

1. Class Particulars

Date: 10/02/2021
Time: 8:40-9.40
Duration: 60 mins
Class Name: W2
Class Level: Transition Year
Subject: Biology

2 Teaching Objectives of lesson

- To introduce the students to the concept of Plant Breeding and Biotechnology.
- To emphasize with the students the importance of plants in our everyday lives.
- To highlight with the students how Plant Biotechnology can be a solution to producing more food to feed a growing population.
- To introduce the term “GMO”.
- To explain ‘The Green Revolution’ and its impact on the developing world’s population.

3. Learning Outcomes

At the end of the lesson students should be able to:

- Define Plant Breeding and Biotechnology.
- Recite the importance of plants in our everyday lives with examples.
- Highlight how Plant Biotechnology can be a solution to producing more food to feed a growing population.
- Explain the term “GMO”.
- Explain ‘The Green Revolution’ and its impact on the developing world’s population.

4. Resources Used

- The food standards agency magazine with teeth
- Biology Plus (Edco) page 136
- Less Stress more success p.g 69
- Hershey’s chocolate bar
- PowerPoint and Laptop
- YouTube video
- Jam Board
- Flashcard
- Kahoot
- www.wooclap.com

5. Literacy and Numeracy

- Reading: students will read information from PowerPoint throughout the lesson.
- Speaking and Listening: Students will listen to the teacher and provide feedback throughout the lesson.

- To assist with literacy I will use flash cards to introduce the following key terms: Plant Breeding, Food security, Abiotic, Biotic and Biotechnology.
- To improve literacy, I will ask specific students at the end of the lesson to recap on what they have just learned and gather pupil's own summaries verbally.

6. Differentiation

- Throughout the lesson, I will ensure to take into account that no two pupils are the same. Therefore, as a teacher I will take this into consideration when explaining the meaning of the term Biotechnology and Plant Breeding.
- When briefly explaining the science behind engineering and breeding plants to improve them for human needs and consumption, I will ensure to take into account that this is not an easy concept to understand. I will take into consideration that these are only 4th year students who are yet to study genetics. I will therefore ensure to make great use of the application Jam board and try and simplify the matter of genetic engineering using diagrams and drawings.
- I will be aware of the differences among my students in relation to ability, aptitude and interest and acknowledge that students learn at different rates and in different ways.
- I will establish an inclusive and supported learning environment for all students.

<p>Biotechnology Video [5 mins]</p> <p>Recap on Key Points</p> <p>GMO [5 mins]</p> <p>Case study: Golden Rice [3 mins]</p> <p>Labelling of GM products [5 mins]</p>	<p>technological application using living organisms. I will explain the term Biotechnology and place a flashcard on my wall. I will use the UN Convention on Biological Diversity to explain the concept (PowerPoint slide 17).</p> <p>I will show students a video on Biotechnology. It quickly summarises its purpose without going into too much detail on the science behind it to confuse the students. It also gives the lower ability students a better understanding (PowerPoint slide 18).</p> <p>I will then ask the students if they have any questions. I will recap on the key points made and emphasise the importance of plants.</p> <p>I will then begin to discuss GMOs. I will ask the students if they have heard of Genetically modified organisms. I will define the term (PowerPoint slide 19-20).</p> <p>I will explain that GM crops have been modified to help overcome two of the major problems faced by commercial farmers, insects. Using the application Jamboard, I will briefly explain how Biotechnology works (PowerPoint slide 21).</p> <p>I will explain that Golden Rice is an example of plant breeding where we improved the rice crop to make it more nutritious (increased Vitamin A). I will recap on the benefits of golden rice in solving hidden hunger an micronutrient deficiency of Vitamin A.</p> <p>I will then move onto discuss labelling of GM products in Ireland. I will explain that GM foods are only authorized for sale if they are judged not to present risk to health or the environment, and to be of no less</p>
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<p>Hershey's chocolate bar [4 mins]</p>	<p>nutritional value than the foods they are intended to replace and that all products made using GM ingredients must be labelled as such.</p> <p>I will show the students a Hershey's chocolate bar. I will ask the students to put their hands up electronically, if they have ever eaten this bar. I will then ask them to read the ingredients list on PowerPoint slide 24. I will ask the students to raise their hand if they have made an observation.</p> <p>I will discuss that the chocolate bar is made from Genetically modified sugar beet, corn and cane. I will explain that this is the only product on market in Ireland that has genetically modified produce. I will then explain that it tastes no different to any other chocolate bar. I will highlight how biological applications are used in our everyday life (PowerPoint slide 24).</p>
<p>Advantages of Genetically modified foods [5 mins]</p>	<p>I will then highlight with the students that on balance the advantages of genetically modified (GM) food outweigh any dangers. I will discuss how we are in a situation where we must consider all options to increase food production to meet food demands (PowerPoint slide 25).</p>
<p>Public opinion on GMO</p>	<p>I will discuss that some of the public opinion on GMO. I will then highlight and emphasise the reality (PowerPoint slide 26-27).</p>
<p>Case Study: Green Revolution [5 mins]</p>	<p>Finally, I will briefly discuss The Green Revolution. A case study that highlights the impact that Biotechnology and our knowledge and application of biology have on the world around us. I will discuss the father of the green revolution- the man who saved a billion lives. I will finish the lesson by asking the students their opinion on GMO and</p>

<p>to try to ensure that the learning outcomes were achieved?</p>	<p>-Flashcards to help with literacy. The flashcards are a great resource for introducing new words to the students.</p> <p>-Chocolate It helped the students to understand that genetically modified organisms are something of our everyday life. It helped to explain to the students that food products that contain genetically modified organisms are no different to the chocolate you find on the shelf in your supermarket. It allowed me to make the point about how plant breeding is just a method of altering plants to improve them using our understanding of genetics.</p> <p>-Informative video My main focus is to make my lessons as interesting as possible for the 4th year students in hope that they choose Biology for the leaving cert. My aim is to highlight how science is involved in their everyday and therefore throughout the year I will be showing them educational videos.</p> <p>-PowerPoint presentation As with every lesson I had a PowerPoint presentation on the overhead data projector. I went through each part of the lesson referring back to the PowerPoint presentation when necessary.</p> <p>Therefore, the learning outcomes were achieved with the aid of the resources used throughout the class</p>
<p>Do I think that the learning outcomes were actually achieved in the lesson?</p>	<p>Yes, I believe the learning outcomes for this lesson were achieved as efficiently as possible.</p>
<p>What do I feel was good about the lesson?</p>	<p>The previous lesson, I asked the students if they would consume a product such as Golden Rice that was genetically modified. Some students said no. After presenting them with a product they are used to, the chocolate bar, we had a discussion and all their opinions changed on the</p>

matter after they were educated on the topic of Biotechnology and Plant breeding. A lot of students become inquisitive and engaged in the lesson, the asked questions on the science behind it and the genetics involved.

They also loved the Kahoot quiz which was a great way to assess the learning outcomes.

Once again, I really liked the use of www.wooclap.com to allow the students to create a word cloud on the importance of plants. As expected, they had a limited view on how much we actually depend on plants. I was happy to then discuss all the different uses of plants such as clothing and medicine and not just as a food source.

This lesson followed on from the lesson on Biofortification (a biological application that can be used to solve world hidden hunger and Micronutrient deficiencies such as Vitamin A). The students were exposed to the real-world problem that is World Hunger. They were given a glimpse on just how important plants are to us and how we are dependent on them for survival- something which they didn't value previously. The statistics showed just how serious of an issue we are currently experiencing and how Biotechnology can be a solution to feeding our every growing human population and those 821 million who are starving. The students were given the opportunity to go into breakout rooms and debate the issue of GMO food products and Biotechnology using their informed opinions to come to a standpoint.

CHECKLIST OF ITEMS INCLUDED IN LESSON PLAN

Science Pedagogy

Title of lesson: Biotechnology

Date of lesson: 10/02/2021

ACTIVITY	YES	NO
Have I included references to at least one other textbook in addition to the one used by the students?	x	
Are my learning outcomes written using the correct active verbs?	x	
Have I included a PowerPoint presentation in my lesson?	x	
Have I taken into account the constructivist approach to science teaching when planning the lesson?	x	
Have I included practical work (student practical or a demonstration experiment) in the lesson?		x
Have I included activities such as worksheets or crosswords or word searches or quizzes in the lesson?	x	
Have I included questions directed at individual students and designed to challenge them?	x	
Did I make use of ICT (Powerpoint or video or CD ROM or datalogging or internet) to promote active learning in the lesson?	x	
Did I ensure that pupils were not spending time copying down notes from dictation or from the blackboard or slides.	x	
Have I included STS material or a story in the lesson?	x	
Have I included flash cards or posters in the lesson?	x	
Have I taken into account the language and literacy problems that may arise in the lesson?	x	
Have I included group work or class discussion or peer group teaching or role play in the lesson?	x	
Have I planned to involve students as much as possible in the lesson?	x	
Have I included assessment strategies in the lesson to check if the learning outcomes have been achieved?	x	
Have I included a recapitulation of the key points of the lesson?	x	
Have I backup material prepared in case a fault develops in the dataprojector or computer?	x	

SIGNED: Farah Shaladan