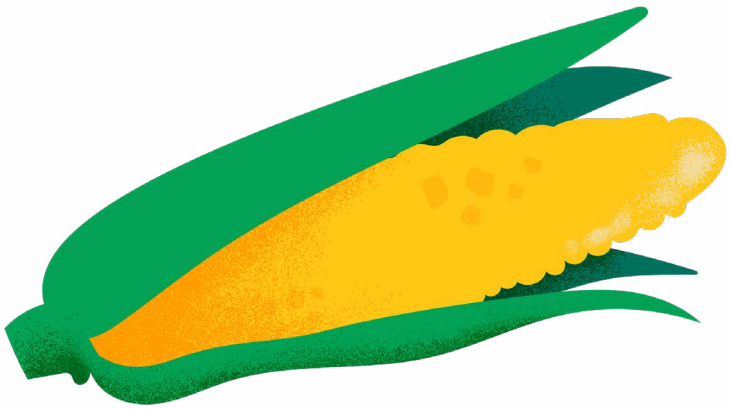
Food Evolution

Year 4 – Science
Year 5 – Technologies
Year 6 – Humanities and Social Sciences



(Science; Yr 4, ACSHE062)
Science knowledge helps people to understand the effect of their actions

(Science; Yr 5, ACSSU043)
Living things have structural features and adaptations that help them to survive in their environment

(Science; Yr 5, ACSHE083)
Scientific knowledge is used to solve problems and inform personal and community decisions

(Science; Yr 6, ACSHE100)
Scientific knowledge is used to solve problems and inform personal and community decisions

(Technologies; Yr 3&4, ACTDEK012)
Investigate food and fibre production and food technologies used in modern and traditional societies

(Technologies; Yr 5&6, ACTDEK021)
Investigate how and why food and fibre are produced in managed environments and prepared to enable people to grow and be healthy

(HASS; Yr 6, ACHASSK137)
(optional) The contribution of individuals and groups to the development of Australian society since Federation

Cross-curriculum priority

Sustainability

Hort Innovation Strategic levy investment | VEGETABLE FUND

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Food Evolution

Little Carrot Dude's journey through the ages...

We wouldn't blame kids for thinking vegetables have always looked and tasted the same. But the truth is much more fun.

From corn to kohlrabi, beans to broccolini, in this lesson we discover how modern and ancient farmers bred vegetables over thousands of years for size, colour, nutrition and flavour.

Equipment:

Several copies of heritage and old-breed seed catalogues such as those from Eden Seeds, Green Harvest, Select Organics, Succeed Heirlooms, The Digger's Club and others (you can request them for free from company websites)

Duration:

45 minutes

Location:

The classroom

Notes:

The Perfect Pet

- Ask the class if anyone has a dog, and what kind of dog it is.
- **Discuss:** if you bred a black dog with a white dog, what colour would the puppies be?
- Spotted black and white is not actually the answer, nor is grey – even though these ideas seem logical. Some of the puppies will be black and some will be white, some may be mixed colours.
- Ask: can we be sure of the outcome – can we say for sure that we will get six puppies, three white and three black? (No.)
- Explain that genetics is the study of how offspring end up with some of their parents' unique characteristics.

Watch **The One with the Little Carrot Dude**

- Explain that many plants work in similar ways. Certain kinds of plants can cross-pollinate (breed) and pass on their individual characteristics to the next generation.
- So if we have little yellow tomatoes and big red tomatoes growing in the same garden for many years, we might eventually end up with a new breed of combining their yellow and red characteristics. These new tomatoes might be stripy or orange, or bigger yellow tomatoes or smaller red tomatoes. With cross-breeding you can find patterns and make predictions but never be one hundred per cent sure what you'll end up with.

(If you would like to show students a more sophisticated explanation of genetics, see 'Genetics'.)

Growing New Food

- Students form groups and look through heirloom seed catalogues for examples of striped vegetables and those that have unexpected colours (red or purple carrots, blue potatoes, purple beans, black corn).

? **Discuss:** which vegetables have groups found that surprised them? Do students think this is an older variety of this vegetable or a new one? Why?

- Explain that many thousands of years ago, in many different places around the world, people started experimenting with breeding (e.g. those black and white dogs, those yellow and red tomatoes).
- They figured out that if Tomato A was super delicious but small, and Tomato B was large but lacking in flavour, they could try again and again to cross-pollinate A with B and (if they were lucky) they would end up with Tomato C that is large and ALSO has great flavour.
- Farmers all over the world have been doing this for millennia. Then they might sell or trade their best seeds of the new plant (Tomato C), or take them with them when they move to new places.

Genetic Modification (GM)

What we are discussing in this lesson is cross-pollination, or cross-breeding. It is not the same thing as genetic modification.

Cross-pollination occurs when two plants combine. In some cases, humans have controlled which plant combines with which (for example, by playing the part of a bee and using a tiny paint brush to pollinate one plant with pollen from another).

Different cultures from around the world became very skilled at cross-pollination and their efforts should not be confused with modern genetic modification.

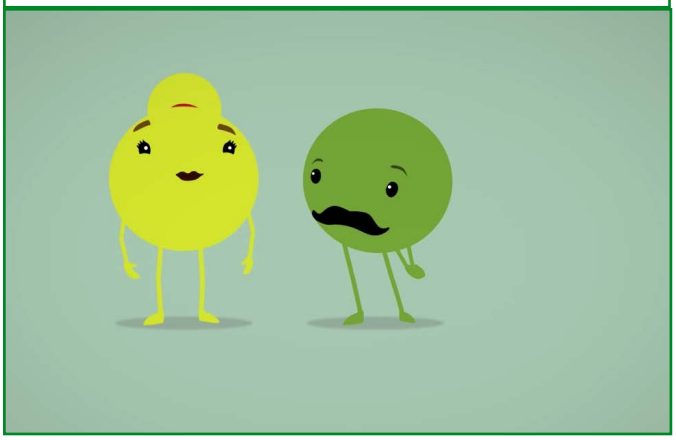
Genetic modification (GM) happens in a lab when scientists create a new plant by splicing the gene of one species (for example, a fish) into a gene from a different species that would otherwise be incompatible in nature (such as fennel).

Genetics

- These explorations can work as an introduction to simple genetics, but at the primary year levels the topic can be kept simple.
- If you would like to show students a representation of genetics, an animation about Gregor Mendel's work on peas and genetic inheritance is a good introduction:

◇ TED-Ed – How Mendel's pea plants helped us understand genetics (animation, duration 3:06)

Watch **TED-Ed – How Mendel's pea plants helped us understand genetics**



Resources

- Carrot Museum – The History of Carrots: http://www.carrotmuseum.co.uk/history.html
- Rupp, Rebecca, *How Carrots Won the Trojan War: Curious (but True) Stories of Common Vegetables.* 2011
- ThoughtCo. – Eggplant Domestication, History and Genealogy: https://www.thoughtco.com/eggplant-history-solanum-melongena-170820
- University College London – Debating the Origins of Rice: https://www.ucl.ac.uk/rice/historyofrice/debate

The Rise of Rice

Did you know that the rice poking out from under your stir-fry started out its life as grass on a riverbank?

- We still aren't sure whether it was in the river valleys of South China or India where people found the first nutritious grass with seed heads that were edible when cooked (or who was the adventurous person who first decided to give cooking grass seed heads a go!)
- When they moved from one place to another, it was normal for people to take their favourite foods, like rice seeds, to plant in their new homes. Sometimes a flood came and washed the crop downstream. These rice seeds grew in the wild and new people picked them up and cultivated them, which is how rice spread along all the river valleys and deltas of South East Asia. The whole process took so long that now we're not even sure exactly where it started.
- Another important factor in the spread of a food is trade. For a while there, goods (including grains, spices and even vegetable seedlings!) were traded and bartered as currency. The new owners would grow and cultivate them, cross-pollinating similar species to make new varieties with different colours, flavours, quicker growing cycles, bigger fruit, as well as resistance to drought, disease and pests – all in an effort to make their product more appealing to traders.

A long way from home

Here's where some of your favourite foods first cropped up:

eggplant / aubergine	South-East Asia, possibly India, Thailand or Burma
capsicum	Central and South America
carrot	Persia – (now parts of Iran, Turkey, Afghanistan)
cocoa	Mexico and Central America
corn	Mexico, Central and South America
kohlrabi	Northern Europe, possibly Germany in the 19th century
potato	Peru / Bolivia
rice	South China or India's river valleys in ancient times (hotly debated)
macadamia	Australia
spinach	Persia, but introduced in ancient times to China and India
squash	Central and North America – cultivated by people of several First Nations cultures
tomato	The Andes – cultivated by the Aztecs and Incas
zucchini / courgette	Specific zucchini varieties of squash – northern Italy in the 19th century