

# Geography:

## Factors Influencing Variations in Runoff: Soil Structure and Infiltration

### Geography

#### The water cycle

- Drainage basins as open systems – stores and flows
- Factors influencing runoff variation
- Changes in the water cycle, both natural and human-induced (including farming practices and land use change)

#### Environment and population

- Exemplifying relationship between soils and human activities, especially agriculture. Soil problems and their management as they relate to agriculture: soil erosion, waterlogging and structural deterioration

#### Opportunities for Geography fieldwork investigation

To access the PowerPoint slides and the resources online, here is the QR code and weblink: <https://www.countrysideclassroom.org.uk/resources/1820>



**Time:** 1 hour classroom time + 1 hour for fieldwork activities

### Resources Required

- Fieldwork activity – Water infiltration test
  - A length of pipe 10 cm in diameter and 20 cm long
  - Hammer
  - Stopwatch (often available on your phone)
  - Ruler or tape measure
  - Tape or permanent pen
- Fieldwork activity – How to assess soil structure
  - Spade
  - Ruler or tape measure
  - Plastic sheet or tray
  - Soil structure scorecard
- PowerPoint
- Student Activity

### Objectives

- To understand drainage basins as open systems – stores and flows
- The interpretation of flood hydrographs
- To consider factors influencing runoff variation
- To understand human-induced changes in the water cycle (including farming practices and land use change)
- To consider the role soil structure plays in infiltration and runoff

## Teacher Notes

Almost three-quarters of the land in the UK is used for agriculture. The management of agricultural land is therefore a major influence of flows and storage within drainage basins. This activity will review the concept of drainage basins as open systems composed of stores and flows, allow students to interpret flood hydrographs and promote discussion around natural and human impacts on runoff variation.

- The PowerPoint ('Factors Influencing Variations in Runoff: Soil Structure and Infiltration') should be used to review drainage basins, flood hydrographs and factors influencing runoff
- Two practical fieldwork activities ('Water infiltration test' and 'How to assess soil structure') build on this learning, providing real-world context
- An independent activity consolidates and demonstrates learning

## You Could Also...

Use this A- Level Resource on Soil and Assessing Soil Health and Soil Biological Activity

<https://www.countrysideclassroom.org.uk/resources/1819>

## Make It Simpler

If it's not possible to conduct the practical activities, data could be provided to the students to allow the completion of the independent task.

## Make It Harder

The 'Think soils' manual (<https://ahdb.org.uk/thinksoils>) is a practical guide to soil assessment. It aims to help farmers, land managers, government and non-government advisers to recognise problems with erosion and runoff from agricultural land. The 'Think soils' resource could form the basis for a more in-depth study.

## Linking to Sustainability

Climate change is resulting in more frequent and extreme weather events. During this session, students will discuss ways agricultural land can be managed to help reduce the severity of flooding (e.g. cover cropping, planting of hedgerows and improving soil health). Lead a class discussion to discuss the additional environmental benefits some of these strategies bring. You may want to think particularly about carbon sequestration and biodiversity gains.