

Introduction

Agriculture is hugely important to us all. Great media interest has been generated following several recent crises, which have significantly damaged the UK's farming infrastructure. This issue may be of personal importance to pupils whose families and local communities have been directly affected. However, the issue can be broadened to consider the need for global sustainability in food production. In moving the debate from a local scale to global food production, pupils may start to see the wider impact of food production policies.

There are a wide variety of conflicting opinions about how best to farm. Scientific evidence about health and environmental benefits of different farming practices is neither complete, nor is its interpretation uncontested. Farming therefore provides an ideal opportunity for pupils to experience a contemporary, real debate.

Running the activities

This unit contains a number of activities and other resources. Select those which are appropriate to your pupils and your scheme of work.

Key ideas

Notes for teachers: key ideas in citizenship and science that relate to this topic.

Farming glossary

This is a general reference including citizenship key words and science key words. You may want to issue a copy to every pupil when introducing (or reviewing) the relevant science. Alternatively, make enlarged photocopies and post them on the classroom walls.

How does fertiliser affect plant growth?

A practical activity: Investigate the effects of different levels of artificial fertiliser on radish growth (Protocol sheet based on SAPS Scottish Higher Investigation Worksheet www.saps.org.uk). A useful introductory activity, which may remind pupils that plants, whether grown organically or conventionally, require a source of nitrogen.

Discussion 'starter' cartoons (drawn by Ralph Edney)

Two drawings are provided:

- The first shows two 'Wind in the Willows' characters reclining peacefully after a picnic by the river, about to be overcome by a cloud spreading from a small plane labelled 'crop spray'.
- The second cartoon shows a single cow attached to an automatic milking-and-processing system, of major industrial scale. At the end of a long conveyor belt, a single carton of milk is delivered.

These could be used in a variety of ways. For example, made into an OHT they would provide a stimulus for class discussion; or pupils could be asked to write a caption for each, relating it to things they already know. The pictures are drawn to be open to many interpretations, to stimulate thinking.

The teacher's role in using these cartoons is twofold - to generate ideas from the class, and subsequently to challenge them. For example, if pupils suggest that farmers use too many chemicals, you might ask what the implications of using less would be. If they suggest that milk production is now over-industrialised, ask how we might otherwise have a reliable supply of cheap, fresh milk, and so on.

Top of the Crops – a play

This 15-minute drama has been specially written for this resource package by Andy Merriman. It is intended to stimulate pupils into raising questions concerning organic farming, its benefits and limitations. (Users should feel free to adapt the script in any way they see fit, for example, to bring in local issues, local humour, etc.)

Using the play *Top of the Crops*

This is one suggested approach to getting the most out of the play, using the following resources to build a sequence of activities. They are designed to help pupils to develop their understanding of the issues surrounding organic farming and its relevance to a sustainable agriculture policy for the future.

If pupils have had the opportunity to prepare the play beforehand, it should take approximately fifteen minutes to perform. After the performance ask pupils to work in groups and provide each group with a copy of the *Top of the Crops* script. They should go through the text and highlight sections that raise questions about organic farming. For example, Jade's statement, 'I think we need to eat more healthily. It's Organic Food Week at school, so this is a good time to start.', raises the question 'Is organic food healthier?'

Learning outcomes

Prior learning

Pupils should be familiar with the need for pesticides and fertilisers, although a practical investigation covering the role of fertilisers is included in the resources as a stimulus activity.

Where the activities fit in

These resources may be used at appropriate places in your curriculum. The following suggestions are based upon the QCA schemes of work. Advice on teaching controversial issues can be found in appendix 9 of the QCA Key Stage 3 Citizenship Teachers' Guide, which you can download from www.standards.dfes.gov.uk/schemes

Citizenship

1i) The world as a global community, and the political, economic, environmental and social implications of this, and the role of the European Union, the Commonwealth and the United Nations.

2a) Think about topical political, spiritual, moral, social and cultural issues, problems and events by analysing information and its sources, including ICT-based sources
2b) Justify orally and in writing a personal opinion about such issues, problems or events

2c) Contribute to group and exploratory class discussions, and take part in debates.

3a) Use their imagination to consider other people's experiences and be able to think about, express and explain views that are not their own.

Science

Various aspects of the science curriculum may be covered, depending on the route chosen through the activities:

2a) The need for a balanced diet containing carbohydrates, proteins, fats, minerals, vitamins, fibre and water, and about foods that are sources of these.

3c) Nitrogen and other elements, in addition to carbon, oxygen and hydrogen, are required for plant growth.

4a) Environmental and inherited causes of variation within a species.

Farming

Using the play (continued)

Bring the groups together and summarise the key questions raised. Pupils may wish to add other questions arising from their group discussion. This set of questions are the focus for the following activities and will be re-visited at the end, when pupils will consider whether the evidence they have considered is sufficient enough to enable them to answer the questions. Alternatively, pupils could raise points highlighted by the play as part of a class discussion, and a *Summary Questions* sheet is provided to review such a discussion.

Place pupils into groups, ideally of four. Each group should consider one of the documents written from the viewpoint of an individual. There are four *Farming Viewpoints*.

- Jade (pupil character in the play)
- Sarah (pupil character in the play)
- David (organic farmer)
- Paula (supermarket manager)

Their task is to oppose the arguments raised, backed up with information gathered during their research. Provide each group with a set of *Statements*. Each member of the group has a different sheet of statements taken from a variety of sources. It is important to discuss with pupils beforehand that the statements may be from sources that are strongly for or against organic farming.

Pupils should be encouraged to do further research using Internet sources to substantiate the evidence statements they have been given, or to gather further information where they feel it is required. Where possible they should be encouraged to interview local members of their community as part of their research, for example, a supermarket manager or local farmer. This activity requires pupils to consider an issue from different perspectives. Each viewpoint is provided in Word format so that pupils can add their opposing arguments directly to the documents. The viewpoints are arranged to cover individual, local and global perspectives to encourage pupils to consider the issue further than their personal experience.

Pupils then re-visit the questions, which should be presented to each group as the set of *Questions Cards*. Ask the pupil to sort the cards into different categories. For example:

- Identify the five cards that they feel pose the most important questions.
- Sort the cards into questions that affect individuals, local communities, our global community. Does any one category have more of the questions that the pupils feel are important? Are they prepared to sacrifice the needs of one category for another? Do they feel that they have sufficient evidence to make such a choice?
- Sort the cards into questions that they feel have been answered, partly answered, or not answered at all, by the evidence they have researched. What do they think should be done, if anything, regarding organic farming in the UK? Who needs to have a role in making this happen?

Sustainable development

This short activity sheet might be used to generalise and consolidate the concept of sustainable development.

More ideas

- As an introductory activity observe samples of organic and non-organic apples. Measure mass and diameter. Does there appear to be greater variety in either batch? Has a large enough sample size been used to be conclusive? This may raise the question, 'Why is there more variation in organic produce?' This could follow on from variation work in Year 9.
- Practical extension activity: Investigate the effects on radish growth of different fertilisers (both organic & non-organic) available from local garden centres. Follow a similar method to the activity sheet, but apply according to manufacturer's instructions. Discuss whether it is fair to compare results directly. It may be more appropriate for pupils to decide which fertiliser gave best value for money.
- Interview local community members to supplement research.
- Look at texts about the use of pesticides and insecticides from different perspectives, e.g. *Silent Spring* by Rachel Carson.

Science

5a) Ways in which living things and the environment can be protected, and the importance of sustainable development.

5b) Habitats support a diversity of plants and animals that are interdependent.

5f) How toxic materials can accumulate in food chains.

Safety

Please refer to the technician notes accompanying the practical activity.