## Module 8: STEAM Application Examples Made on the Farm

## Lesson Plan 1

BARNLAND

**Proposed Students Age Range: 8-12**

| Purpose / Learning Objective |
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| * Students will be able to be able to recognize the engineering principles behind structures.
* Students will be able to build structures with Lego WeDo
* Students will be able to make moves according to algorithm
* Students will be able to understand the food preservation techniques
 |
| Intersecting objectives |
| * Students will be able to learn about food science and technology and their application in agriculture.
* Students will be able to investigate food preservation techniques
* Students will be able to discover specific technology that makes jobs faster and easier
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| Facilitation |
| * The teacher will teach simple algorithms by using games ( frog game :

 https://data.bangtech.com/algorithm/switch\_frogs\_to\_the\_opposite\_side.htm* Lego WeDo
 |
| Ideas for follow-up |
| Students will play the frog game to learn how they can make simple moves by using an algorithm. They will build a Lego set to feed the animals and they will learn how a Lego engine works and how to use it. |
| Resources required |
| * Computer, laptop, tablet
* LegoWeDo 2.0 or spike
 |
| Source / The day of the lesson: Materials & Class preparation |
| https://data.bangtech.com/algorithm/switch\_frogs\_to\_the\_opposite\_side.htmClick on the frogs to swap the three frogs on the left and the three frogs on the right.In the lower right corner, click on Restart.https://education.lego.com/en-gb/<https://education.lego.com/tr-tr/downloads/retiredproducts/wedo-2/software/> |

| Implementation |
| --- |

| Timing | Instructions step by step |
| --- | --- |
| 10 min | Pre-activity:Ask students what they remember about farms, animals, and their housing systems.  |
| 10 min | Screen the pictures about animals, and their housing systems.* Facilitate discussion with students about animal feeding systems. How do they feed themselves? Who feeds them?

-Teacher screens the cow photos, and asks questions about its needs? ( what do they eat? How do they feed themselves ? Who gives them food? Where do they live? ) Students discuss the feeding methods with the teacher. |
| 30 min | * Teach the students what a Lego brick is and how to build models.
* The teacher gives the students the lego set and has them make a barn and a tool or a vehicle.
* Divide the students into groups and first have them sketch their models and then give them the Lego pricks, and help them to build their simple models.
 |
| 40 min | * Make the students understand the simplest way of programming.
* Show the students how to connect the barn to the computer.
 |

| Hands on activity / farm - based learning |
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| Timing | Description of activity |
| --- | --- |
| 80 min. | LEGO Farm-Based Learning ActivityObjective:To educate children about farming, farm animals, crop cultivation, and the farm-to-table process using LEGOs.Age Group:Suitable for children aged 8-12 years.Materials Needed:* A variety of LEGOs (different sizes and colors)
* Baseplates for building
* Mini figures (to represent farmers and workers)
* LEGO animals (if available, such as cows, chickens, horses)
* Green LEGO pieces for crops
* Blue LEGO pieces for water features

Activity Setup:1. Introduction (10 minutes):

-Begin by discussing what a farm is and what it includes, such as animals, crops, and buildings.-Explain the importance of farms in providing food and resources.1. Building the Farm (30 minutes):

-Divide the children into small groups and assign each group a part of the farm to build. This can include animal barns and enclosures-Provide guidance and help as needed to ensure each group can execute their ideas.1. Role Play (15 minutes):

-Once the farm is built, allow the children to use mini figures to role play farm activities. This could include:* + - Feeding the animals
		- Driving a tractor (if available in LEGO form)

-Discuss each role and its importance to the farm's operation.1. Educational Discussion (10 minutes):

-Gather the children and discuss what they built and learned.-Talk about how farms work, the importance of each part of the farm, and how food gets from the farm to their tables.1. Cleanup (5 minutes):

-Help the children to carefully dismantle their creations and sort the LEGOs back into their containers.Learning Outcomes:* Understanding the basics of farming and agriculture.
* Development of spatial awareness and motor skills through building.
* Enhancement of teamwork and communication skills.

Extension Activities:* Visit a real farm to see the concepts in action.
* Create a farm diary or story using the LEGO farm as a setting.

This activity not only teaches about farming but also encourages creativity and teamwork among children. Enjoy your educational LEGO adventure! |

## Module 8: STEAM Application Examples Made on the Farm

## Lesson Plan 2

FRUITLAND

**Proposed Students Age Range: 8-12**

| Purpose / Learning Objective |
| --- |
| * Students will be able to build structures with Lego WeDo
* Students will be able to make moves according to the algorithm
* Students will be able to understand the food preservation techniques
 |
| Intersecting objectives |
| * Students will be able to learn about food science and technology and their application in agriculture.
* Students will be able to investigate food preservation techniques
* Students will be able to discover specific technology that makes jobs faster and easier
 |
| Facilitation |
| Teacher enters the classroom with a jar of jam and asks the students what it is, why do we need to make jam?What kind of preservation technique is it? Students discuss the techniques with the teacher. |
| Ideas for follow-up |
| Students will make a list of preservation techniques of food. Cold storage, canning, fermentation, pickle |
| Resources required |
| * Computer, laptop, tablet
* LegoWeDo 2.0
* Materials :a jar of jam
* Videos on youtube
 |
| Source / The day of the lesson: Materials & Class preparation |
| <https://education.lego.com/tr-tr/downloads/retiredproducts/wedo-2/software/><https://www.youtube.com/watch?v=foT78hzZbXU><https://www.youtube.com/watch?v=-gRisxyou2Y> |

| Implementation |
| --- |

| Timing | Instructions step by step |
| --- | --- |
| 10 min | Pre-activity:Ask students what they remember about the trip to the farm. Talk about the fruit they saw. |
| 10 min | Screen the pictures and videos taken on the farm.* Facilitate discussion with students about fruit preservation systems. How do fruit grow? How the farmers preserve fruit?
 |
| 30 min | * Teach the students what is a Lego brick, a smarthub, programming and how to build models.
* Ask the student to share their ideas about building a food preservation structure with Lego bricks.
* Divide the students into groups and first have them sketch their own models and then give them the Lego pricks, help them to build their own simple models.
 |
| 40 min | * Make the students understand the simplest way of programming.
* Show the students how to connect the smart hub to the computer
* Press the button
 |

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

| Timing | Description of activity |
| --- | --- |
| 80 min. | Building a LEGO Food Preservation SystemObjective: Students will create a LEGO model that simulates a food preservation process using LEGO WeDo kits. They will program their models to demonstrate how technology can aid in extending the shelf life of food.Materials Needed:* LEGO WeDo 2.0 or SPIKE kits
* Computers or tablets with LEGO programming software installed
* Various LEGO pieces for constructing the model

Activity Setup:1. Introduction to Food Preservation (10 minutes):

-Begin with a brief explanation of different food preservation techniques such as refrigeration, drying, canning, and vacuum sealing.-Discuss how automation and technology can enhance these processes.1. Design and Build (30 minutes):

-Challenge students to design a LEGO model that represents one of the food preservation techniques discussed. For example:* + - Refrigeration Unit: Students build a small structure that represents a cooling system.
		- Drying System: Create a model that simulates a food dehydrator.
		- Canning Line: Assemble a conveyor belt system for canning fruits or vegetables.

-Encourage creativity and problem-solving as they consider how to use motors and sensors to automate the process.1. Programming the Models (20 minutes):

-Teach students to program their models using the LEGO WeDo software. They might program a motor to simulate the operation of a conveyor belt in a canning system or sensors to detect when a "fruit" is properly "dried."-Introduce basic programming concepts such as loops and conditionals to help automate their models.1. Testing and Optimization (10 minutes):

-Allow students to test their models, observe how well they simulate the preservation process, and make any necessary adjustments.-Discuss why certain designs or programs are more effective than others.1. Presentation and Discussion (10 minutes):

-Have each group present their model to the class, explaining the food preservation technique it represents and how their program works.-Discuss how these technologies impact food safety, quality, and shelf life.Learning Outcomes:* Understanding the practical applications of food preservation technologies.
* Enhanced skills in building and programming with LEGO WeDo.
* Improved problem-solving and critical thinking skills.

This activity not only reinforces the STEAM concepts but also gives students a practical insight into how technologies are applied in agriculture and food production, making it a comprehensive learning experience. |