

## Activity

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<b>Country:</b>	Basque Country
<b>Title:</b>	Agriculture and technology: is it always positive?
<b>Students' age:</b>	15-16 years
<b>Subjects:</b>	Science, Technology, Social issues, Foreign language (it will be used to teach the workshop)
<b>Duration:</b>	9 hours

### Objectives:

- Knowing the main technological innovations in the agricultural sector.
- Thinking about the positive impact of these innovations, but also the serious damage they caused at an environmental and social level.
- Reading about a problem and adopting a personal position on the issue.
- Tackling a complex problem from different perspectives.
- Communication in a foreign language

### Activities:

Time	Activity description
1h	Present the learning unit and its connection with “Scientific Culture” subject. Explain what is going to be learnt, the different activities, the main goals... Introduce the first work to be carried out by the students (successes and disasters of agricultural technology). Each student will analyze this topic during a different historical age (antiquity, roman age, middle age, contemporary age and the 20 <sup>th</sup> century) preparing a short PowerPoint presentation (including videos, images, graphics...).
1h	The students will work in a computer room so that they can search in the Internet (properly selecting the material) information about the agriculture (crops, materials, machinery, technology, social impact, economy, development, etc.). The teacher will clarify their doubts, answer questions and guide them. Once they have found the information they will start preparing the presentation.



1h	The students will orally communicate their presentations in front of the class (maximum 5 minutes). Once they finish, the teacher will ask him/her some questions. The teacher will try to promote discussion with the rest of the class and will analyze each presentation with that coming before or afterwards because, in principle, it would be nice to present them chronologically. It is important to discuss both the technological (industrialization, increase in production/yield...) and the social aspects (population growth, economy, human rights...). Close the session by remarking the main conclusions found.
1h	Introduce The Green Revolution promoted by Norman Borlaug (Nobel Awarded scientist) by watching different videos with a wide range of opinions. After watching every video the teacher will ask some questions so that he/she can analyze the way the students start thinking about it. As usual, the teacher will close the session remarking the take-home messages and introducing them the activity to be carried out the next session.
1h	"Barometer game" about The Green Revolution. The teacher will briefly explain the activity to the students (i.e. the teacher will read different sentences about The Green Revolution and ask the students to answer whether they find themselves for or against each sentence). The students will be placed in one side of the classroom or in the other one, depending on their opinion about each sentence related to The Green Revolution. The students must explain why they think like that, giving arguments (both technical and social). Of course, before starting the game it is recommended to ask them their initial opinion about The Green Revolution. The students will take pictures during this game. Finally, once the sentences are finished, the teacher will ask them again their opinion about the topic. In principle, this game would have changed their minds and their physical position about it (it would be nice to take a picture of their initial and final positions, to be compared). The teacher, depending how the game has gone, will remark his/her observations and ask the students about this activity.
1h	Introduce biotechnological innovations in agriculture, taking into account the material used for this subject (Scientific Culture). The idea is to connect the project with the student's book so that they can observe that these activities are clearly related to the subject. The teacher will use his/her typical class material (PowerPoint presentations, book, exercises, questions...). Mainly, this session will work the GMO's (Genetically Modified Organisms) from a scientific point of view.



1h	Continue learning about the GMO's and organic food by watching different videos showing a wide range of opinions. After watching every video the teacher will ask some questions so that he/she can analyze the way the students start thinking about it. As usual, the teacher will close the session remarking the take-home messages and introducing them the activity to be carried out the next session.
1h	"Barometer game" about GMO's (and organic food). The teacher will briefly explain the activity to the students (i.e. the teacher will read different sentences about GMO's and organic food and ask the students to answer whether they find themselves for or against each sentence). The students will be placed in one side of the classroom or in the other one, depending their opinion about each sentence related to GMO's. The students must explain why they think like that, giving arguments (both technical and social). Of course, before starting the game it is recommended to ask them their initial opinion about GMO's. The students will take pictures during this game. Finally, once the sentences are finished, the teacher will ask them again their opinion about the topic. In principle, this game would have changed their minds and their physical position about it (it would be nice to take a picture of their initial and final positions, to be compared). The teacher, depending how the game has gone, will remark his/her observations and ask the students about this activity.
1h	Last session. The teacher will start analyzing the activities carried out, promoting the discussion among the students. Finally, the teacher will give some activities to be carried individually by the students (one of them about explaining the difference between the GMO's crops and those obtained by artificial selection, the other one about analyzing the food labelling, the presence/absence of GMO's in the food they eat at home).

### Materials and equipment:

- Computer (so that the teacher can access to his/her material during the lessons).
- Projector and screen (in order to project videos, presentations...).
- Text book (in order to connect the learning unit to the subject).
- Videos related to The Green Revolution, GMO's and organic food (mainly from Youtube and Vimeo), the list of videos can be found in the annexes.
- Computer room where the students will start preparing their presentations about the agricultural technology.



## Teaching tools:

- PowerPoint presentation about the activities to be carried out (outline, barometer game...).
- Text book (in order to connect the learning unit to the subject).

## Questions to discuss:

- What are GMO's?
- The definition of organic food and its certification.
- National, EU and North American United States legislation on GMO's (production, labelling...).
- Analyzing food labelling of home food.
- Difference between the GMO's crops and those obtained by artificial selection.
- The social impact of the scientific and technological innovations in agriculture.

## Evaluation tools suggested:

- Taking into account the previously commented presentations prepared by the students.
- Considering the implication of the students (questions, critical thinking...).
- Observing their attendance, participation...
- Other exercises proposed



## Annexes:

- 1) Videos about the Green Revolution, GMO's and organic food (and some pictures of GMO's food labelling).

Videos about the Green Revolution:

<https://www.youtube.com/watch?v=dBaW5IpvQVA>

<https://www.youtube.com/watch?v=hq8b-iCgvLM>

[https://www.youtube.com/watch?v=c6lds\\_RK6XM](https://www.youtube.com/watch?v=c6lds_RK6XM)

<https://www.youtube.com/watch?v=e7Npall-0hg>

<https://www.youtube.com/watch?v=Lg9-HTtgFOk>

Videos about GMO's:

[https://www.youtube.com/watch?v=m\\_CWoSdqYcw](https://www.youtube.com/watch?v=m_CWoSdqYcw)

<https://vimeo.com/52828163>

<https://vimeo.com/125962829>

<https://vimeo.com/63111465>

<https://www.youtube.com/watch?v=ZtJfEeRAY8o>

<https://www.youtube.com/watch?v=0qMh9jJk4fQ>

[https://www.youtube.com/watch?v=M\\_ztZGbLEJ0](https://www.youtube.com/watch?v=M_ztZGbLEJ0)

<https://www.youtube.com/watch?v=HSten18rI9A>

<https://www.youtube.com/watch?v=2G-yUuiqIz0>

<https://www.youtube.com/watch?v=L9tIirsBNg4>

Videos about organic food:

<https://www.youtube.com/watch?v=dDsJgxiowAc>

<https://www.youtube.com/watch?v=BebNsezt6r0>

<https://www.youtube.com/watch?v=GhIZWhJtY8w>

Pictures of GMO's food labelling:

<https://sensibilidadartificial.files.wordpress.com/2013/01/etiquetado-transgenicos.jpg>

<http://fundacion-antama.org/wp-content/uploads/2009/10/01-Etiqueta-cerca.jpg>

[https://noticiasdeabajo.files.wordpress.com/2011/07/etiquetado\\_transgenicos.jpg](https://noticiasdeabajo.files.wordpress.com/2011/07/etiquetado_transgenicos.jpg)

[http://www.tiendeo.com/blog/wp-content/uploads/2013/08/lecitina\\_soja3.jpg](http://www.tiendeo.com/blog/wp-content/uploads/2013/08/lecitina_soja3.jpg)

<https://foodfreedom.files.wordpress.com/2011/03/gm-label.jpg>

[http://media.mnn.com/assets/images/2014/05/brazil\\_GMO\\_label\\_0.jpeg](http://media.mnn.com/assets/images/2014/05/brazil_GMO_label_0.jpeg)

<http://static01.nyt.com/images/2013/06/06/business/Mccheese1/Mccheese1-master675.jpg>



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The European Union is made up of 28 Member States who have decided to gradually link together their know-how, resources and destinies. Together, during a period of enlargement of 50 years, they have built a zone of stability, democracy and sustainable development whilst maintaining cultural diversity, tolerance and individual freedoms. The European Union is committed to sharing its achievements and its values with countries and peoples beyond its borders.

2) Presentation about the activities to be carried out (including barometer game material).



## Agriculture and technology: is it always positive?

Lourdes del Valle Carrandi

### Outline

#### 1) Successes and disasters of agricultural technology

- Summarize the main technological innovations in the agricultural sector (from Antiquity to the 20<sup>th</sup> Century).
- Think about the consequences of these innovations on the Western Society.
- Learn about the Green Revolution and discuss about it (barometer game).

#### 2) Genetically modified or organic?

- Learn about GMOs.
- Learn about organic food.
- Debate in favour or against the use of GMOs (barometer game).



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## Barometer game about the Green Revolution

- The Green Revolution saved millions of people from starvation.
- Agrochemicals are needed to improve the agricultural technology.
- The Green Revolution has decreased food security.
- The overpopulation due to this revolution is unsustainable.
- Carrying out the Green Revolution implies an increasing pollution.
- Increasing food production, decreasing famine.
- Monocultures of cereal grains produces malnutrition.
- The mechanization needed removes employment.

## Barometer game about the Green Revolution

- The Green Revolution increased class disparities.
- The Green Revolution supports the equality between the first and third world.
- The Green Revolution agriculture affected both agrodiversity and wild biodiversity.
- Most high intensity agricultural production is highly reliant on non-renewable resources.
- Long term exposure to pesticides such as organochlorines, creosote, and sulfate have been correlated with higher cancer rates and organochlorines DDT, chlordane, and lindane as tumor promoters in animals.
- The critics about the Green Revolution come from people who have never experienced the physical sensation of hunger.



## Barometer game about GMOs

- GMOs are more resistant to certain pests, diseases, or environmental conditions, reduction of spoilage, or resistance to chemical treatments (e.g. resistance to herbicides), or improving the nutrient profile of the crop.
- The use of GMOs does not affect the food chain.
- GMOs enhances food security.
- GMOs are healthy and improve the quality of life.
- GMOs support the equality between the first and third world.
- GMOs are subject to patents.
- The biological risks of GMOs are known.

## Barometer game about GMOs

- The fast evolution of the insects may let them attack also the transgenic crops.
- Labeling of GMO products in the marketplace must be mandatory in all the countries.
- GMOs can affect the environment and nature.
- GMOs avoids any cultivation problem.
- GMOs can save millions of people from starvation.
- GMOs affect both agrodiversity and wild biodiversity.
- GMOs industry has generated the raise of the organic food.
- The critics about the GMOs come from people who have never experienced the physical sensation of hunger.

