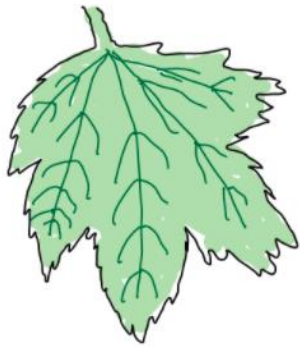


A3.1 Diversity of organisms

How to make your own dichotomous key

Choose 5 or 6 species around you.

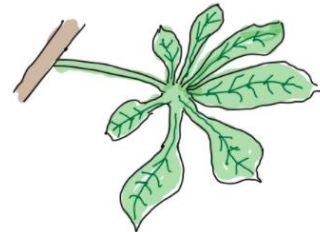
Here are some examples of some broadleaf trees which are often planted in the urban areas and public parks of temperate climates.



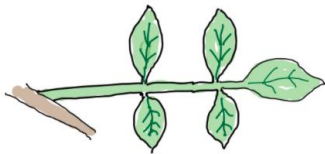
Sycamore (*Acer pseudoplatanus*)



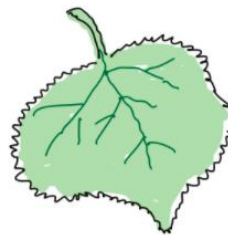
Silver birch (*Betula pendula*)



Horse chestnut tree
(*Aesculus hippocastanum*)



White Ash (*Fraxinus americana*)



Small-leaved Lime
(*Tilia cordata*)

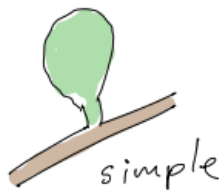
Observe the trees and their leaves.

What features do they have in common?

What differences do they have in their morphology?

Here are some characteristics to look for:

Do the leaves grow individually or are they in groups? Here the dichotomy splits leaves into simple or compound leaves.



Do they have deep indentations? Here the dichotomy splits leaves into lobed or not lobed leaves.



lobed



not lobed

If they are lobed, do the lobes originate from a single point at the base of the leaf or do they occur from alternating points along the mid rib?

Here the dichotomy splits leaves into palmately lobed and pinnately lobed leaves.



palmately lobed



pinnately lobed

Do they have rounded sides and end in a point? Here the dichotomy splits leaves into heart shaped or not heart shaped leaves.



heart shaped



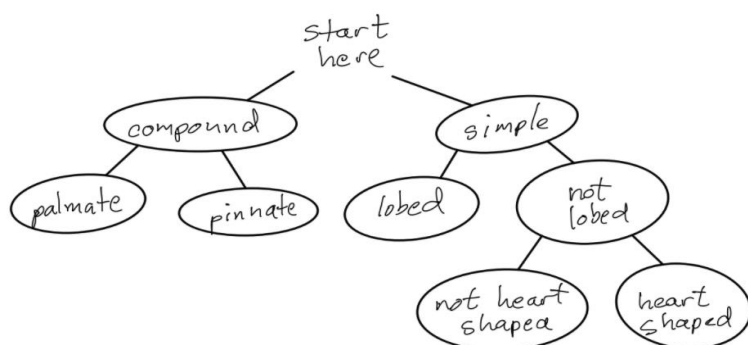
not heart shaped

Can you see other dichotomies in the characteristics of the leaves?

- jagged edges or smooth edges?
- hairs on the surface or no hairs?
- thick and leathery or thin and flexible?

Note that each category must be mutually exclusive for the dichotomous key to work. If you run into a problem where one type of leaf can fit into both categories, you will need to create a new dichotomy.

Now pick some characteristics to make a dichotomous key. One helpful technique is to draw a flowchart showing each dichotomous split into categories. Start with the biggest split you can make and then get more specific. For example, only leaves without lobes can be heart-shaped, so the heart-shaped category would be a subcategory of the 'not lobed' category.



A flowchart using morphological features can help to build a dichotomous key.

The flowchart can then be used to make the key. For each dichotomy, write either where the next dichotomy is or write the name of the tree if it is the only one in the key with that combination of characteristics.

- 1a** The leaf is compound go to 2
- b** The leaf is simple go to 3

- 2a** The leaf is palmate horse chestnut
- b** The leaf is pinnate white ash

- 3a** The leaf is lobed sycamore
- b** The leaf is not lobedgo to 4

- 4a** The leaf is not heart shapedlime
- b** The leaf is heart shapedbirch

This key is quite short and simple because there are only 5 trees to identify. If we add more trees to the key, we will need a longer list of categories. To be sure your key works, give someone the leaves you collected and then give them the dichotomous key. If they are able to identify the trees correctly, your key is effective.

Below is a list of some possible organisms for which you could try making a dichotomous key of your own. It depends on what you have available in your local area and it often depends on the season, too.

Please keep in mind the following things when observing nature: respect the organisms and their habitat as well as local laws and remember that plants can be observed without having to pick them and animals do not necessarily need to be captured to be observed.

- Birds, including waterfowl such as ducks and swans
- Common plants, such as dandelions, clover and plantago that might be in your school's sports fields or a local park
- Insects in your area, including moths or butterflies – shining a flashlight against a white sheet of fabric suspended outside on a warm night works well for observing moths
- Lichens or mosses growing on trees, rocks or on marker stones in graveyards