

Station 1 of Carousel

*This would be a one hour lesson but for the purpose of the workshop it will be adjusted to a 25 minute experience for participants.

Lesson title: Genetic Modification and Improvement

(Using a four phased lesson)

Rationale: Using a four phased lesson plan

Phase 1 - Preparing for learning: elicitation of prior learning and agreeing learning intentions.

Phase 2 - Input of new information and skills

Phase 3 - Processing new information and skills

Phase 4 - Review: reflection on progress made

Learning Outcomes:

3.1 (c) and 1.4 (c)

Key skills used:

Communicating, being personally effective, working with others, creative and critical thinking, information processing.

Cross cutting themes considered:

Technology, Food production, Breeding and Genetics.

1. Phase 1: Elicitation and Starter / engagement activity (Timing: 3-5 minutes)

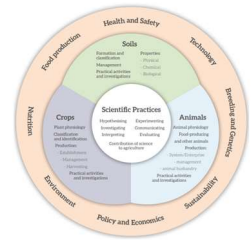
Ask students (participants) to write on post it notes, a question they would like to ask a plant geneticist about genetic modification / improvement.

Place the questions on a large flip sheet which will be tacked to the wall. Try to group the questions into linked categories such as knowledge & understanding, ethics, values (benefits and risks) – in line with the specification.

Blue tack these sheet /sheets to the wall for a gallery review at the end of the lesson, which will be used as a plenary, after all tasks have been completed.

*Alternatively these could be entered onto menti.com and displayed as an open ended question on the board and revisited as a plenary / shared electronically with students.

2. Phase 2 – Input through Visual, Auditory or Kinesthetic – Place an I-pad or laptop at the station to play a short video clip on gene editing. (Timing: 8 minutes)



After watching this youtube clip <https://youtu.be/XPDb8tgfjY> with the whole class (group), write down the answers to the following questions using the provided mini white board.

*Teachers can tailor questions to their own needs for use in their classrooms.

- (i) Explain gene editing.
- (ii) Describe some benefits and negatives of genome editing.
- (iii) Briefly explain how such genetic technologies could be used to improve agricultural practices in Ireland and on a global platform.

Scaffolding for students / teachers:

- How could gene editing make crops more nutritious?
- Can gene editing be used to increase disease resistance, yields, pests, droughts and extremes of temperatures / rainfall / drought?
- Genome editing enables faster, easier, cheaper and more precise changes to DNA.

3. Phase 3 - Processing – As a crop geneticist, advise the Department of Agriculture about using gene editing / the need for gene editing.

(Timing: 8 minutes)

Fun element – we are going to play “Dragons Den”

Task – In small teams of 2-3 students (participants) are tasked with producing a 2 minute “pitch” on their idea of how to use gene editing.

Fun / craic – who are the dragons? What cunning questions can they come up with for participants?

Scaffolding – Purpose, benefits, risks. Link back to specification, knowledge & understanding, ethics and values.

4. Phase 4 - Plenary: link back to learning outcomes (Timing: 3 minutes)

We now go back to our initial gallery poster(s) that we created in the starter activity.

Look at the questions you wanted to ask the plant geneticist, how many of these can we now answer?

For homework:

1. Find the answers to any remaining questions
2. State the advantages that CRISPR-Cas9 could bring to this process.

