Sustainable Farms - Session 1

Introduction to British Farming

Context:
Learners are introduced to the types of farms in our country, in particular arable and dairy farms, and where they are located. They apply a range of maths skills to develop understanding about land use and space. They use information presented in tables and graphs to find out more about farming in the United Kingdom. They begin to recognise the challenges farmers face and how engineers work with them to solve problems.

Engineering focus:
Learners will be working as an engineer by asking questions to understand more about farms by identifying problems. In particular, this session draws on maths applications in context.

Learning time:
1.5 hours

Suggested age group:
11-14 years old

Curriculum links:
Mathematics - data handling
Learners will learn:

- To construct and interpret appropriate tables, charts and diagrams for ungrouped and grouped numerical data.
- To develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.
- To develop their use of formal mathematical knowledge to interpret and solve problems.

Keywords
Arable
Horticulture
Dairy
Livestock
Sustainable
Climate
Sowing
Fertilising
Weeding
Harvesting
Irrigation
Ploughing
Compaction
Nutrients
Fertiliser

Resources:

- NFU Video: Introduction to Arable Farming
- NFU Video: Keeping Soil Healthy
- Sustainable Farms Session 1 PPT
- Access to the internet for mapping exercise

Optional:

- Access to measuring equipment to estimate the area for the school grounds (eg. trundle wheel)

Suggested Activities

1

What do we know happens on farms in the United Kingdom? (5 minutes)
In groups of 3, ask the learners to generate ideas about things they think happen on farms. This is a quick-fire activity to generate lots of ideas. Ask them to prioritise the 4 things that they think happen most often (slide 2 can be used to inspire conversation.

Why are farms important to you? In the same groups allow learners some time to discuss why farming is important to them and their families. What aspects of their daily lives do they think have links to farming?

2

What does the data tell us about farming in the UK? (40 minutes)
Use Slides 3–12 to introduce learners to the two types of farming that are most common in the UK. The slides engage learners in using their maths skills to interpret and present data about different types of farms across the UK.

Involve the learners in interpreting the tables and pie charts provided, and then construct their own pie chart using the data they have been exploring. Work individually or in pairs to tackle the multi-step problem focused on exploring the area of land used to grow particular crops.

3

Optional: What is a hectare? (15 mins)
Teachers may encourage learners to apply their maths skills linked to area to develop a better understanding of the term 'hectare'. By collaborating, learners estimate how many times their school grounds would fit into a hectare of land. Learners decide how they will estimate the area of their school grounds in metres squared, convert this to hectares, and apply their understanding (Slides 13-14).

4

What farms are in our region of the UK? (30 mins)
Learners reflect on the number and reasons for particular types of farming in their local area (Slide 15-16). Learners can find out more about the processes involved in growing plants for food by watching the **NFU Video: Introducing Arable Farms**.
They collaborate to use Google maps to research local farms and develop understanding about the range of farm types in their area (arable, horticulture, dairy, sheep, pigs, poultry etc.). They present data following the instructions on slide 17, from which learners draw conclusions about why different certain types of farming occur in different parts of the country (slide 18), applying knowledge of terrain and weather.

5

What sort of problems do farmers, who grow plants for food, face? (10 mins)

A bespoke **NFU video: Keeping Soil Healthy** provides learners with insight into the problems that farmers face in keeping soil healthy. Through watching the video and listening to a real-world farmer describe the issues they face, learners identify multiple problems that are regularly experienced on contemporary farms.

Encourage learners to consider how the problems relate to sustainability and climate change. Explore the links between the processes in farming that impact on greenhouse gases and climate? Debate the positive and negative impacts of farming and whether farming could be considered an optional human activity or not?

6

How do engineers help arable farmers to solve problems? (10 mins)

Bring the session to a close by recapping the problems that farmers find on their arable farms. Find out what problems learners can recall from the video. Slide 19 includes quotes from the video to revisit issues arising. Ask learners to work in pairs and use their quotes to support them in summarising the four problems they have identified:

- soil compaction
- pests eating seeds
- keeping nutrients in the soil
- carbon emissions have an effect on the environment, contributing to climate change.

Use the **infographic** on slide 20 to explain the relationship between farmers and agricultural engineers. Key things to note:

- Agricultural engineers that design and create innovations to make farming more efficient and sustainable.
- Agricultural engineers work through the Engineering Design Process: they **ask** questions to identify problems on the farm, **imagine & plan** solutions to those problems, **create** designs to solve the problem and then test and **improve** their designs.