

Farm visits and GCSE Science: *How could connections with and visits to local farms enrich learning?*

This list of ideas has been put together to try and give teachers some ideas for how connections with and visits to local farms might enrich learning in GCSE Science.

GCSE Topic	Enrichment opportunity provided by visiting a farm / inviting a farmer into school
<p>Health, disease and the development of medicines bacteria, viruses and fungi as pathogens in animals and plants reducing and preventing the spread of infectious diseases in animals and plants</p>	<p>Animal disease Explain to pupils how wormers, vaccines, fly treatments, foot baths etc are used to maintain health in livestock Show pupils the equipment and ask them to guess how it might be used</p> <p>Plant disease Show pupils specimens or photographs of plant diseases, (e.g. examples of ash dieback, brown rot, yellow rust) and discuss how the spread of disease might be prevented</p>

Ecosystems

levels of organisation within an ecosystem
 some abiotic and biotic factors which affect communities; the importance of interactions between organisms in a community
 organisms are interdependent and are adapted to their environment
 positive and negative human interactions with ecosystems

Food chains and webs

Use a farm walk to study food chains and webs (e.g. wildlife in the hedgerows such as hawthorn leaves eaten by insects, which are in turn eaten by a blackbird - blackbird also eats the berries, so is an omnivore), or crops / livestock and man (grass is eaten by the cow, which becomes beef eaten by man)

Abiotic factors

Discuss how different abiotic factors (such as water, carbon dioxide levels, nitrates) affect the growth of arable crops and livestock

Adaptations

Discuss the different adaptations of wildlife on the farm and how farmers need to look after livestock who may not be as well adapted to the environment (e.g. dormice hibernate, whilst chickens are provided with housing)

Food security

Discuss sustainability on the farm (e.g. show how soil fertility is maintained, how food waste is minimised pre and post harvest, how the field to fork chain works in practice, show pupils around the farm shop)

Pollution

Explore potential farm pollutants and damaging practices and explain how farmers minimise the harmful effects of these (e.g. explain why nitrates can only be applied and hedge cutting carried out at certain times of year)

<p>Nutrient cycles and energy flow</p> <p>photosynthesis as the key process for food production and therefore biomass for life how materials cycle through abiotic and biotic components of ecosystems the role of microorganisms (decomposers) in the cycling of materials through an ecosystem</p>	<p>Photosynthesis Visit or observe glasshouses or hydroponics to see how photosynthesis is maximised in terms of nitrogen / carbon / water</p> <p>Recycling of nutrients Demonstrate use of Farm Yard Manure, composts and other examples of recycling (e.g. show pupils an AD plant and explain where the raw materials come from and what is done with the products, show pupils examples of leguminous plants and explain their role in the nitrogen cycle)</p>
<p>Biodiversity the importance of biodiversity methods of identifying species and measuring distribution, frequency and abundance of species within a habitat</p>	<p>Biodiversity Measure biodiversity - (e.g. record the different shrub species in a hedge, or count the different farmland bird species present) Measure distribution -(e.g. use a simple open frame quadrat to measure the distribution of plants in a field) Explain the different ways in which biodiversity is maintained / increased on the farm (e.g. describe the activities carried out for Countryside Stewardship)</p>
<p>Inheritance the genome as the entire genetic material of an organism how the genome, and its interaction with the environment, influence the development of the phenotype of an organism most phenotypic features being the result of multiple, rather than single, genes single gene inheritance and single gene crosses with dominant and recessive phenotypes genetic variation in populations of a species the importance of selective breeding of plants and animals in agriculture</p>	<p>Variation Observe and record differences of continuous and discontinuous variation in crops or livestock and construct graphs, charts etc (e.g. each count the number of grains on a crop seedhead and draw up a histogram of the data)</p> <p>Selective breeding Explain and show examples of breeding programmes in place on the farm (e.g.- show pupils AI equipment, explain the selection of sires, EBVs, crop breeding programmes,)</p>

<p>Biotechnology the uses of modern biotechnology including gene technology; some of the practical and ethical considerations of modern biotechnology</p>	<p>Biotechnological techniques Discuss potential applications of GM and cloning techniques with pros and cons of the technology</p>
<p>Chemistry evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate common atmospheric pollutants: sulphur dioxide, oxides of nitrogen, particulates and their sources the Earth's water resources and obtaining potable water</p>	<p>Protecting the environment Discuss significance of NVZs, catchment sensitive farming and techniques used to save and recycle water on the farm Explain how feed choices can reduce methane emissions in cattle</p>
<p>Physics renewable and non-renewable energy sources used on Earth, changes in how these are used</p>	<p>Show pupils wind or solar installations and explain how they work</p>

This has been compiled by a Secondary Science Teacher and FACE South West Co-Ordinator-Debbie Hicks. Please contact enquiries@face-online.org.uk with any further ideas – this is a work in progress!