

In this exercise you will use an interactive learning object, *Virtual microscope: Pollen in focus*, to summarise characteristics of nine types of pollen. You will then use these characteristics to design a dichotomous key to classify pollen.

- Open the *Pollen in focus* software, then complete Table 1 in this worksheet.

Your next task is to use these pollen characteristics to design a dichotomous key. A dichotomous key helps you form descriptive statements in order to identify and name an organism. Figure 1 shows part of a dichotomous key.

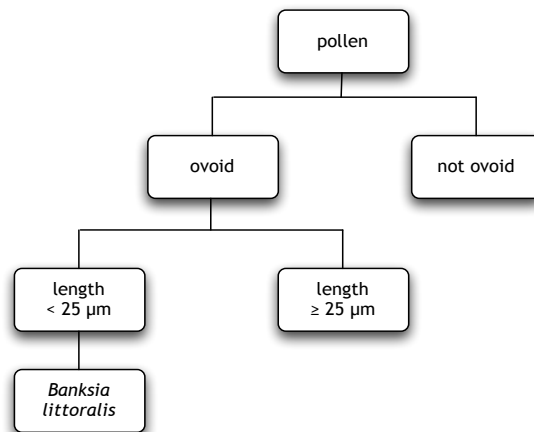


Figure 1: example of a dichotomous key

Use the template in Figure 2 (at the end of this worksheet) to design your key. As you construct your key, remember: not all boxes in Figure 2 will be completed; all pollen grains must be included; and your key should show all decisions required to identify a particular pollen grain.

Step 1 (explains the process)

- The first row in Figure 2 has been completed for you, with entries ‘ovoid’ and ‘not ovoid’. This characteristic of pollen divides pollen types into two categories. Do not write the names of pollen grains at this stage.
- About half the pollen types will appear on each side of the key.
- An easy way to approach this task is to ask a question that has a ‘yes’ or ‘no’ answer. For example, the question for the first row may have been: Are the pollen grains ovoid? If the answer is ‘yes’ the characteristic appears on the ovoid side, and if the answer is ‘no’ it appears on the not ovoid side.
- Each row requires you to choose a different characteristic and to form a relevant question that has a ‘yes’ or ‘no’ answer.

Step 2 (what you should do)

- In the second row of Figure 2, write a characteristic that divides the first two groups of pollen into four groups, two on each side of the diagram.

Step 3

- Continue this process with each row. When you run out of characteristics complete the following row with names of the pollen grains. Make sure you classify all nine of the pollen grains.

Questions

1. Is the dichotomous key you completed the same as those produced by other members of the class?

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2. What might be reasons for this?

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3. When completing the dichotomous key you used only observable characteristics, such as shape. Why are observable characteristics used?

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4. Why would the following characteristics of organisms be unsuitable for use in dichotomous keys?

- behaviour

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- internal structures

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- distribution

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5. Why is colour not a good choice when classifying pollen?

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6. Will a specific pollen always be classified the same way in a dichotomous key?

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7. Why are classification and identification an important part of biology?

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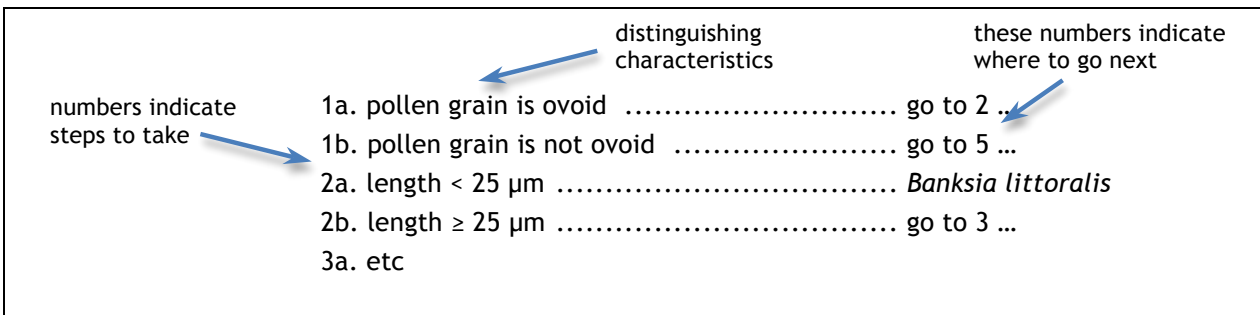
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Extension activity

Dichotomous keys are presented in a number of forms. One form is graphic, as in Figure 1. Another form, commonly used by scientists, is to present information as text, as shown below. This text form of a dichotomous key is easier to publish (the explanatory notes are not included).



- Convert your graphic dichotomous key into text. Use the conventions above to complete your key.
- Compare and contrast graphic and text forms.

8. Which form is more usable?

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9. Are there situations when one form would be more useful than the other?

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10. Which form would be more useful for the following groups of organism?

- species of echidna

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- species of seagrass

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- all animals of the world

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11. Use resources to find other ways to present classifications. Discuss these ways and consider advantages and disadvantages.

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12. Complete a dichotomous key for a group of your choice (such as insects, leaves or flowers).

Table 1: pollen characteristics

Characteristic Pollen	Shape with sketch	Colour	Grain dimensions (length/width/diameter) (you may have a few measurements here)	Pollen wall width	Pore diameter	Number of pores	Surface texture
<i>Adenanthos meisneri</i>							
<i>Adenanthos obovatus</i>							
<i>Banksia grandis</i>							
<i>Banksia ilicifolia</i>							
<i>Banksia littoralis</i>							
<i>Banksia meisneri</i>							
<i>Banksia occidentalis</i>							
<i>Grevillea</i> Robyn Gordon							
<i>Hakea lissocarpa</i>							

Figure 2: dichotomous key

