

GLU 4.4 Seeds – basic concepts and trading

AUTHOR	Institute for Sustainable Development
COUNTRY	Slovenia
AGE GROUP	11 - 17 years
SUBJECTS	natural sciences geography biology
DURATION	2 lessons (45 minutes each) + complementary activities in class
TOPICS	<ul style="list-style-type: none"> Seeds Right to food Sustainable agriculture GMOs
SDGs	SDG 2: Zero hunger

Competences required

- Communication skills and knowledge of English
- Social and civic skills
- Cultural awareness and expression

Learning objectives

- To become aware about the importance of seeds from the perspective of nutrition, self-sufficiency and trade.
- To understand that climate and soil conditions vary around the world, and become aware that respective plants and crops are 'designed' to grow in these diverse conditions.
- To learn to recognise the labels on seed packages, and to know what they mean.
- To be able to distinguish between organic, indigenous, treated, hybrid and genetically modified seeds.
- To learn which kinds of seeds are most appropriate for self-sufficiency in food.
- To become aware of the role of large multinational companies in the production of seeds; to learn about the consequences of farmers' dependency on an annual purchase of those seeds and consequently about the problem of global trade in seeds.
- To become aware of the global consequences of purchasing hybrid or GM seeds.
- To recognise that they, as students and active citizens, could promote the sustainable development of the planet.



Recommended methodologies

- Use of educational video clips
- Group work
- Brainstorming
- Comprehension and summary (of article)
- Mind map / creating mind-map posters

Materials and equipment

- **Lesson 1**
 - Students bring seed packages which they found at home
 - 2 soaked bean seeds per student
- **Lesson 2**
 - Computer with internet access

Teaching tools and additional resources

- Seed packets: how to interpret the information on seed packets (pdf)
- Wikipedia articles about: **seeds, hybrids (biology), seed treatment, GMOs**
- Annex 3c. Indigenous varieties (pdf).
- **Video clip:** *Bitter seeds* trailer available on YouTube
- **Video clip:** *Monsanto Indian Farmer Suicide* available on YouTube
- The value of the global seeds market:
 - “5 things to know about GMOs”, The Wall Street Journal, available at <http://bit.ly/5thingsGMOs>
 - “Global Commercial Seed Market”, available at <http://bit.ly/SeedMarket>
- “The world’s top 10 seeds companies: who owns Nature?”, available at: <http://bit.ly/Top10SeedCompanies>
- Arche Noah webpage in English: <https://www.arche-noah.at/english>
- Organic Agriculture and Food Security, Dossier IFOAM
- Organic Agriculture, Environment and Food Security, UN Food and Agriculture Organization
- How to make a concept / mind map: <http://bit.ly/MindMap101>

Questions to discuss

- **Lesson 1**
 - What is a seed, and why is it important?
 - Are the conditions for germination of seeds and food production adequate everywhere on our planet?
 - Can the same seeds be sown anywhere on the planet?
 - Does it matter what kind of seeds (hybrid, GM, organic, indigenous) we sow?
- **Lesson 2**
 - Why do corporations produce seeds that require additional chemical protection and thus contribute to the pollution of environment?



- Why do farmers purchase seeds that they cannot, or are not allowed to, reproduce by themselves (hybrids, GMs)?
- How important is the self-sufficiency of a country with seeds – so-called ‘seed independence’?
- What can we, as individuals, do on a local and global level?

Suggested evaluation tools

Classwork:

- The students should draw a mind map of all the terms they have learnt regarding to the seed trade, including a description of the consequences. They should also draw themselves as active citizens and link up with terms of activities that they could/would undertake in order to achieve fairness in sustainable development.
- The students can write and explain which seeds (hybrid, treated, organic, GM, indigenous) they would select for sowing or planting in a home garden or the school garden.

GLU 4.4 Lesson plans

NOTE: In guiding the students through the learning process offered by this GLU, the teacher should always keep in mind sustainable development, independency from corporations and fair trade. Students should realise that: **a)** they could be active citizens on a local and global scale, especially if they, as consumers, choose organic food; **b)** producers of organic food need organic seed; **c)** in purchasing organic food we directly support cultivation of organic and indigenous seeds, which leads to a more sustainable development of planet and better life quality for all of us.

GLU 4.4 Lesson Plan 1 (45 minutes)

Materials and equipment

- Students bring seed packages which they found at home
- 2 soaked bean seeds per student

Questions to discuss

- What is a seed and why is it important?
- Are the conditions for germination of seeds and food production equally adequate everywhere on the planet?
- Can the same seeds be sown anywhere on the planet?
- Does it matter which kind of seeds (hybrid, GM, organic, indigenous) we sow?

Activities



Time	Activity description	Additional tips
5 minutes	<p>The teacher opens the lesson with questions such as:</p> <ul style="list-style-type: none"> What is a seed? How is it composed? What is the function of a germ (eg. wheatgerm) or spore? What is the reserve food material for? What is seed shell for? <p>This is followed by an explanation of the importance of seeds.</p> <p>The students are then encouraged to find the answers with the help of beans, which are in themselves a type of seed. They should peel and halve the bean, find the germ, reserve food material (cotyledon or seed leaf)¹ and seed shell.</p>	
10 minutes	<p><u>Class discussion:</u></p> <p>The teacher asks the following question:</p> <ul style="list-style-type: none"> What are conditions for seed germination? Are they equally present across the planet? <p>The students are to list all the places they think are not suitable for germination and plant growth, and justify their decision.</p> <p>The discussion then proceeds to the following 2 topics:</p> <ul style="list-style-type: none"> What is the role of seeds and why are they so important? <p>(Guide the students to reach the following conclusions: Reproduction of plants. Food for people and animals.)</p> <ul style="list-style-type: none"> Is this the only way through which plants reproduce? <p>(To explain to the students that vegetative reproduction is a form of asexual plant reproduction. This occurs in or through tubers (e.g. potatoes), tendrils (e.g. strawberries), cuttings (e.g. blackberries). However, it is less often compared to seed reproduction.)</p>	
25 minutes	<p>The students lay out on a table or desk the seed packets that they brought from home, whilst the teacher presents at least 3 different types of seed packets: e.g. organic, hybrid and indigenous seeds.</p> <p>Important note: If one of the students brings treated</p>	<p>For this part of the lesson, it would be a good idea to keep a copy of the following close at hand, in order to refer to them as necessary:</p>

¹ This is the part of the seed that, upon germination, might become the first leaves of a seedling.



	<p>seeds, the teacher must prohibit opening the packet, and explain why such seeds are harmful to the environment. The students are then encouraged to explore the information on the seed packets: sowing and harvesting time, sowing distance, exploration date, germination, has it been chemically treated, method of seed production (organic, hybrid or indigenous seed).</p> <p>The teacher then explains two additional terms: genetically modified seed and plant breeding, pointing out that seeds are 'alive'.</p>	<ul style="list-style-type: none"> the 'Seed packets' pdf the 'Explanation of terms' pdf the 'Indigenous varieties' pdf
5 minutes	<p>As a conclusion to the lesson, the students select seeds appropriate for the school garden, and save them in a dry and dark place until it would be the right time for planting them. Packets of home-grown seeds should provide the following information: plant and variety, year of production and for how many years this seed variety has been producing a yield (of plants) .</p>	

GLU 4.4 Lesson Plan 2 (45 minutes)

Materials and equipment

- Computer with internet access

Questions to discuss

- Why do corporations produce seeds that require additional chemical protection and thus contribute to the pollution of environment?
- Why do farmers purchase seeds which they can't or are not allowed to reproduce by themselves (hybrids, GMs)?
- How important is the self-sufficiency of a country with seeds – so-called 'seed independence'?
- What can we do as individuals on local and global level?

Activities

Time	Activity description	Additional tips
7 minutes	<p>Screening of the following video clips (in the order shown below):</p> <ul style="list-style-type: none"> <i>Bitter seeds</i> film trailer: <i>Monsanto Indian Farmer Suicide</i>: 	This lesson should focus in particular on the aspects concerning the seed trade.



8 minutes	<p>Discussion about the content of the clips with students.</p> <p>Some guiding questions:</p> <ul style="list-style-type: none"> ▪ Why is it that so many farmers in India commit suicide? ▪ Why does a multinational company such as Monsanto have such large interest in selling their seeds in India? (The teacher should seek to elicits the students' views.) ▪ What kind of seeds did Monsanto sell to the farmers? (Answer: Seeds without reproductive ability.) 	
5 minutes	<p>OPTION 2: The teacher presents the information about the range of Monsanto products (available at: https://monsanto.com/products/brands/).</p> <p>The teacher should highlight which other items this large seed company sells to farmers besides seeds, and how the company benefits financially from the sale of all these products. The teacher should also encourage the students to think about the role of a farmer (from the perspective of their dependence on multinational companies).</p> <p>Following this brief explanation, the teacher explains to the students that the global seed market was worth 35 billion dollars in 2014, and that it is expected to reach 74 billion dollars by 2021.</p> <p>At this point, the teacher could display the webpage about the distribution of seed-trading profit of multinational companies: "Global Commercial Seed Market" (see the 'Teaching tools and additional resources' section above).</p>	
5 minutes	<p>The teacher distributes printed copies of the "EU Seed Law" article, available at: http://bit.ly/EUseedLaw</p> <p>The students should be allowed some time to read through the article and highlight the essential facts related to seed trade.</p>	
8 minutes	<p>The students should then analyse the article in pairs, following which they would discuss the topic as a class.</p>	For this activity, the teacher should encourage the students to think critically.
8 minutes	<p>The teacher writes the students' findings and conclusions on the board. The class then discusses solutions on a local and global scale.</p> <p>The teacher should highlight the fact that in the majority of countries it is still possible to choose seeds to be able to grow a wide variety of plants. Emphasis should be placed</p>	



	on paying special attention to opt for seeds of indigenous species and to try and grow our own plants/crops.	
4 minutes	To conclude the lesson, the teacher should introduce the Austrian organisation, Arche Noah , as an example of good practices, briefly explaining the purpose and activities of this organisation.	Optionally, the teacher could visit the Arche Noah website during the lesson: https://www.arche-noah.at/english

GLU 4.4 Complementary activities (45 minutes)

Time	Activity description	Additional tips
45 minutes	<p><u>Instruction to the students:</u></p> <ul style="list-style-type: none"> ▪ Draw a mind map of all terms you have learnt regarding the seed trade, including a description of the consequences. Depict yourselves as active citizens and link up with terms of activities that you could or would undertake in order to achieve fairness in sustainable development. ▪ Write down and explain which seeds (hybrid, treated, organic, GM, indigenous) you would select for sowing or planting in a home garden or the school garden. 	These activities could also be used for evaluation purposes. Moreover, the posters they create could be placed in a visible location in the school, to raise awareness among their fellow students.

