

# MOLECULAR PLANT BIOLOGY WITH DR CHARLOTTE KIRCHHELLE

## TALKING POINTS

1. What is molecular plant biology? (See *About molecular plant biology*)
2. What are some of the differences between plant cells and animal cells?
3. How many of the estimated 8.7 million species on Earth are plants? (See *Introduction to the article*)
4. What are cell geometric edges? (See *What are cell geometric edges?*)
5. Why is Charlotte studying plant morphogenesis? (See *Why is this research important?*)
6. What is RAB-A5c? (See *What have the team discovered up to this point?*)
7. What does Johann Wolfgang von Goethe's poem, *The Metamorphosis of Plants*, talk about? (See *What does Charlotte love most about her research?*)
8. Why do scientists need to think about and study how to improve plants for food production? What sorts of things could they improve in plants?

## EVEN MORE RESOURCES

- Penn State Extension has a page called 'Botany for Beginners', which is dedicated to explaining the nuances involved in the world around you. Have a read through and try to define all of the terms involved: <https://tinyurl.com/retz64c>
- The Royal Botanic Gardens in Kew truly are among the best in the world. If you can make a trip there you should, but if not, their website is very interesting. Go explore!
- Avas Flowers has a webpage called 'The Study of Plants and Flowers - A Botany Guide for Kids and Students', which includes heaps of information about botany, including several games that help you learn about the planet and the plants on it: <https://tinyurl.com/t7ah6av>

## ACTIVITIES YOU CAN DO AT HOME OR IN THE CLASSROOM

### CONDUCT YOUR VERY OWN CELL BIOLOGY EXPERIMENT!

This simple experiment will show you how plants adapt to survive. You will need:

- A packet of sunflower seeds
- Small pots or seed trays
- Seed compost

Fill two pots almost to the top with seed compost then tap the compost so it is level. In each pot, place a seed on the surface of the compost and then cover with soil. Water the pots lightly (too much water will cause your seeds to drown or rot). Place one of the pots on a warm, sunny windowsill, and put the other pot in a dark room or cupboard.

Keep monitoring your plants. Over the next week or so, you notice them growing very differently to each other. Here are examples from Charlotte's lab of the model plant *Arabidopsis thaliana*.



"This experiment illustrates that plants can sense light and change their growth accordingly," says Charlotte. "If a plant germinates in the dark, it normally means it is covered by soil. Plants have a limited amount of nutrients in their seeds and need to photosynthesise to survive and grow. A plant in the dark will grow a long, thin hypocotyl until it encounters light so it can photosynthesise. In comparison, a plant grown in the light will unfold and expand its leaves, enabling it to photosynthesise. The green colour comes from the chlorophyll, the pigment plants use to harvest light energy during photosynthesis."