

# Evolutionary biology

with Dr Kate Ostevik

## Talking points

### Knowledge

1. What is a geographical barrier?
2. What is parallel evolution?

### Comprehension

3. How can a difference in mating season act as a reproductive barrier?
4. How can a structural variant, such as an inverted section of chromosome, help keep advantageous alleles together during reproduction?

### Application

5. How might structural variants be responsible for a hybrid plant that can grow but can't produce seeds?
6. How could you adopt a 'growth mindset', and how might this help you lead a successful career in evolutionary biology?

### Analysis

7. Why does Kate use sunflowers to study the process of speciation?
8. Compare the roles of geographical barriers and structural variants. How does each one prevent the mixing of DNA?

### Evaluation

9. "If we can predict when biodiversity is generated, this might also help us predict when it will be lost," says Kate. To what extent do you think this approach will help us protect Earth's biodiversity?
10. Why does Kate say that "mistakes are a normal and important part of science"? How does this challenge the typical public view of scientific facts?

## Activities

Imagine that you are a research assistant in Kate's lab. Design an experiment that would allow you to investigate how seed size affects germination success. Working with a partner, use information from Kate's article and your own research to help you.

Consider the following:

- Your variables: What is your independent variable (the thing you are changing)? What is your dependant variable (the thing you are measuring)?
- Your constants: What conditions will you keep exactly the same for each seed to ensure that any differences are caused by your independent variable?
- Your sample: What seeds will you study, and how many will you use?

Write a clear step-by-step procedure of how you will conduct your experiment. Remember to be detailed and specific; anyone reading this procedure should be able to repeat your experiment exactly. Then, make a prediction about what you think the results of your experiment will show. For example, do you think larger seeds will have a higher or lower germination rate? Why?

Reflection questions:

- What could go wrong in your experiment? How could you adapt your experiment to avoid these limitations?
- If larger seeds do have a higher germination rate, why hasn't evolution made every seed giant?
- What did you find difficult about this activity? What steps could you take to become better at designing experiments?

## More resources

- Keep up with the latest from Kate's lab on their website: [osteviklab.com/news](http://osteviklab.com/news)
- This video from Crash Course provides an introduction into plant evolution: [youtube.com/watch?v=ciGqnGFWqBs](https://www.youtube.com/watch?v=ciGqnGFWqBs)