Shape & Symmetry

AN ACTIVITY TO DO AFTER VISITING GEELONG BOTANIC GARDENS

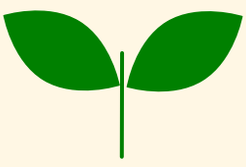
Looking around the botanic gardens, it's easy to see that plants come in all shapes and sizes. But there are common patterns to the growth habit and structure of plants that help botanists to identify, classify and describe plants. This is particularly important when encountering a new species.

It's estimated there are 80 to 100 thousand species of plants yet to be classified and described. Perhaps one of your students will grow up to contribute to scientific knowledge about the plant world. Botanists find and classify new species every month!

Classification relies on observation of the way plants grow and are structured. Most flowering plants begin in a predictable form - the shoot being either monocotaceous or dicotaceous (monocots or dicots). Put simply, this just indicates whether a shoot has one (mono-) seed leaf or two (di-) seed leaves when it appears. Grass, corn and bamboo are monocots. Pumpkins, peas, rocket and most vegetable seedlings are dicots.

This Maths lesson focuses on finding symmetry in plants. Incidental learning about classification and observable features in plants support studies in Science.

Monocot
e.g. corn, bamboo, grass



Dicot
e.g. pea, bean, pumpkin, daisy

Victorian Curriculum Links:
Level 3 - Mathematics: VCMMG144, VCMMG145
Level 4 - Mathematics:
VCMMG173, (optional) VCMMG174
Levels 3 & 4 - Science VCSSU057, VCSIS072

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resources

- The leaf arrangement diagrams on the next three pages will be useful.
- If you have plastic mirrors or mirror cards, you might use them in this lesson to help students see lateral symmetry in leaves and leaf arrangements.
- Background botanical information for the teacher about monocots vs. dicots from University of Berkeley.
- Watch this Gardening Australia factsheet on monocots and dicots with students: The Meaning of Leaf (video, duration 2:49)

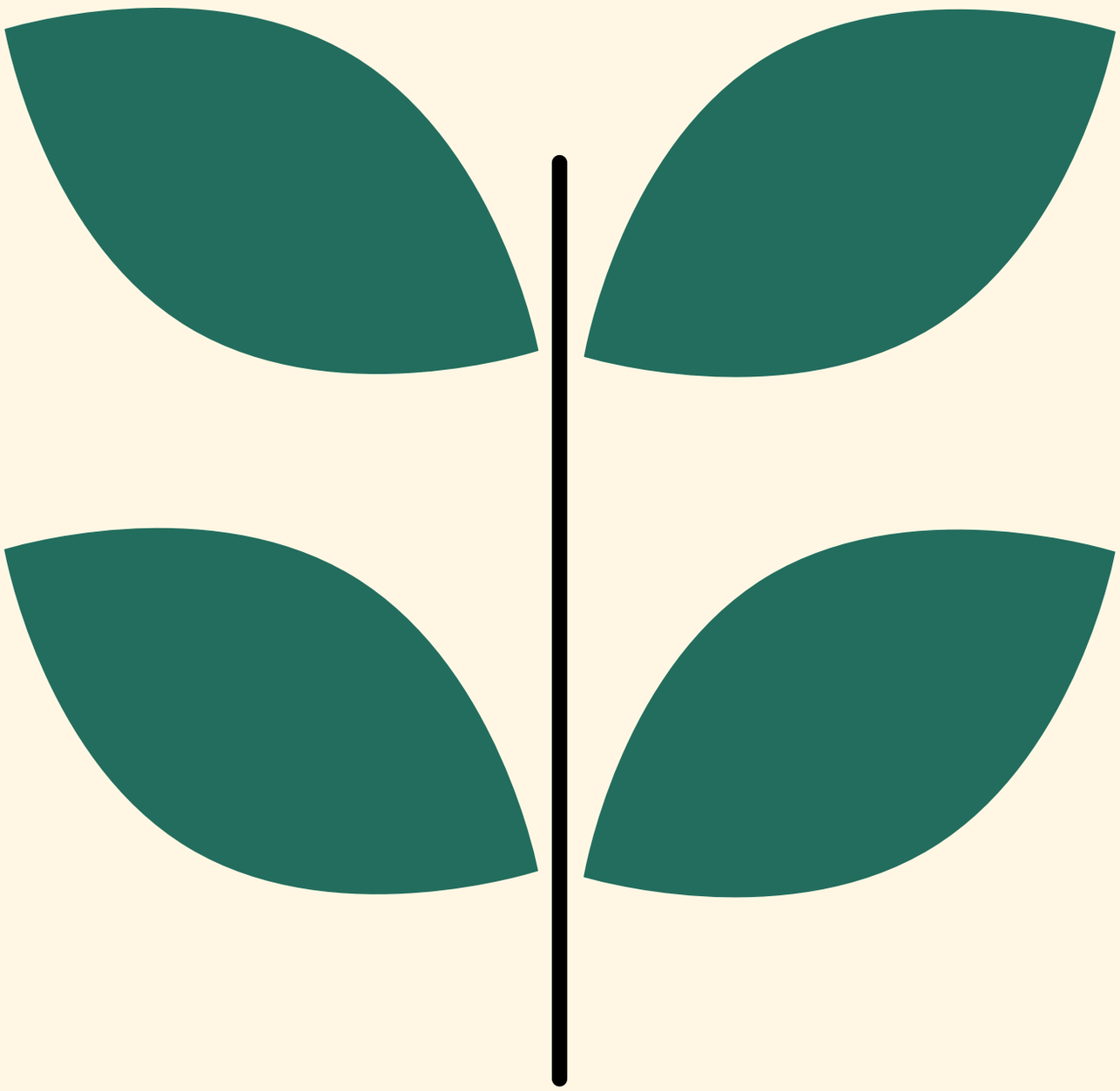
Extension idea:

- Explore how insects use visual as well as chemical cues to recognise their food plants: How do Insects Find Their Host Plants?

directions

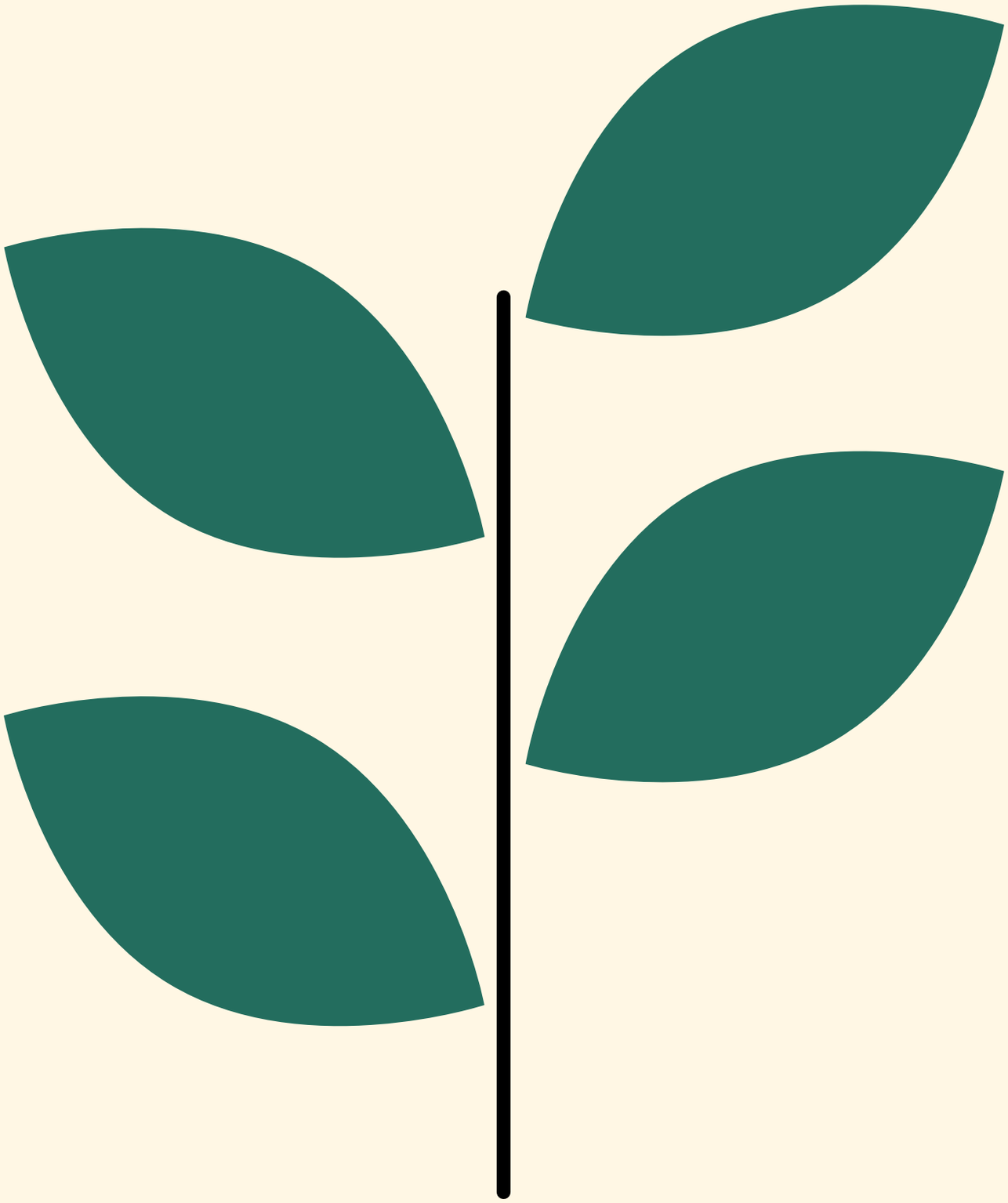
- Explore pictures and if possible, real specimens of **monocotaceous** and **dicotaceous** plants. If time permits you to grow pea and corn seeds with students before this lesson, it will have even more relevance.
- Trace around the shape of leaves collected from the school grounds.
- Use the leaves and drawings to identify lines of symmetry in leaves.
- Use seedlings or branches harvested (appropriately) from plants such as shrubs and flowers to look for symmetry in the leaf arrangement on the stem.
- You might use the images on the following pages as examples of leaf patterns or arrangements that help botanists and others to identify, classify and describe plants. You may also use plastic mirrors to help students see the lines of symmetry.
- What type or types of symmetry does each example display - in its leaf arrangement / in each individual leaf?
- Look at a wide range of natural materials including gum nuts, eucalyptus leaves, blades of grass and other common natural materials.
- Press them and create posters explaining what plant the leaf comes from and how it displays what type of symmetry.

Leaf Arrangements



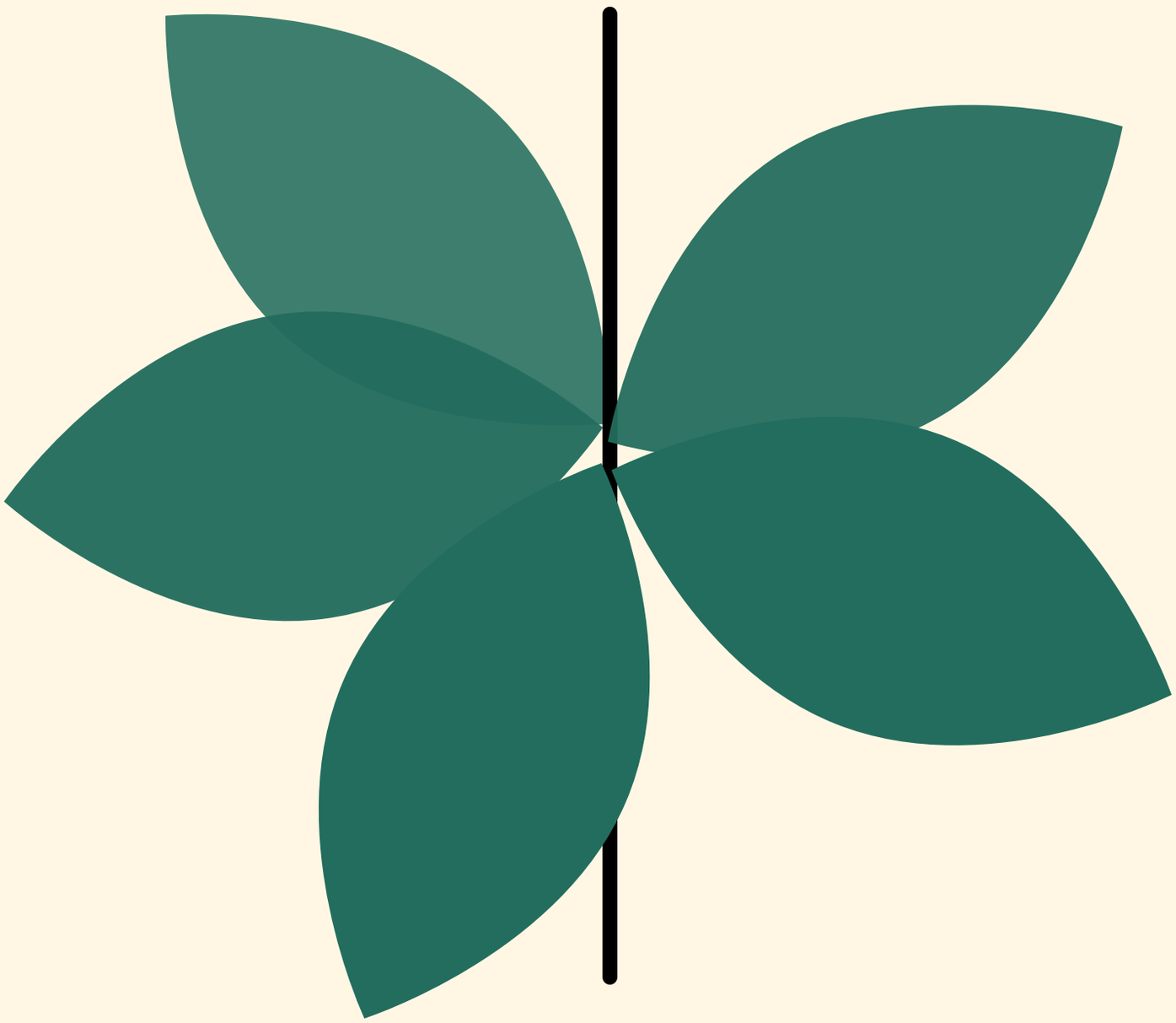
Opposite

Leaf Arrangements



Alternate

Leaf Arrangements



Whorled