

## LESSON PLAN

# Species Variation

## Overview

In this lesson, students cover the concepts of variation and adaptation. They then apply these ideas to examples of bacteria which show variation in their population, which leads to some ideas on natural selection. The lesson ends by watching a TED Talk on antibiotic resistance, which is supported by a worksheet.

## National Curriculum links

### KS3/4 Working Scientifically:

- understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review

### Cells and organisation

- the structural adaptations of some unicellular organisms

### KS4 Biology:

#### Health, disease and the development of medicines

- reducing and preventing the spread of infectious diseases in animals
- the process of discovery and development of new medicines

#### Evolution, inheritance and variation

- genetic variation in populations of a species
- the process of natural selection leading to evolution

## Starters

**What is variation and adaptation? (5 minutes)** – Students look at the diagram of Darwin's finches on the PowerPoint presentation. Explain to students that the differences between them are an example of variation. On the slide, the animated question that appears should be used to push students understanding further. Question them on why the larger beak is better for opening hard seeds and nuts to elicit an understanding of adaptation. You could extend the task by getting students to predict what food type the other finches were adapted for.

## Main

The first slide links the starter on finches to why this important in terms of bacteria. The concept of natural selection is lightly touched upon, and is there to help students think about why bacteria may have the features that they do.

Students should then use the MicroTrumps cards. These are available to buy from the Chilled Food Association website: <http://www.chilledfood.org/product/microtrumps/>.

Firstly, they need to compare non-pathogenic and toxigenic *E. coli* thinking about which is better adapted to survive in humans. Students may need some scaffolding on this to get them to think about why it is important that a bacterium is not fatal to the human host.

Secondly, they compare the psychrotrophic and mesophilic varieties of *Clostridium botulinum*. In this example they need to focus on the minimum temperature for growth and relate it to foods. The varieties both produce an equally deadly toxin, but the mesophilic type needs a higher temperature to grow (10°C minimum) which is above that of the maximum at which a fridge should be set (5°C).

Finally students watch the 'TED Ed' lesson on antibiotic resistance using the supporting worksheet questions to help scaffold their learning.

## Plenary

**Tweet your response (5 minutes)** – Ask students to answer a Tweet about overuse of antibiotics.