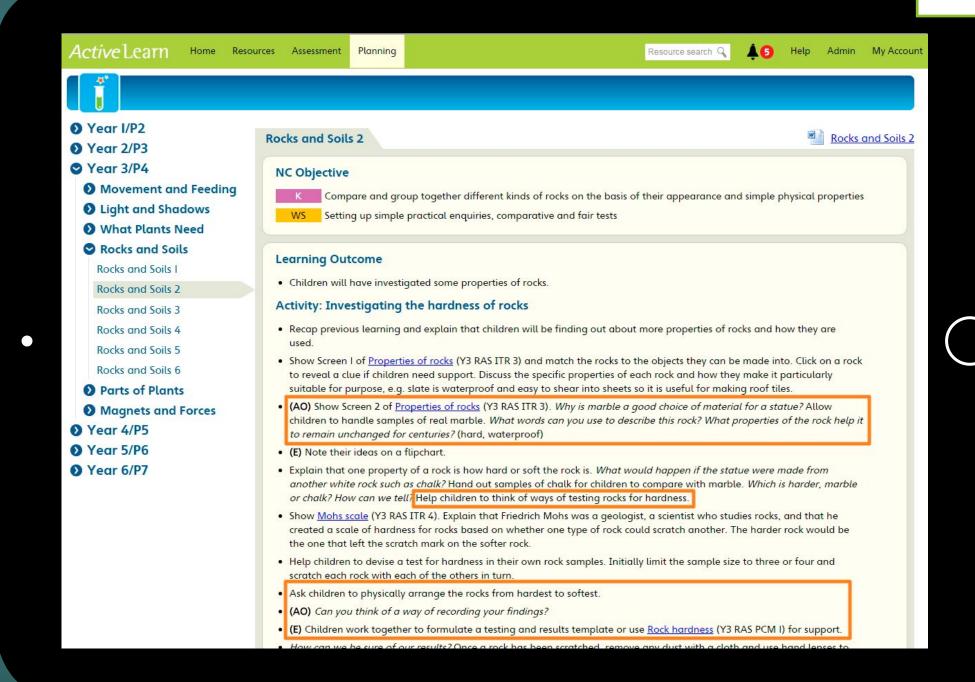
2. Develop understanding

- ▶ Teach using real-life examples
- Practical work and simulation activities





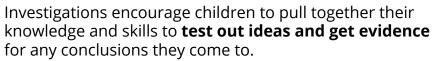
Throughout the teaching cycle there are **regular opportunities for children to reflect on their learning** allowing for formative assessment throughout.



3. Apply understanding

Children use knowledge and skills to carry out an investigation or to apply to a situation











Rocks and Soils

Rocks and Soils I

Rocks and Soils 2

Rocks and Soils 3

Rocks and Soils 4

Rocks and Soils 5

Rocks and Soils 6

- Parts of Plants
- Magnets and Forces
- Year 4/P5
- Year 5/P6
- Year 6/P7

Learning Outcome

Children will have investigated some properties of rocks.

Activity: Investigating the hardness of rocks

- Recap previous learning and explain that children will be finding out about more properties of rocks and how they are
 used.
- Show Screen I of <u>Properties of rocks</u> (Y3 RAS ITR 3) and match the rocks to the objects they can be made into. Click on a rock
 to reveal a clue if children need support. Discuss the specific properties of each rock and how they make it particularly
 suitable for purpose, e.g. slate is waterproof and easy to shear into sheets so it is useful for making roof tiles.
- (AO) Show Screen 2 of <u>Properties of rocks</u> (Y3 RAS ITR 3). Why is marble a good choice of material for a statue? Allow
 children to handle samples of real marble. What words can you use to describe this rock? What properties of the rock help it
 to remain unchanged for centuries? (hard, waterproof)
- (E) Note their ideas on a flipchart.
- Explain that one property of a rock is how hard or soft the rock is. What would happen if the statue were made from another white rock such as chalk? Hand out samples of chalk for children to compare with marble. Which is harder, marble or chalk? How can we tell? Help children to think of ways of testing rocks for hardness.
- Show Mohs scale (Y3 RAS ITR 4). Explain that Friedrich Mohs was a geologist, a scientist who studies rocks, and that he
 created a scale of hardness for rocks based on whether one type of rock could scratch another. The harder rock would be
 the one that left the scratch mark on the softer rock.
- Help children to devise a test for hardness in their own rock samples. Initially limit the sample size to three or four and scratch each rock with each of the others in turn.
- · Ask children to physically arrange the rocks from hardest to softest.
- (AO) Can you think of a way of recording your findings?
- (E) Children work together to formulate a testing and results template or use Rock hardness (Y3 RAS PCM I) for support.
- How can we be sure of our results? Once a rock has been scratched, remove any dust with a cloth and use hand lenses to
 decide which of the two rocks has made the scratch.
- (AO) As a class, discuss how reliable the results are. Can you suggest other ways of collecting evidence or any improvement
 to your method? For example, double check by scratching with a fingernail. This will scratch the very softest rocks, then a
 copper coin and finally a nail file which is likely to scratch the hardest rocks.
- (E) Children add a new section to their scrapbooks or poster to detail the investigation and learning so far, including some
 examples of where different rocks are used in everyday life.

Differentiation

Support

 Use clearly defined rock samples where the rock is obviously hard, medium hard and soft. Add a fourth sample if appropriate. Use <u>Rock hardness</u> (Y3 RAS PCM I).

Extend

· Add Mohs information to their rock fact cards from Lesson I. Use several different rock samples in the hardness test and

4. Reflect and Review

The activities at the end of each unit allow children to **demonstrate their understanding** of the knowledge and skills they have been taught and explain whether their initial ideas have changed or not and why.

Use the learning expectations set out in the unit overview to decide how a child has performed against the expectations.







The final activity brings the unit to an end.

Rocks and Soils 3

Rocks and Soils 4

Rocks and Soils 5

Rocks and Soils 6

Assessment Toolkit

- Parts of Plants
- Magnets and Forces
- Year 4/P5
- Year 5/P6
- Year 6/P7

Expectations

By the end of this unit:

On Track

Children who are working at the expected standard will have recognised that there will always be rocks under the ground and in some places they will find soil as well. They will have compared and contrasted several types of soil and rock and will have grouped them together in different ways. They will have explained how soils are made from rocks and vegetation. They will have understood that different rocks and soils have different properties and they will have investigated some of these. They will have learned that fossils are found in rocks and will have described in simple terms how fossils are formed.

Exceeding

Children who have exceeded the expected standard will have described and explained how fossils are formed and will have described precisely the physical differences between different samples of rocks and soils. They will have explained how types of soil are dependent upon the types of rocks from which they have been formed. They will have recognised the long timescales involved in the formation of rocks and soils. They will have described the role of worms in keeping soil healthy.

Working Towards

Children who are emerging will have named some different types of rock, e.g. marble and slate. They will have named some of the constituents of soils, e.g. rock particles and vegetation. They will know that rocks are natural materials and that they cover the surface of Earth but may sometimes not be visible. They will have understood that soils take a long time to form and that fossils are found in some rocks.

Lesson Summaries

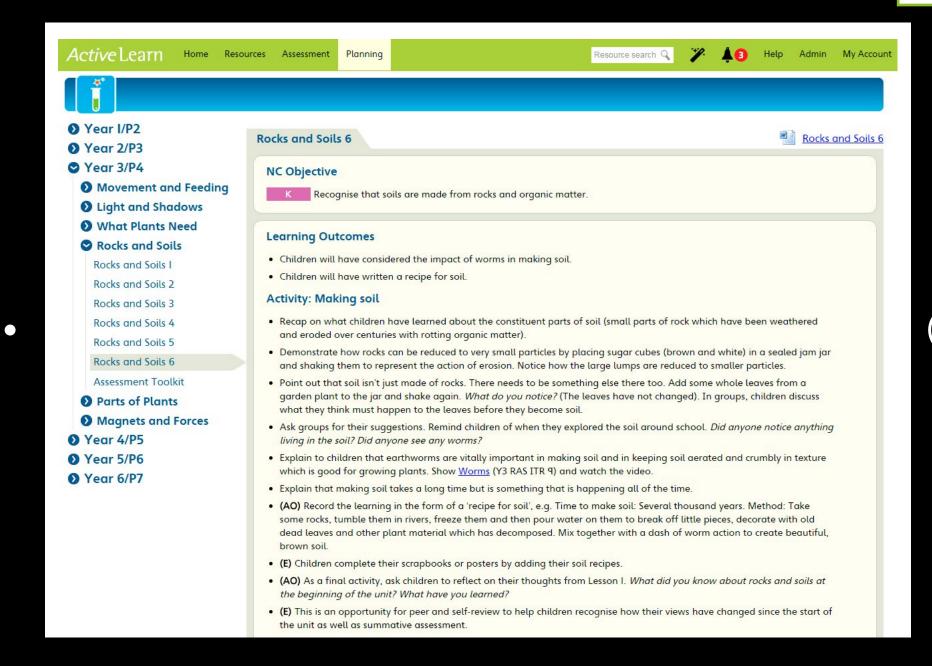
Rocks and Soils I:

Children write down what they know about how rocks and soils are formed and discuss which rocks they can name. The teacher plays a game of 'twenty questions' with the class with chocolate samples ('chocolate rocks'). Children then sort real rock samples into groups and create their own selection criteria. They start their own scrapbooks which they will update throughout the unit.

Rocks and Soils 2:

Children discuss the specific properties of the rocks before handling and comparing marble and chalk samples, thinking about how they would test for hardness. Children look at the Mohs scale and devise a test for hardness. They arrange their rocks from hardest to softest and make a testing and results template. They discuss how reliable the results are and add the investigation to their scrap books.

Rocks and Soils 3:



4. Summative Assessment

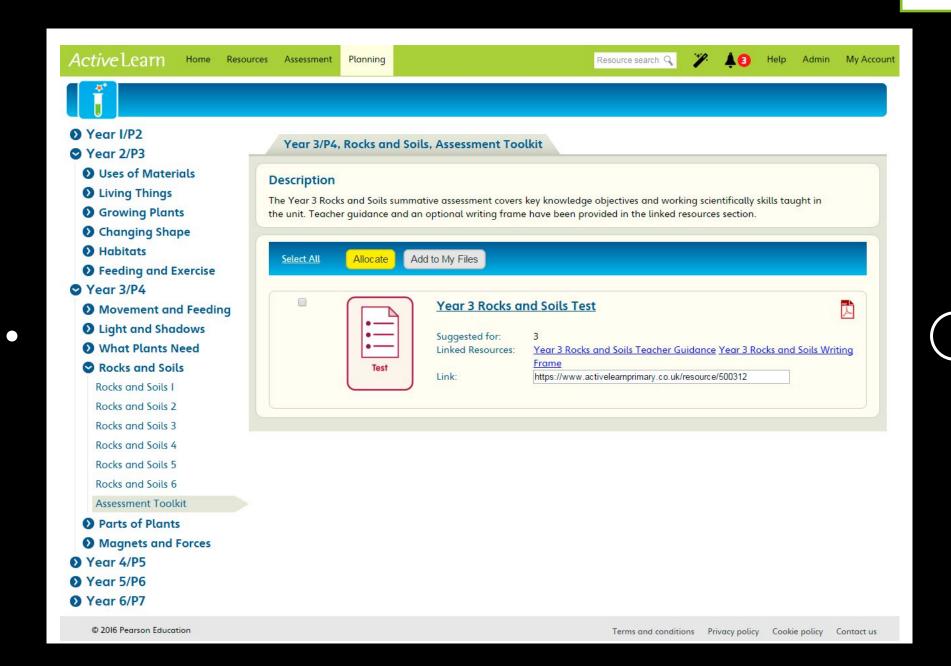


In addition to the formative assessments you have done you may wish to use the summativeassessment toolkit with a written and practical activity.



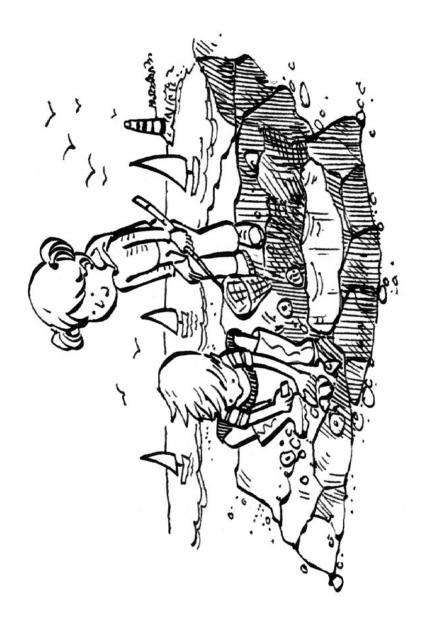
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Thinking about rocks Name: Class: Date:	ond Soils a discover the answer? o v Becca and Dan how they can find out the	Overview Children will carry out an investigation to classify different types of rock based on permeability.	r funnel r paper ker
Rocks	estion, for an information book about some other you know.	Collecting evidence Systematic recording Evaluating processes Different rocks have different properties	ren plan a test to discover which are permeable or not. They write trity for an information book or clopsedia on the properties of
A property of some rocks is permeability.	words helpful rmeable, particle, air, solid, permeability	rocks Teaching notes	
Permeability is	d Assess © Pearson Education Ltd 2015	Set the scene for the assessment activity. Have you even noticed what Becca and Dan notice? Encourage children to discuss Becca and Dan's question they can come up with. Summarise answers. Demonstrate how water can filter through sand but runs water might stay in the rock pools but not on the sand. What do you think and in made form? Explain that sand proceedings of wom down shells from sea creatures. The air waters of wom down shells from sea creatures. The air waters of wom down shells from sea creatures. The air waters of wom down shells from sea creatures. The air waters are the search of the search of proceedings with also talk a particles of sand or pie dee of jermeability but also talk a particles of sand or pie dee of jermeability but also talk a particle of sand or pie dee of jermeability but she to all rock me which would give the month?	In groups to see what answers off some rocks. Discuss why the is made of rock particles and between the particles lets the wild we find out?
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Rocks and Soils



Thinking about rocks

Becca and Dan are on the beach. Dan wants to know why the water stays in the rock pool but doesn't stay on the sand.



How could the children discover the answer?

What you need to do

- Plan a test to show Becca and Dan how they can find out the answer to their question.
- Write a paragraph for an information book about some other properties of rocks you know.

You may find these words helpful

rock, sand, water, permeable, particle, air, solid, permeability

Thinking about rocks

Teacher Guidance

NC objectives

K: Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.
WS: Setting up simple practical enquiries, comparative and fair tests.

Overview

Children will carry out an investigation to classify different types of rock based on permeability.

Key concepts

- Collecting evidence
- Systematic recording
- Evaluating processes
- Different rocks have different properties

Resources / equipment

- A selection of different permeable and impermeable rocks, e.g. chalk, granite
- Water
- Pipette
 - Sand
- Filter funnel
- Filter paper
- Beaker

Microscope

An optional writing frame has been provided for this assessment activity.

Outcomes

Children plan a test to discover which rocks are permeable or not. They write an entry for an information book or encyclopaedia on the properties of rocks.

Teaching notes

- Set the scene for the assessment activity. Have you ever been on a beach? Have you noticed what Becca and Dan noticed?
- Encourage children to discuss Becca and Dan's question in groups to see what answers they can come up with. Summarise answers.
- Demonstrate how water can filter through sand but runs off some rocks. Discuss why the water might stay in the rock pools but not on the sand.
- particles of worn down shells from sea creatures. The air between the particles lets the What do you think sand is made from? Explain that sand is made of rock particles and water flow through. Does this happen with rocks? How could we find out?
- How can we tell the difference between rocks? Think about visible features such as colour, particles of sand or pieces of rock may be. Is all rock the same? Are there some rocks Remind children of the idea of permeability but also talk about how large or small the which would let water through?

smoothness, whether or not there are crystals or particles in the rock, etc. Children look

- under the microscope at different rock samples and sand. *Is permeability a way we could* if it sinks in. Practise using a pipette to master the skill before beginning the test. Children devise a test for permeability of their rock samples e.g. dropping water onto rocks to see Show children the equipment they should use to test permeability before helping them should rank their results from most to least permeable. tell rocks apart and identify them? (Yes.)
 - How good is your evidence? Can you suggest other ways of collecting evidence or improvements to your method?
- information book. They should write about what permeability is and also record some other Children record their evidence as a short paragraph for entry into an encyclopaedia or properties of rocks, e.g. hardness.

Thinking about rocks

Name:

Year 3 Rocks and Soils

Class:	Date:
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How to improve	

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