



## Classifying pollen

### Components

	NAME	DESCRIPTION	AUDIENCE
	<i>Classifying pollen</i> teachers guide	This guide suggests how students can explore characteristics of pollen, classify pollen and produce a dichotomous key.	teachers
	<i>What is pollen?</i> background sheet	This sheet contains information about pollen and its features.	teachers
	<i>Exploring pollen</i> presentation	This presentation contains information about pollen and its features.	teachers students
	<i>Forensic palynology</i> fact sheet	This fact sheet explains how properties of pollen are used in investigative science. It includes a profile of forensic palynologist, Dr Lynne Milne.	students
	<i>Looking at pollen</i> procedure sheet	This instructional guide provides a reliable method of collecting, preparing and observing pollen under a microscope.	students
	<i>Virtual microscope: Pollen in focus</i> learning object	Students use a virtual microscope to examine characteristics of pollen, through measurement and observation.	students
	<i>Classifying pollen</i> worksheet	This worksheet guides students through the classification of pollen. It directs students to produce a classification key based on their own observations from the virtual microscope.	students

### Purpose

To **Explore** the nature of pollen including its collection, observation and classification.

### Outcomes

Students:

- use microscopy skills for collection and identification, and development of a summary table of pollen features;
- collect pollen from a sample;
- prepare a wet mount slide for viewing under a microscope;
- observe pollen under a microscope;
- recognise unique characteristics of pollen types;
- use a classification key for pollen, based on observable features; and
- select appropriate discriminators for use in a dichotomous key.

## Activity summary

ACTIVITY	POSSIBLE STRATEGY
Distribute the fact sheet, <i>Forensic palynology</i> , and allow students time for reading. Students are introduced to uses of pollen and the work of forensic palynologist, Dr Lynne Milne.	Generate class discussion about other possible uses.
Students are introduced to terms and information used in palynology either through viewing the presentation, <i>Exploring pollen</i> , or through information provided in the background sheet, <i>What is pollen?</i> Discuss concepts involved.	Allow students to view presentation as a class and encourage note-taking.
Students explore the learning object, <i>Virtual microscope: Pollen in focus</i> .	individually or pairs
Students use the worksheet, <i>Classifying pollen</i> , to guide them through use of the virtual microscope and development of a classification key.	individual students on computers or teacher-led whole group
Use the fact sheet, <i>Forensic palynology</i> , with observations students have made, and the focus questions below, to develop a teacher-led class discussion.	teacher-led class discussion on questions outlined below

### Technical requirements

The guide, background sheet, procedure sheet and worksheet require Adobe Reader (version five or later), which is a free download from [adobe.com](http://adobe.com). The procedure sheet and worksheet are also available in Microsoft Word format.

The presentation is provided in Microsoft PowerPoint and Adobe PDF format.

The learning object requires Adobe Flash Player version 8 or later (this is a free download from [adobe.com](http://adobe.com)).

### Focus questions

The procedure sheet, *Looking at pollen*, guides teacher and class through processes of pollen collection and preparation of pollen for microscopy. The activity is designed for a single laboratory session.

Collection of flowers from the school grounds, or in the field, might be incorporated into the activity. Different flowers need to be kept separate after collection. Any plants with large flowers are practical for pollen collection and identification. Particularly useful plants include: hibiscus, jasmine, sunflowers, daisies, grevillea, and most banksias and acacias.

The purpose of this activity is to observe and record shape, size and surface texture of pollen grains to show variations between plant species.

The following questions may assist in generating class discussion:

- Who in the class saw pollen? (answers will vary)
- Who in the class had problems with equipment or techniques? (answers will vary)
- What methods did groups use to overcome any problems? (answers will vary)
- What features of pollen were visible under the microscope? (Usually only shape and colour are seen under ordinary light microscopes, with the possibility of some surface features. Better resolution through high quality light microscopes and electron microscopes leads to more definition and feature identification.)
- What were similarities and differences between the pollens you saw? (answers will vary)
- Explain how a forensic palynologist could use observations you have gathered (as part of a database for later use, if observations were from a crime scene).
- The fact sheet describes the need to 'take care that crime scenes are not contaminated'. What did your observations show that might justify this statement? (Sometimes a sample is contaminated with pollen transferred from another source, because of its small, light nature. It is necessary to be precise and clean to maintain sample reliability.)

## Using the learning object, *Virtual microscope: Pollen in focus*

The virtual microscope includes ten examples of native pollen types. Each example is presented on a single screen and includes a photograph and brief species description.

- Select a slide to view a particular pollen type under low, medium or high magnification.
- For each magnification a description of observable characteristics is provided.
- Select **Grid** to place a grid over the pollen. Structures on the slide may be measured, using a scale underneath the image.
- Select **Labels** to display detailed labels for the selected pollen.
- To move the image, drag it in the direction required.
- Use the **Rotate** control to rotate an image for better viewing or fit.
- Select **Split screen** to view two slides simultaneously, either to compare different pollen (eg *Grevillea* Robyn Gordon and *Banksia littoralis*), or to view the same pollen side by side.
- Select the **Padlock** between two slides to move both images together. This can be used to compare labelled and unlabelled views of a slide.

## Acknowledgements

Thanks to Dr Lynne Milne (School of Earth and Environment, The University of Western Australia).

Photography: Dr Lynne Milne (School of Earth and Environment, The University of Western Australia), Mr Tom Alford (Friends of Kings Park); photograph of *Adenanthos meisneri* by J Scott, S D Hooper and M Hislop. Image used with permission of the Western Australian Herbarium, Department of Environment and Conservation.

Designed and developed by the Centre for Learning Technology, The University of Western Australia.

Production team: Kim Braimbridge, Roger Dickinson, Jan Dook, Alwyn Evans, Bob Fitzpatrick, Jenny Gull, Trevor Hutchison, Mark Lehmann, Paul Ricketts, Jodie Ween and Michael Wheatley, with thanks to Fred Deshon and Wendy Sanderson.

## Worksheet activities

The student worksheet, *Classifying pollen*, contains a range of questions that relate to the virtual microscope. Some questions may require students to use resources, other than those provided in the learning object, such as relevant textbooks and the Internet.

The worksheet assists students to identify eight observable features of pollen. Note: students may have already completed this part of the worksheet in the SPICE resource, *Food and energy 2: Pollen*.

Students use this information to complete a dichotomous key. By choosing a series of discriminators from the table provided, students classify pollen into different groups, and sort these into a classification system. Students enter this information into a dichotomous key.

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Web: [spice.wa.edu.au](http://spice.wa.edu.au)  
Email: [spice@uwa.edu.au](mailto:spice@uwa.edu.au)  
Phone: (08) 6488 3917

Centre for Learning Technology (M016)  
The University of Western Australia  
35 Stirling Highway  
Crawley WA 6009