















# Rocks: Investigating Soil Permeability

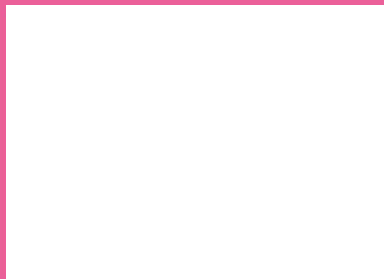
<p><b>Aim:</b> Making systematic and careful observations in the context of investigating the permeability of different soils.</p> <p>I can observe carefully and systematically.</p> <p>Recording findings using simple scientific language. Reporting on findings from enquiries, including presentations of results and conclusions. Children will present their finding using the key science vocabulary for this lesson.</p> <p>I can present my findings using scientific vocabulary.</p>	<p><b>Success Criteria:</b></p> <p>I can identify how to make careful observations.</p> <p>I can observe how much water has filtered through different types of soil.</p> <p>I can use the same equipment and length of time for each observation.</p> <p>I can record my observations accurately in a table.</p> <p>I can contribute to creating a group presentation.</p> <p>I can use simple scientific language accurately in my presentation.</p>	<p><b>Resources:</b> <b>Lesson Pack</b></p> <p>Samples of the different types of soil (pre-measured to ensure the children use the same amount of soil)</p> <p>Beakers</p> <p>Funnels</p> <p>Coffee filter paper</p> <p>Measuring cylinders</p> <p>Water</p> <p>Visualiser equipment or a webcam (if available)</p>
	<p><b>Key/New Words:</b> Soil, formation, rock, rock type, igneous, sedimentary, metamorphic, properties, permeability, permeable, impermeable, semi-permeable.</p>	<p><b>Preparation:</b> <b>Soil Permeability Activity Sheet</b> - one per child <b>Rocks and Soils Matching Cards</b> - one per pair</p>

**Prior Learning:** Children will have learnt about different rock types in lessons 1 and 2 and how soil is formed in lesson 5.

**Health and Safety:** Ensure that children either avoid handling the soil directly or wash hands immediately after handling the soil or soil packages.

## Learning Sequence

	<p><b>Rocks Quiz:</b> Children recap their knowledge and understanding of different types of rocks and their properties.</p> <p><b>Types of Soils:</b> What part do rocks play in forming soil? How many types of soil do you think there are?</p>	
	<p><b>Matching Rocks and Soils:</b> In pairs, children to match soils with the rock(s) that they are formed from using the <b>Rocks and Soils Matching Cards</b>. Reveal answers on the <b>Lesson Presentation</b>.</p>	
	<p><b>Comparing Soils:</b> Use the <b>Lesson Presentation</b> to discuss how different types of soil can be classified depending on their colour and texture. Encourage children to compare and contrast the different soil types shown.</p>	
	<p><b>Soil Permeability:</b> Read the information on the importance of soil permeability.</p> <p><b>Making Careful Observations:</b> Go through a checklist of how to make careful observations.</p>	
	<p><b>Testing Permeability:</b> Show children the different types of soil they will be testing before children make predictions regarding the permeability of different types of soil. Using a visualiser or webcam (if available), model how to test permeability and how to make careful observations for one soil sample. Each mixed ability group collects the necessary equipment and soil samples for their practical investigation. Children to record their observations on the <b>Activity Sheet Soil Permeability</b>. Are children observing and carefully? Can they record their findings in a table?</p>	
	<p><b>Oral Presentation:</b> Children discuss the success criteria for their oral presentation in their groups before feeding back to the whole class. Groups should be given around ten minutes to create and rehearse their group presentation.</p>	
	<p><b>Presentation:</b> Each group presents its findings. Can the children use simple scientific language? Ask children: Were the findings similar or different? Why do you think that might be? How can we know which results are accurate? What conclusions can you draw about the permeability of different types of soil?</p>	

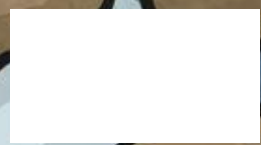


# Science

## Rocks



# Investigating Soil Permeability





# Aim

- I can observe carefully and systematically.
- I can present my findings using scientific vocabulary.

# Success Criteria

- I can identify how to make careful observations.
- I can observe how much water has filtered through different types of soil.
- I can use the same equipment and length of time for each observation.
- I can record my observations accurately in a table.
- I can contribute to creating a group presentation.
- I can use simple scientific language accurately in my presentation.





# Rocks Quiz



How many different types of rock are there?

A

4



B

3



C

5



Reveal  
answer



# Rocks Quiz



Which of the following is not a type of rock?

A Chalk



B Igneous



C Metamorphic



Reveal  
answer



# Rocks Quiz



What is the name of rock that is formed from lava or magma?

A Metamorphic rock



B Igneous rock



C Sedimentary rock



Reveal  
answer



# Rocks Quiz



What type of rock is created on the seabed?

A Metamorphic rock



B Igneous rock



C Sedimentary rock



Reveal  
answer





# Rocks Quiz



What type of rock is granite?

A

Metamorphic rock



B

Igneous rock



C

Sedimentary rock



Reveal  
answer



# Rocks Quiz



Which of the following statements is true?

A

Metamorphic rock is formed from sedimentary rock.



B

Metamorphic rock is formed from igneous rock.



C

Metamorphic rock can be formed from both igneous and sedimentary rock.



Reveal  
answer



# Rocks Quiz



What is permeability?

A

How hard-wearing the rock is.



B

How easily the rock splits.



C

Whether water can pass through the rock.



Reveal  
answer



# Rocks Quiz



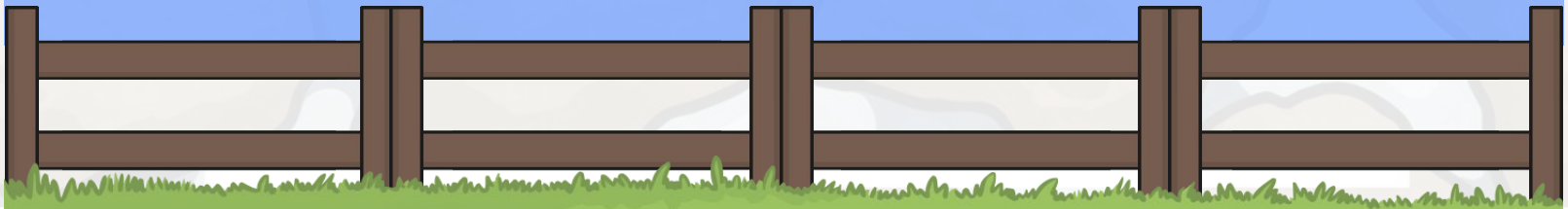
What part do rocks play in forming soil?

How many types of soil do you think there are and why?

**Correct Answer:** There are hundreds of different types of soil, however there are 6 main types of soil that you will focus on in this lesson.

Why do you think there are hundreds of different types of soil?

Why might soil contain some types of rocks more than others?







# Matching Rocks and Soils



In pairs, match soils and the rock(s) they are formed from.

Clay Soil



Clay





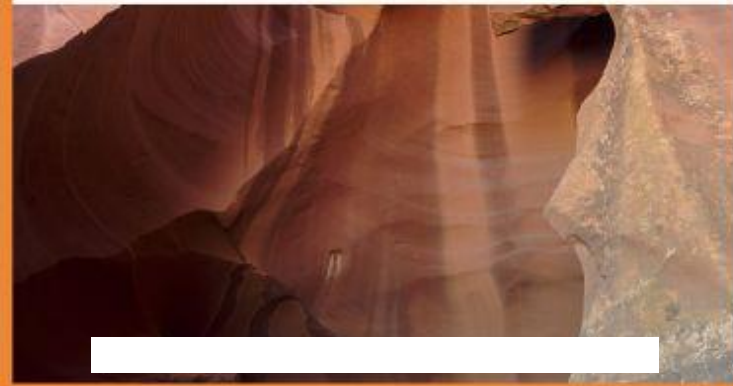
# Matching Rocks and Soils



Sandy Soil



Sandstone



\_\_\_\_\_





# Matching Rocks and Soils



Chalky Soil



Chalk





# Matching Rocks and Soils



Peaty Soil



Peat







# Matching Rocks and Soils



Loamy Soil



Clay, Sandstone and Siltstone







# Comparing Soils



Soil is made up of tiny particles of rock, dead and decaying plants and animals, air and water. Worms and other insects live and die in the soil and, along with microbes, they help to break down dead plants and animals in the soil.







# Soil Permeability

Just like rocks, soils differ in terms of how permeable they are.

## Why does it matter?

We grow much of our food in soil, including vegetables, fruit, wheat and rice. The permeability of soils affects which plants will grow and how well they grow in the particular soil.

When describing the permeability of a material...

**Permeable** means that liquids flow through it.

**Semi-permeable** means that some liquid manages to flow through it.

**Impermeable** means that liquid cannot flow through it.



# Making Careful Observations

In this investigation it is important that you make careful observations.

Seeing, looking and glancing are not the same as observing!

Scientists have to train themselves to observe carefully to know and understand what they are observing.



## Observation Checklist:

- Focus your attention to what you are trying to find out in your investigation (in this case the permeability of soil).
- Make sure you have a clear view of what you are observing.
- Avoid taking your attention away as you may miss something important happening. This would mean that what you think has happened and what actually happened is different.







# Testing Permeability



Question: What is the permeability of different types of soils?

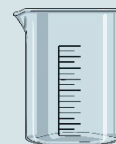
Prediction: I predict that \_\_\_\_\_ soil will be the most permeable and \_\_\_\_\_ soil will be the least permeable. I think this because \_\_\_\_\_

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Equipment:

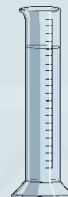


Beakers



Measuring cylinder

Water



Funnels

Coffee filter papers



(use a different one for each type of soil)



# Testing Permeability



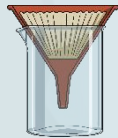
## Method:



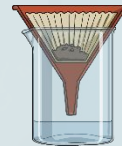
1. Place the funnel in the beaker.



5. Observe the water filtering through.



2. Insert a coffee filter into the funnel.

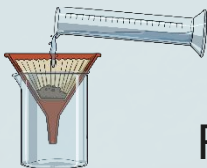


6. After 5 minutes check how much water has collected in the beaker and record this on your **Soil Permeability Activity Sheet**.



3. Add the soil sample to the lined funnel.

4. 4. Pour 300 ml of water into the soil.



Repeat the instructions with each soil sample you are testing.



# Oral Presentation



I can present my findings using scientific vocabulary.

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I can use simple specific language accurately in my presentation.







# Presentation

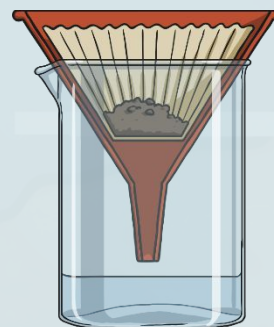
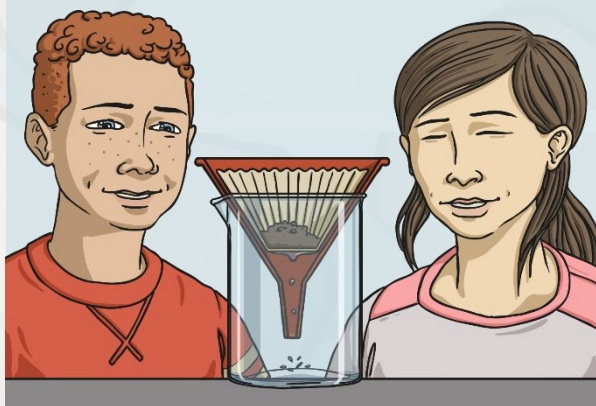


Were the findings similar or different?

Why do you think that might be?

How can we know which results are accurate?

What conclusions can you draw about the permeability of different types of soil?







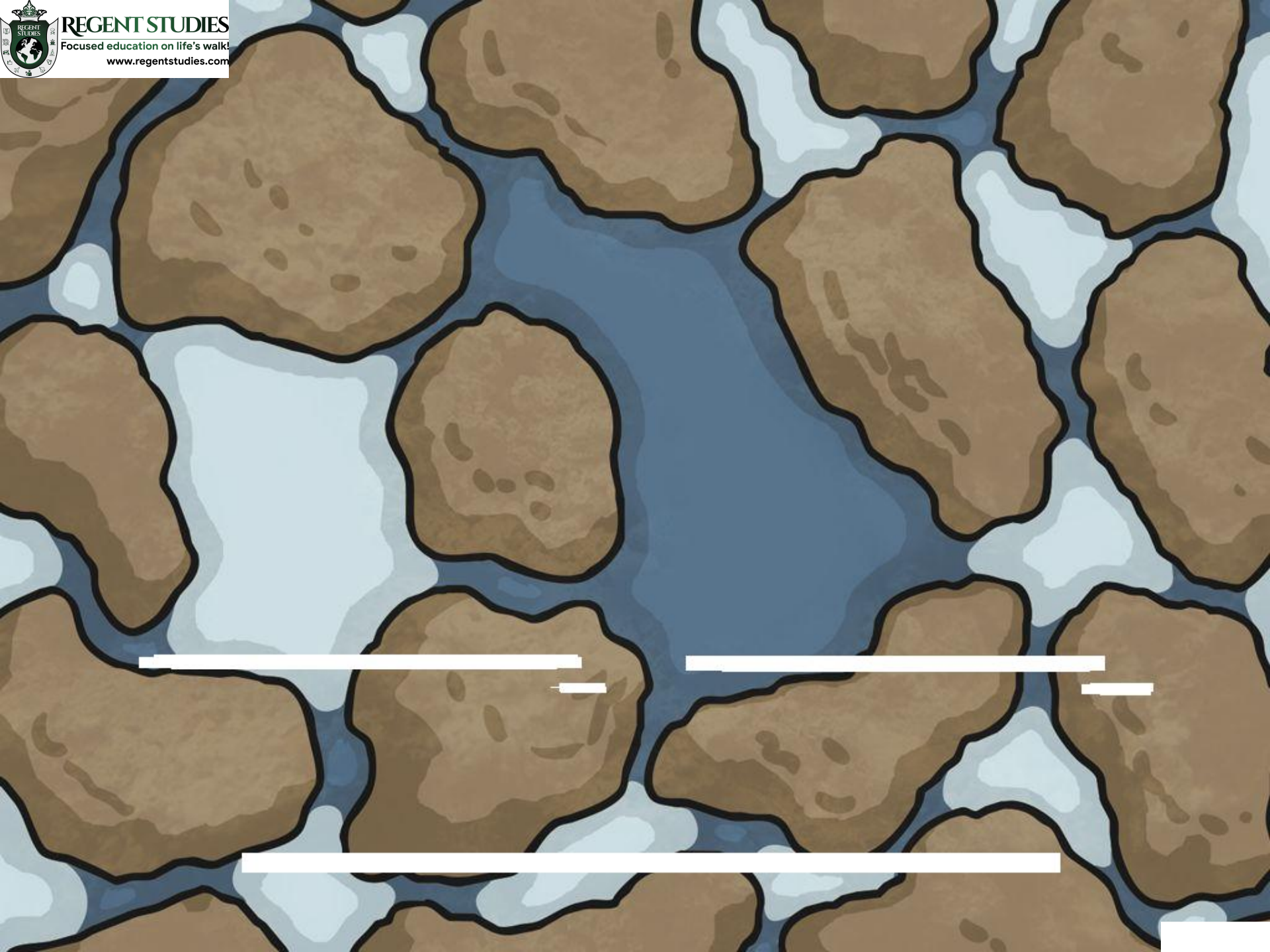
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\_\_\_\_\_

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