

Scientific enquiry

Main messages from the unit

- The programme of study for scientific enquiry needs to be taught explicitly. Pupils should be given opportunities to practise their developing skills.
- The Framework yearly teaching objectives for scientific enquiry can be refined to produce objectives for individual lessons or groups of lessons.
- The scientific enquiry posters offer one useful means of teaching pupils how to plan, manage, record, conclude and evaluate a fair test.
- Enquiries and investigations can challenge pupils' scientific knowledge and understanding, their investigative skills, or both. Teachers should take account of this when planning work.
- There is a range of types of enquiry which needs to be taught and practised throughout Key Stage 3.
- In Key Stage 3 there is an emphasis on increasing the accuracy and reliability of evidence and on evaluating the validity of conclusions in terms of the quality and quantity of evidence obtained.
- Scientists test hypotheses by predicting outcomes and looking for evidence to support their predictions. They also look for evidence which renders the prediction invalid.
- Pupils should be taught to discriminate evidence from other information.
- There are many historical and contemporary examples of how scientists work. It does not matter which ones teachers choose to use.
- There are many interesting examples and source materials which teachers can draw upon.

Implications for the science department

The priority which the department has accorded to developing the teaching of scientific enquiry will be reflected in the action points identified for the departmental action plan. Scientific enquiry may be a priority for the whole science department or only for one or more individual teachers. In either case there are a number of actions which can be taken. Some of these actions are listed below as an aide-memoire.

For the department

Review the scheme of work to ensure teaching scientific enquiry becomes more explicit.

Review the scheme of work to ensure scientific enquiry is taught within a structure which ensures progression.

Consider introducing the scientific enquiry posters to all classes at least in the early years of Key Stage 3.

Using the repeat-reading activity as an example, consider how to develop or find other activities which enable scientific enquiry skills to be taught explicitly.

Obtain the AKSIS publications, try other activities and then build them into the scheme of work.

Using some of the activities for teaching pupils about ideas and evidence as examples, consider how to develop or find other similar activities.

Encourage colleagues to look for and develop more historical examples of how scientists worked.

Encourage colleagues to look for and develop more contemporary examples of how scientists work.

For individual teachers

Try using the posters to help pupils plan and manage a fair test enquiry.

Try teaching about the value of repeat readings to a class.

Try teaching some other aspect of scientific enquiry which you have identified as being a particular weakness with one class or group of pupils.

Try a few short activities to help pupils understand what is meant by evidence.

Develop a card sort activity of your own to help pupils recognise evidence.

Try the lemonade fizz activity.

Try the pineapple jelly activity.

Try the Lavoisier example to help pupils understand how scientists work.

Develop a similar activity based on a scientist whose work you know well to help pupils understand how scientists work.

Try the clinical trial simulation.