

Exploring water in soils: Infiltration and hydraulic conduc-



· EXPLORE
SOILS ·

Summary:

Soil is main material through which “throughflow” occurs and is an important method of transport of water through the hydrological cycle. Where soil acts as both a filter, removing compounds/physical particles from the soil but also may add to it.

Measuring the rate of infiltration allows us to estimate the amount of water that a soil is able to absorb during rain events, this allows for further assumptions to be made about the rate of surface runoff that a soil will be subject to and potential erosion or flooding risks.

Learning Objectives:

- Understand the practical nature of infiltration through soil
- Witness and apply measurement to infiltration rates within soils
- Contrast and compare various soils infiltration rates

Equipment:

- Piece of drainage pipe cut to 30cm diameter
- Piece of net cloth
- 10litres+ of water
- Knife
- Stopwatch
- Measuring cylinder
- Wood block
- Mallet/Hammer
- Electrical tape
- Spirit level

Preparation:

Estimated time 30 minutes.

Chop drainage pipe to size and place electrical tape around the outside to mark 10cm from base.

Time Required:

Introduction 5 mins

Select location and cut turf - 5 mins

Insert ‘infiltrometer’ (pipe) 10 mins

Prepare ground 5 mins

Add measured water and timing 5-20 mins (dependent on soil)

Calculating hydraulic conductivity 5 mins

Total timing 35-50 minutes.

Background Learning Needs:

- Understanding of basic soil horizons (eg. O, A, B and C)
- Understanding of hydrological cycle

Risk Assessment:

Hazard	Likelihood	Severity	Mitigation
Injury from knife	Medium	Medium	Use care when cutting earth
Illness from ingesting soil	Low	Medium/High	Use gloves to handle soil
Site/local specific risks	Unknown	Unknown	Anyone running this activity is advised to conduct a risk assessment for the specific site and conditions

Description of Activities:

1. Select location for recording hydraulic conductivity and place tube on the ground and use this a block to cut around with the knife- this allows for the vegetation or binding within the soil to be broken apart and makes driving the 'infiltrator' in easier.
2. Use the block of wood to knock the pipe into the cut that has been made using the hammer/mallet. Knock the 'infiltrator' into the ground until the level of 10cm, which is marked by the tape.
3. Check that the top of the 'infiltrator' is level using the spirit level, at ~3 points across the diameter, and alter with the block and hammer where it is not.
4. Place the net fabric in the base and pour water both within the 'infiltrator' and outside to ensure that the ground is wet.
5. Measure out 1litre of water into the measuring cylinder.
6. Remove the cloth from the 'infiltrator'.
7. Set the stopwatch to 0 and begin it as the water is poured into the 'infiltrator'. This method uses the constant-head method so keep the water topped up to the rim of the 'infiltrator' until all the litre is within the tube.
8. Stop the stopwatch at the point when all the water has been absorbed by the ground.
9. Calculate hydraulic conductivity.



