Adventures of a Geologist Year 3 Term 5

What knowledge do you have that will help you classify rock samples based on their appearance and properties?

Big Questions:

How can we organise rocks into groups?

Which type of rock is the hardest?

How do we make use of rocks? Which rocks are best for what purpose?

Which types of rock are most affected by acid rain?

Does soil change the deeper you go?

How are fossils formed?

Does soil change the deeper you go?

What are soils made from?

Skills Taught: (working scientifically)

- Asking relevant questions and using different types of scientific enquiries to answer them
- Setting up simple practical enquiries, comparative and fair tests
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Recording findings using simple scientific language, drawings, labeled diagrams, keys, bar charts, and tables
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings.

Immersion Activity/Provocation:

Mantle of the Expert: The children will be assigned Paleontologist/ Geologist roles in identifying specimens found within different rock samples. They will report their findings to the group and how they made their classifications.

Topic Title: Adventures of a Geologist!

Challenge for All:

	Skills and Knowledge
Some children will:	• Name one or two rock types; say that there are rocks under surfaces and make measurements of time and volume. • Observe carefully throughout testing.
Most children will:	• Name and give characteristics of several rocks; explain that rocks are used for different purposes. • Recognise that there is rock under all surfaces and that soils come from rocks. • Identify when a test or comparison is unfair, measure time and volume of water carefully and say what their experiments and investigations show. Record observations.
Some children will progress further and will:	• Explain how to make a test fair and explain what their experiments and investigations show in terms of the characteristics and uses of the soils and rocks tested.

Enrichment/Outdoor Learning:

Local area excavation looking for rocks and soil types – which plants grow best in clay soil?

Animation and Video/ Online materials

- The Geological Society https://www.geolsoc.org.uk/SupportingMaterials - A fantastic collection of free to download information sheets and posters.
- National Event GeoWeek (www.bgs.ac.uk/geoweek/home.html)
- Earth Learning Idea https://www.earthlearningidea.com
- STEM Learning eLibrary (www.stem.org.uk/resources)
- Rockwatch www.rockwatch.org.uk – UK's Geology Club for Children – competitions, events and a magazine
- Make chocolate rocks -www.earthsciweek.org/classroom-activities/chocolate-rock-cycle or www.geolsoc.org.uk/LessonPlanCh
- Rock Song- https://www.youtube.com/watch?v=jPgE74Vltdc

Key Vocabulary: fossils, physical properties, organic matter, sedimentary, igneous, fossilisation, metamorphic

Cross Curricular Links:

Maths Measuring volume – Children can calculate the volume of rocks that they are comparing by half filling a large measuring cylinder with water and recording its volume, then dropping in the rock so it is totally submerged and measuring the new volume. The difference between the two measurements is equal to the volume of the rock. They will also measure the volume of liquids when comparing the permeability of soils.

Measuring mass – Children can measure and compare the mass of the rocks they are comparing.

Estimating fractions – When investigate what soils are made from, children can estimate the fraction of different materials that make up the soil samples by comparing the

Celebration of Knowledge and skills gained (assessment opportunity)

- Present knowledge to the other groups during Mantle of the Expert immersion activity.
- Design a far test to discover the impact of "Acid Rain" on rocks and soils from our samples kit.

Previously on… (Links to prior learning)

Materials and their properties

Big Question	Skills and Knowledge	Learning activities	Resources	Outcomes assessment
How can we organise rocks into groups? *LO: To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.*	Grouping and classifying/Research • Using scientific equipment to observe carefully. • Recording data in tables and labeled scientific diagrams. • Using identification keys to identify and name rocks.	Make detailed observations of rocks using key science language to describe observable physical features. Recording observations in detailed, labeled diagrams. Using a branched key to name the rocks tested.	Rock samples Scales Large measuring cylinders Magnifying glasses or geologist eyeglasses Identification keys	Can chn identify rocks and explain why they are used for a particular purpose? Can chn understand there are different types of soil depending on the rock they come from?
Which type of rock is the hardest? *LO: To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.*	Comparative Test • To record data in tables. • To use evidence to support or refute ideas. • To draw conclusions.	Record data indicating which rocks are damaged when scratch with an iron nail – sort into hard and soft rocks. Investigate which rocks will be damaged when scratched with each other the other rocks. Use data to sort rocks into order of hardness.	Rock samples Identification keys Iron nails Magnifying glasses	Can chn rank soils in terms of colour, texture and justify choices? Can they describe how the soil particles are separated? Can chn compare rocks according to differences in texture and record and justify the groupings? Can chn compare rocks according to differences in texture and record and justify the groupings?
How do we make use of rocks? Lo: To understand the purpose of rocks	Research • To collect data to help answer a scientific question. • To record data in tally charts, labeled	Local area walks – collecting data in tally charts and photographs. Cross-curricular links to geography fieldwork and mapping.	Clipboards Identification keys Risk assessment	Can chn research to further their knowledge?

	diagrams and photographs.			
Which types of rock are most affected by acid rain? *LO: To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties*	Comparative Test • To carry out a comparative test. • To record observations in tables. • To use evidence to support or refute ideas. To draw conclusions.	Place a drop of lemon juice on each rock sample and observe carefully for bubbles. This shows that the rock has reacted with the acid. Children can count how many bubbles they observe in a fixed time to make comparisons.	Rock samples including limestone Lemon juice Pipettes Magnifying glass	Can chn use results of their tests to rank rocks in order of ease of wearing away and/or permeability.
How are fossils formed? *LO: To describe in simple terms how fossils are formed when things that have lived are trapped within rock.*	Research • To use secondary sources to find answers to scientific questions. • To use scientific language to communicate findings in writing. To use labeled diagrams to describe a scientific process	Children work collaboratively using a range of sources to research the big question. They share their findings and then report their learning as a group poster, individual reports or posters or a TV documentary.	References books, access to the internet, research materials	Can children research the big questions?
Does soil change the deeper you go? *LO: To recognise that soils are made from rocks and organic matter.*	Pattern Seeking • To make careful observations of soil samples. • To compare soil samples using scientific language. To notice patterns and use this to answer scientific questions.	An adult digs holes of three different depths in the school grounds. Children use a ruler to measure down different depths and collect small soil samples in bags or containers (labeling the depth that they were taken from). They create a soil profile card with a depth scale running along a piece of double-sided tape. They tape the soil material corresponding to each depth on the card then make careful observations to look for patterns.	Spades Rulers Small bags or containers Labels/Sharpies Double sided sticky tape	Can children make careful observations, notice patterns and use this to answer scientific questions?

What are soils made from? *LO: To recognise that soils are made from rocks and organic matter.*	Identifying and classifying • To record observations in detailed scientific diagrams with labels. • To use scientific language to describe observations. • To create an identification key for soil types	Each jar is filled half full with a soil sample and labeled (a sharpie is used to mark the soil level), the jar is then filled with water and the lid is tightly screwed on. Shake the jar until the soil and water mixes thoroughly. Leave the soil to settle for 6 hours or more then mark off the different levels. Sand lies on the bottom layer, then silt, then clay and then organic matter. The layers can be marked on the jar and the fraction of each estimated.	Soil material from three locations Jars with lids Water Sharpie pens Microscopes Water softener	Can children work scientifically, recognising that soils are made from rocks and organic matter?
Which soil retains the most water? *LO: To recognise that soils are made from rocks and organic matter.*	Comparative Test • To use measuring cylinders and stop watches to make accurate measurements. • To record data in tables and bar charts. • To use data to answer scientific questions. • To begin to develop scientific explanations.	Weight equal masses of each soil to be tested. The soil samples are placed in filter paper cones, and then in a funnel and sat on a measuring cylinder. To test a soil sample, 50ml of water is poured into the soil gently, after a fixed time (1- 5 minutes) the volume of water that has passed through is measured. This data is collected and compared.	Different soil types (gravel, clay, silt, sand and compost) Funnels Filter paper/coffee filters Measuring cylinders Stop watches	Can children work scientifically to find out which soil retains the most water?
Can we use chocolate to model How different types of rocks are formed? *LO: To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.*	• To use scientific language and labelled diagrams to report observations. • To report findings in written explanations. • To evaluate how effectively the model illustrates the rock cycle,	Follow the instructions given in one of the links in the 'Useful online resources' section. Children create layers of different coloured grated chocolate, press together firmly to create a crumbly sedimentary rock, press together and heat to create a stronger metamorphic rock that still has layers, then melt completely to form igneous rocks.	Dark, Milk and white chocolate grated Cups Clingfilm or foil Hot water A scraping device	Can children describe how different rocks are formed?

	suggesting improvements.			

Non- Fiction Boxed Collection:

Monster Stones: The Story of a Dinosaur Fossil (Jacqui Bailey)

The Fossil Girl: Mary Anning's Dinosaur Discovery (Catherine Brighton)

Rocks and Fossils: Discover the World Beneath Your Feet (Chris Pellant)

A Rock is Lively (Dianna Hutts Aston)

DK Eyewitness Rock and Fossil Hunter (Ben Morgan)
Earthly Treasure (Kate Petty & Jennie Maizels)
Naturetrails: Rocks and Fossils (Struan Reid)

Our Amazing Planet: The World in Infographics

Everything Rocks and Minerals (Steve Tomacek)

Usbourne Spotter's Guide: Rocks and Minerals (Alan Woolley & Mike Freeman)