




Components

	NAME	DESCRIPTION	AUDIENCE
	<i>Soil scientists</i> teachers guide	This guide shows how to extend students' knowledge of sampling techniques by studying two case studies.	teachers
	<i>Soil stories</i> fact sheet	This provides interviews with two soil scientists about their research and sampling techniques.	students
	<i>Soil scenarios</i> worksheet	Students apply their knowledge to research scenarios.	students

Purpose

To enable students to reflect upon their knowledge of soil sampling techniques in the context of the PhD projects of two University of Western Australia scientists. Students use their knowledge to solve problems in relation to the two different research scenarios.

Activity summary

ACTIVITY	POSSIBLE STRATEGY
Students read the fact sheet, <i>Soil stories</i> , and discuss the research projects as a class.	individually or in pairs
Students complete the worksheet, <i>Soil scenarios</i> .	individually or in groups, with teacher-led discussion

Technical requirements

The teachers guide, fact sheet and worksheet require Adobe Reader (version 5 or later), which is a free download from www.adobe.com. The worksheet is also available in Microsoft Word format.

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Outcomes

Students:

- recognise that different investigation techniques are used in different research projects; and
- suggest appropriate methodology when presented with a new research scenario.

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Teacher notes

Suitable discussion questions and suggested answers are tabulated below.

DISCUSSION QUESTION	SUGGESTED ANSWER
Deborah states that she knew her sample sites were 'undisturbed' and 'homogenous' before taking four random soil samples at each site. Why was this important?	At a homogenous site she could be fairly confident that the soil microbes were uniformly distributed, allowing her to take fewer samples from the area than if it was highly heterogeneous.
Back in the laboratory, Deborah treated half the soil with hydrocarbons, but left the other half untreated. Why did she leave half untreated?	These were her controls. They let her see which changes in microbial activity were due to the hydrocarbons and which changes occurred naturally in the controls due to environmental conditions.
Why did Martha sample around the base of many plants, for each species, when collecting the soil? Why didn't she collect the soil from just one or two plants of each species?	By taking multiple soil samples she's more likely to get a representative sample of soil fauna that live around the roots of each plant species. A single sample puts you at risk of an abnormal result that is then assumed to be normal.
Why was it not important to have exactly the same number of samples from each plant species?	It was important to have a representative sample of soil organisms across the sites and plant species to mix into the soil for the experiment. Exactly equal numbers of samples were not important.
Every two weeks Martha rotated the plant pots that were growing in the glasshouse. What do you think she meant by rotated, and why do you think she did this?	Rotating means moving the pots within and between the root cooling tanks. Even though they were kept at a constant temperature and watered the same way it's possible there were differences between two root cooling tanks. Rotating the pots ensured that all pots were exposed to the same environmental conditions.

Associated SPICE resources

Soil life 5: Soil scientists may be used in conjunction with related SPICE resources.

DESCRIPTION	LEARNING PURPOSE
<p><i>Soil life (overview)</i></p> <p>This learning pathway shows how a number of SPICE resources can be combined to assist with teaching the topic of ecology.</p>	
<p><i>Soil life 1: Life in the soil</i></p> <p>This resource engages student interest in the variety and importance of soil fauna.</p>	Engage
<p><i>Soil life 2: Exploring soil</i></p> <p>Videos guide students through the process of sampling soil and extracting soil fauna, which they then identify.</p>	Explore
<p><i>Soil life 3: Soil ecosystem</i></p> <p>Students use worksheets and an interactive learning object to construct food chains and food webs. An animated video explains the concept of energy flow through ecosystems.</p>	Explain
<p><i>Soil life 4: Soil investigation</i></p> <p>Students investigate the importance of the sampling strategy by using an interactive learning object to see how observed sampling results vary with each organism.</p>	Explore/Explain
<p><i>Soil life 5: Soil scientists</i></p> <p>Interviews with soil scientists illustrate the importance of different sampling strategies in their research.</p>	Elaborate