# LESSON PLANS

## Module 4: Outcome-Oriented Work with Structured Games on the Farm Math

## Lesson Plan 1

How small business works in the countryside.

**Proposed Students Age Range: 12 years old**

| Purpose / Learning Objectives |
| --- |
| * learn the basic principles of smart farming, which contributes to more sustainable use of resources, by developing and analyzing different budgets and evaluating farming models * Analyze examples of farming to see that there are different ways to use resources |
| Intersecting objectives |
| * social science - budget * math - calculation * biology/ nature science/chemistry |
| Facilitation |
| * board * worksheet “Winter wheat cultivation on 30 ha” for the teacher * worksheet “Winter wheat cultivation on 30 ha” - 1 copy per group, cut in pieces: separately 1st column and 2nd column * worksheet “Winter wheat cultivation on 30 ha” - full version, 1 copy per group |
| Ideas for follow-up |
| If they have a farm or garden, they can ask their parents what they do to increase productivity. |
| Resources required |
| * board * phones or calculators for calculation |
| Source / The day of the lesson: Materials & Class preparation |
| no special preparation is needed |

| Implementation |
| --- |

| Timing | Instructions step by step |
| --- | --- |
| 3 min | Pre-activity:  Ask students to imagine - they want to farm in the countryside. What is the main resource? (Answer: Land). What can we do if we have land? The teacher writes the answers on the board - to do livestock farming; fruit farming, and grain farming. |
| 15 min | Students can be divided into groups of 3-5 pupils depending on how big the class is.  Facilitate discussion with students posing the question: What affects the opportunities of any farming?  Students work in groups and write down their answers.  Answers in random order: weather conditions; mechanical characteristics of the land; planning; human resources; machinery resources (own or rent); seasonality; subsidies (EU aid); knowledge, education (agronomy; machinery management and repair); accounting; legal (contracts); finance; crop protection products; modern technology (digital devices, software, navigation, GPS)  Students name the options they have written down and explain why this affects grain production. If an option is not named, the teacher uses a prompting question to encourage the pupils to come up with all the options. The teacher writes the pupils' ideas on the board. |
| 5 min | * Today we will analyze one example - Winter wheat production on a 30 ha field. The data is taken from a real farm in Latvia countryside, season 2022/2023 * TT: What are your assumptions - the teacher asks a question - How does a farmer (grain production) earn money - each month or after the harvesting? Students answer. * How much money would a farmer need to spend to cultivate 30 ha of land? * The teacher writes answers on the board and leaves them there. T: After the lesson we will find out if our assumptions were correct. |
| 15 min | * The teacher asks a question “What do you think **needs to be done** in the fields to harvest the grain at the end of summer?” * Students work in groups and write down the jobs they have to do. It could take 10 min. * Each group names one work and the teacher writes it on the board. If an option is not named, the teacher uses a prompting question to encourage the pupils to come up with all the options. |
| 15 min | * Next task - The teacher gives **“Work to be done**” (the 1st column of the worksheet) in cut pieces and asks students to put them in the right **order** as they should be done. 10 min. Teacher goes around and helps students by asking driving questions to find the right order. |
| 15 min | * Next task - teacher gives **“Cost/dose per ha”** (2nd column of worksheet) in cut pieces. And the task is to find the right match of work and cost. Students should know the measurement kg or lt. 10 min. The teacher goes around and helps students with asking driving question to find the right order. |
| 15 min | * Next task - teacher gives the whole worksheet “Winter wheat cultivation on 30 ha” and the task is to calculate costs for 30 ha. 10-15 min. The teacher goes around and checks the process of calculation. * Next task - now you have calculated expenses. And now there is an autumn and grain is harvested. So it is your income time. The teacher gives the second part of the worksheet “Income”. Students calculate the income and come to conclusion to the driving question in the beginning - how much money (loan/credit) should a farmer take from a bank if he wants to start to grow grain in the field (30 ha)? |
| 10 min | * discussions - feedback. * Students come to conclusions: is the small business easy to manage? What facts didn’t you know? * What do you find - the easiest and the hardest in farming example? What surprised you? |

| Hands-on activity/farm-based learning |
| --- |

| Timing | Description of activity |
| --- | --- |
| 2-3 hours | visiting/seeing in Zoom the local farm or grain producing and exploring the local situation in the country/ region |

| Annexes |
| --- |

**Annex 1: Indicative table for calculations**

**Winter wheat cultivation on 30 ha**

**Expenses**

| **Work to be done** | **Cost/dose per 1 ha** | **Notes** | **Cost/dose per 30 ha** |
| --- | --- | --- | --- |
| Soil tillage (weed control) work can be carried out in dry weather | 3l/ha  9,5€/1l  Package-20l | A certificate of €40 is required for the purchase of chemicals |  |
| Equipment service for spraying | 20€/ha | Spraying certificate €150 (every 3 years) |  |
| Combined soil tillage service | 53€/ha |  |  |
| Seed | 240kg/ha  550€/1t | +10% kg for seed replanting |  |
| Seeding service | 40€/ha |  |  |
| Nutrient Managment Plan fertilisers | 200kg/ha  560€/1t |  |  |
| Chemicals for weed control | 0,5l/ha  56€/1l | Needed in wet weather |  |
| Misting service | 20€/ha |  |  |
| Nitrogen in spring  (for harvest of 5 t/ha) | 400kg/ha  550€/t |  |  |
| Combine harvesting services | 85€/ha | (for harvest of 5 t/ha) |  |
| Grain transportation service | 1€/1km | car capacity 22 t for a distance of 120 km |  |
| Grain drying,  cleaning | 1t % 4€  20€/t | E.g.: humidity 18% |  |
| Salary of farmer | 700 EUR/month |  |  |

**Winter wheat cultivation on 30 ha**

**Income**

| Per 1 ha | Per 30 ha |
| --- | --- |
| EU aid in subsidies for Latvia (lowest in the EU) € 100 per 1 ha |  |
|  | Winter wheat harvested 140 tonnes |
| payment per tonne of grain current exchange price: 238 € |  |
| Total income |  |

## Module 4: Outcome-Oriented Work with Structured Games on the Farm Math

## Lesson Plan 2

Can I be a small Entrepreneur? Autumn Fair

**Proposed Students Age Range: 12 years old**

| Purpose / Learning Objective |
| --- |
| * students will know how to calculate the price of products, * students will know how to advertise and promote the product (determines the added value of the product) |
| Intersecting objectives |
| * math - financial management * social science - business planning * design and technologies, art - branding of product, packing * languages - advertising and promotion |
| Facilitation |
| * in agreement with family finds things, products (homegrown or made) that could be sold in school autumn fair |
| Ideas for follow-up |
| after the Autumn Fair discuss the successes and failures and make a plan for what could be prepared for the Spring Fair or next Autumn Fair |
| Resources required |
| * products to sell * organize the place for selling (school class or corridor) and time (lessons’ breaks) * customers from other classes or teachers or parents (depending on school regulations) |
| Source / The day of the lesson: Materials & Class preparation |
| place for Fair;  customers |

| Implementation |
| --- |

| Timing | Instructions step by step |
| --- | --- |
| 1 week or 1 day before the lesson or in previous lesson | Pre-activity:  Ask students to find things, products (homegrown or made) that could be sold in the school autumn fair ( in agreement with family); if smb does not have anything to sell students can work in pairs |
| 10 min | Students can work in pairs or groups (2-3).  Each student presents the products they want to sell. Products could be vegetables, fruits, canned vegetables, jams. Or buns, pies, cakes, crisps, biscuits, etc |
| 10 min | Students calculate the **price** of the product. They can check prices in the internet shops or go to local shops. |
| 10 min | Students share their ideas about **packing** products - what is suitable for each product (and also desirable), and what recyclable |
| 10 min | Students share their ideas of promotion - what is the added value of this product, how to attract customers. They rehearse their sayings. |
| 30 min | Autumn Fair   * process of selling the products |
| 20 min | After Autumn Fair  sharing of experience - discussing the successes and failures in groups; how much money each seller has earned, how much money is my profit; what my failures are; and what should be done differently next time. Students share their experience in groups and then for the whole class |

| Hands-on activity / farm-based learning |
| --- |

| Timing | Description of activity |
| --- | --- |
| 2-3 hours | excursion or conversation with direct selling local farms: what are the best-sold products, what are their tips and tricks to sell more |

| Annexes |
| --- |

Poster of the fair

