GLU 3.1 Is there a food crisis in the world?

AUTHOR	Petcu Laura Grațiela | APSD-Agenda 21
COUNTRY	Romania
AGE GROUP	12 - 14 years
SUBJECTS	geography | environmental studies | ICT
DURATION	5 lessons (total of 8 hours)
TOPICS	▪ Education towards better choices and critical consumption ▪ Composting / gardening ▪ Food waste ▪ Sustainable agriculture ▪ Food miles ▪ Food environmental impact
SDGs	SDG 12: Responsible production and consumption

Competences required

- Communication skills
- Social and civic skills
- A sense of initiative and entrepreneurship
- Cultural awareness and expression

Learning objectives

- To become aware of the limited land and soil resources of our planet, and correlate this with the global demographic growth.
- To be able to identify the challenges of humankind in ensuring that food is available in an equitable manner for everyone.
- To be able to list at least three ways of supporting the environment and sustainable development through individual / group actions and activities, for the future of the community.
- To learn about food choices offered by non-conventional foods.

Methodologies

- Group work
- Guided discussions and brainstorming

This publication has been produced with the assistance of the European Commission. The contents of this publication are the sole responsibility of Kopin (VO/0200) and its partners and can in no way be taken to reflect the views of the European Union.
"EAThink 2015 – Global Learning for Change in EYD 2015 and beyond: European Youth Engagement from School Gardens to Sustainable Food Systems" [Project Number: DCI-NSAED/2014/349-033]

- Online research
- Mapping and drawing
- Field visits
- Demonstration about composting, possibly to be held outside

GLU 3.1 Lesson plans

Materials and equipment

- Computer/laptop, video projector
- Markers, poster colours, paint brushes, felt-tip pens
- Staplers, glue, scissors
- Cardboard, polystyrene sheets
- boots, shovels, plastic containers with a small flap (to be able to take out the compost0
- Sand and gravel, wooden boards or twigs, fertiliser pellets[1], green branches or chopped dry wood, green plants without seeds or roots, vegetables, fruit/vegetable peel, worms (e.g. earthworms or brandlings).

Teaching tools

- Short quiz: "Understanding key definitions of hunger"
- Online article: "2016 World hunger and poverty facts and statistics"

Questions to discuss

- Do you think there are countries or regions around the world that do not use some of their resources to the full because they do not know their benefits and uses?
- In your opinion, which environmental factors contribute to the development and growth of the population?
- In your country, are you witnessing a migration phenomenon of people going from urban to rural areas? Why do you think this is happening / not happening?
- Which of these issues do you think is the more important: a) regarding sources of energy, or b) food crises?
- What measures should be taken in modern production processes and technologies to safeguard our health?
- Which are the effects of the current food production system on the global sustainability of the environment? What tools are there to combat the negative effects?
- What differentiates locally grown products using compost, and those we find in supermarkets?
- How do you appreciate the taste, colour, smell, shape and nutritional value of products grown locally using compost?

[1] This item is usually available in pet and garden centres.

This publication has been produced with the assistance of the European Commission. The contents of this publication are the sole responsibility of Kopin (VO/0200) and its partners and can in no way be taken to reflect the views of the European Union.
"EAThink 2015 – Global Learning for Change in EYD 2015 and beyond: European Youth Engagement from School Gardens to Sustainable Food Systems" [Project Number: DCI-NSAED/2014/349-033]

Suggested evaluation tools

- At the end of all activities, students will be asked to present a short report about what they have learnt through this GLU.
- Optionally, a small exhibition of non-conventional food products could be organised.
- Self-assessment questionnaires or compiling a class diary could also be useful evaluation tools.

Additional resources

- http://www.fao.org
- www.worldhunger.org

GLU 3.1 Activities **Lesson Plan 1** (100 minutes – 1 hour 40 minutes)

Time	Activity description	Additional tips
100 minutes	**A check-up of our planet.** The students are divided into seven groups, and each group receives the task to collect information about a particular continent, including at least: ▪ its surface area; ▪ population density; ▪ level of soil resources; ▪ available agricultural land; ▪ specific agricultural crops; ▪ current problems of the population in that continent. The teacher asks each group to create a small map of the continent they researched, using the information gathered. After creating the map, each group presents the findings in no longer than 5 minutes. The teacher briefly presents the strong connection between food and the growth of the global population, encouraging the students to make connections themselves on the effect that the differences between continents have had throughout the years, focusing on the following guiding questions: ▪ Do you think there are countries or regions around the world that do not use some of their resources to the full because they do not know their benefits and uses? ▪ In your opinion, which environmental factors contribute to the development and growth of the population? ▪ Which of these issues do you think is the more important: a) regarding sources of energy, or b) food crises?	Be prepared to answer students' questions and guide them during the research phase. If the students do not have the possibility to use their phones, tablets or computers to search for information online, the teacher should make sure to provide enough articles and books for them to use in this phase. One idea for the discussion phase could be to split them into small groups or to organise buzz groups.

This publication has been produced with the assistance of the European Commission. The contents of this publication are the sole responsibility of Kopin (VO/0200) and its partners and can in no way be taken to reflect the views of the European Union.
"EAThink 2015 – Global Learning for Change in EYD 2015 and beyond: European Youth Engagement from School Gardens to Sustainable Food Systems" [Project Number: DCI-NSAED/2014/349-033]

GLU 3.1
Activities

Lesson Plan 2 (40 minutes)

Time	Activity description	Additional tips
40 minutes	**A planet of three 'worlds'.** This activity will start with the introduction of a study published by FAO in 2003, which concluded that there are three different 'worlds', with respect to food, as follows: ▪ The first is made up of about 1000 million people, for whom access to food is not a concern (2500 kcal/day/person) and which coincides more or less with the developed countries. ▪ The second one covers more than 1000 million people (1/4 of these being children) who live on less than $1 per day, and who suffer from malnutrition (less than 1480 kcal/day/person). ▪ The third is an in-between category covering about 4000 million people who live in countries where the market economy does not function to the desired levels, but which have the willingness to develop and implement the most adequate agricultural practices. Next, the teacher gives the students the "Understanding key definitions of hunger" quiz. The students will be given about 3 minutes to answer the quiz individually – they will not be required to share their answers with the class, because they will assess their own answers by reading an article. Each student receives one copy of the article entitled, "2016 World hunger and poverty facts and statistics" and reads it. Through the guided-discussion technique, the students are encouraged to analyse the text and explain the main challenges the world is facing: ▪ The discrepancy between the real nutritional needs of the population and available food / food providers or suppliers. ▪ The impact of agriculture on the level of employment of populations from rural areas, etc. ▪ The consequences of modern agriculture-related production technologies and the food industry on the health of humans and animals. ▪ The effects of the production system on the global sustainability of the environment. Next, the students are encouraged to think of possible solutions guided by the following questions: ▪ What measures should be taken in modern production processes and technologies to safeguard our health? ▪ Which are the effects of the current food production system on the global sustainability of the environment? What tools are there to combat the negative effects?	The teacher could use a more recent study (if available) but should make sure to highlight the differences around the world in in terms of access to food. The focus here is on the distribution of resources and ways to combat undernourishment.

This publication has been produced with the assistance of the European Commission. The contents of this publication are the sole responsibility of Kopin (VO/0200) and its partners and can in no way be taken to reflect the views of the European Union.
"EAThink 2015 – Global Learning for Change in EYD 2015 and beyond: European Youth Engagement from School Gardens to Sustainable Food Systems" [Project Number: DCI-NSAED/2014/349-033]

	To conclude, the teacher introduces the **UN Zero Hunger Challenge** (https://www.un.org/zerohunger/) and invites the students to explore the campaign, its videos and the ideas for action.	

GLU 3.1 **Lesson Plan 3** (100 minutes – 1 hour 40 minutes) Activities

Time	Activity description	Additional tips
100 minutes	**How can we compost biodegradable waste in our homes?** This theoretical-practical activity helps students understand which is the biodegradable waste in their homes, and how and when it could be composted. The teacher explains the tools/materials needed, how to build the composting container, what could be put into the container and what cannot be composted. ▪ **What you need:** a plastic container with a small flap to take out the compost, sand and gravel, wooden boards, twigs or something to set the limits of the area where the biodegradable waste will be deposited. ▪ **How to build the composting container:** - Make a hole in the top, base and walls of the container for ventilation. - Place 3 layers of sand and gravel at the bottom of the container for draining of liquids. - Place wooden boards or twigs on top of the sand or gravel. - In the case of a plastic container, it is necessary to fix a small door on the container right above the sand/gravel layer, where the wooden boards / twigs are placed. - Earthworms or brandlings could be added to the plastic container if it is fully isolated, and it is not positioned directly on the ground. This is in order to speed up the composting process. ▪ **What can we add in the composting container:** fertiliser pellets, green branches or chopped dry wood, green plants without seeds or roots, vegetables, fruit/vegetable peel, vegetables, fruit, egg shells. ▪ **What should not be added to the composting container:** cat/dog excrement, bones, oils, fats, seeds and plants with roots. Ideally, the students would be taken to visit a few farms in their area, and use the information received in order to prepare a compost box. They will be guided to place the box preferably directly on the ground, over a layer of	Should a field visit not be possible, the live demonstration could be done on a small scale in the classroom, using a small composting box or a bucket. What is important is to demonstrate the steps and the techniques.  

This publication has been produced with the assistance of the European Commission. The contents of this publication are the sole responsibility of Kopin (VO/0200) and its partners and can in no way be taken to reflect the views of the European Union.
"EAThink 2015 – Global Learning for Change in EYD 2015 and beyond: European Youth Engagement from School Gardens to Sustainable Food Systems" [Project Number: DCI-NSAED/2014/349-033]

	branches, twigs and leaves. They will learn how to take out the compost using the small flap or door fitted at the bottom of the box. During the activity, the students will also discuss aspects such as: ▪ In what way/s are agricultural products we grow ourselves with compost different from what we find in the supermarkets. ▪ What do they think about the taste, the colour, the smell, the shape and the nutrient content of products grown in this way.	

GLU 3.1 Activities **Lesson Plan 4** (120 minutes – 2 hours)

Time	Activity description	Additional tips
120 minutes	**Managing fertiliser.** During this session, the students will be informed on the importance of effectively managing compost and other types of fertiliser, such as garden mould, fluid and semi-fluid waste. ▪ **Compost:** this is obtained through the fermentation of varied organic waste to which mineral substances (ash, chalk, etc.) are often added. Gathered in a pile, these leftovers are watered from time to time in order to favour the fermentation process. Compost could be used on all agricultural crops in quantities of 15-25 tons per hectare. ▪ **Garden mould:** this is the result of the fermentation of garbage. It is a very efficient natural fertiliser, used mainly for the production of vegetables, in greenhouses and in fields. ▪ **Semi-liquid and liquid waste:** this is collected from chicken factories or septic tanks; it has a very high content of phosphorus and contains about 15% dry substance. In order to be used, one needs to remove any solid matter. When used during the vegetation stage, it has a rapid action ensuring the plant's needs with extremely favourable effects on growth. The students will also find out information about different types of wastewater. They will visit several farms in their village/town and will see why it is important to manage fertiliser effectively, and to acquire practical skills on manually spreading compost and other types of fertiliser.	

This publication has been produced with the assistance of the European Commission. The contents of this publication are the sole responsibility of Kopin (VO/0200) and its partners and can in no way be taken to reflect the views of the European Union.
"EAThink 2015 – Global Learning for Change in EYD 2015 and beyond: European Youth Engagement from School Gardens to Sustainable Food Systems" [Project Number: DCI-NSAED/2014/349-033]

GLU 3.1 Activities

Lesson Plan 5 (120 minutes – 2 hours)

Time	Activity description	Additional tips
120 minutes	**Non-conventional food products.** The teacher explains that besides growing food that offers conventional proteins, it is also necessary to evaluate the possibility of producing 'non-conventional' sources of protein, such as fibrous remains, fodder crops or microbial saprophytes (bacteria, fungi, yeasts and algae). During the activity the students, will learn more about 'leaf proteins', microscopic algae and spirulina. ▪ **Leaf proteins:** fibrous waste coming from a number of crops is easy to be preserved and often represents valuable food for herbivores. This is why there is growing interest in the possibility of extracting edible proteins from fodder and leaves which represent by-products of other forms of agriculture, such as sugar beet, potato, peas, kohlrabi and Indian hemp. ▪ **Microscopic algae:** these represent an unconventional source of protein, as they form their cell substance through the photosynthesis of carbon dioxide and a solution of nutritive salts. Their protein content is quite high (over 50%) and have the advantage of a lower content of nucleic acid, because of the fact that their growth rate is slightly lower than that of bacteria and yeasts. ▪ **Spirulina:** a blue-greenish alga, it is the species that was the subject of the most intense studies for production on large scale. It made part of the traditional diet of the inhabitants of some areas in Mexico and Chad. The dried alga contains approximately 63% protein, 2-3% fats and 16-18% carbohydrates. Its cellulose is extremely low, which makes it more digestible. **Note:** In order to grow microscopic algae, two methods were proposed: in the open air with natural light or in a closed space with natural or artificial light. By far the first method seems to be more promising and it is therefore the methods being studied at the moment. The main technological problems are related to the distribution of carbon dioxide, shaking crops to get satisfying light, harvesting the algae and maintaining an optimal temperature level for the algae to grow. As a conclusion to the session, the students could be asked to create a short leaflet with the information they gathered on the sources of food and other aspects that they found useful and interesting. The leaflet could be entitled, "Healthy food for everybody".	

This publication has been produced with the assistance of the European Commission. The contents of this publication are the sole responsibility of Kopin (VO/0200) and its partners and can in no way be taken to reflect the views of the European Union.
"EAThink 2015 – Global Learning for Change in EYD 2015 and beyond: European Youth Engagement from School Gardens to Sustainable Food Systems" [Project Number: DCI-NSAED/2014/349-033]