SCIENCE AT PRIMARY LEVEL

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Primary students on a science "dig"

"Science also serves as a means of promoting the development of skills and attitudes not necessarily specific to science"

It is nearly ten years since Science Education was formally recognised as one of five principal aims of the National Minimum Curriculum at Primary Level (1988). However, despite the backing provided by the education department, science has retained the secondary role it had before, often being sacrificed for the sake of the other examinable subjects.

Why is it important to do science at primary level? What educational goals can be achieved? Children should not do Science at Primary level only for the sake of covering concepts and content, but it serve as a means of promoting the development of skills and attitudes not necessarily specific to science(Harlen,1992). Raper and Stringer (1987) have summed up the aims of primary science education under three headings:

- to build up a framework of concepts which help students make sense of their everyday experiences - ***knowledge***
- to introduce pupils to a rational way of finding out about the world - ***Scientific method***
- to foster skills and attitudes for investigation and experimentation - ***attitudes and skills***

Skills, attitudes and concepts cannot be considered separately, but all make up part of doing science, at the same time being also interrelated to each other.

Concepts

Children often have ***ideas*** about their surroundings before any formal science education (Driver, 1994, 1985; Harlen, 1993) . They can explore and learn science through these ideas. It has been documented that children at all levels, even at primary (SPACE Project) have wrong ideas about a range of science concepts. Teaching should then be aimed at targeting these ideas or as are more commonly known, 'alternative frameworks' (Driver, 1981)

Science as a subject contains a body of knowledge of established ***facts***. Part of doing science is introducing pupils to parts of this body of knowledge. However, it is not enough to get across scientific concepts. If scientific ideas are to be accepted by children, they need to be ***understood*** fully. It is only then that children can apply these concepts to different contexts.

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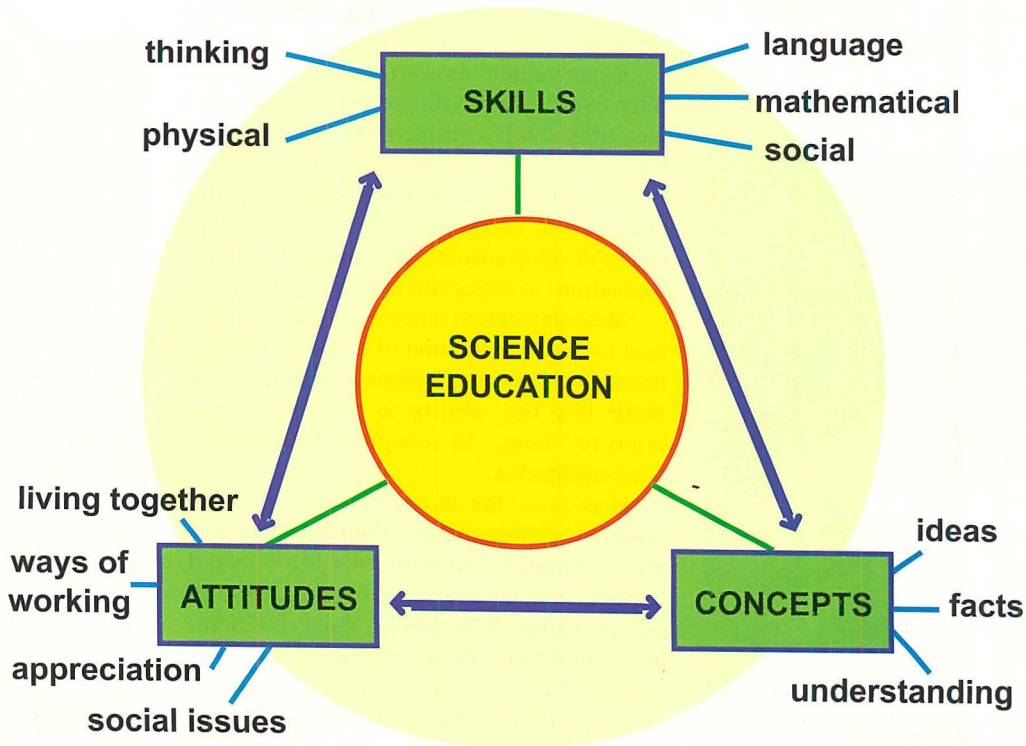


Fig.1 **The inter-relation of skills, concepts and attitudes in Science Education**

Skills

Scientific activities at the primary level involve the development of skills which may not necessarily be specific to doing science (Jarvis, 1991). Science experiments often involve pupils working in groups. Children will therefore need to develop the ***social skills*** necessary to be able to work with their classmates, in deciding how the tasks should be shared and how to cope with different opinions.

Communication in science is through ***language***. Whether this involves talking and discussion, reading from books, listening to others' ideas, or writing down reports, in each case pupils are practically continually engaged in the use of language. In addition, however much we try to keep the language simple, some technical words specific to science cannot be done away with. Doing science will therefore involve also introducing pupils to the scientific language.

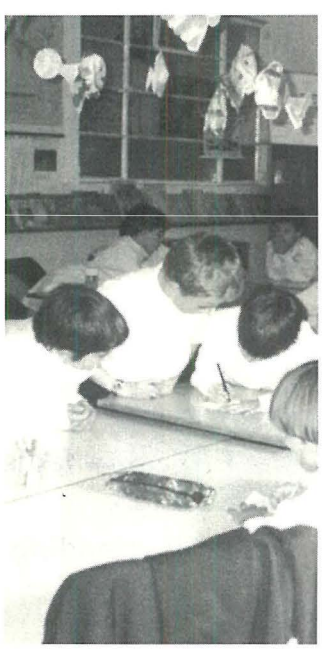
Experimental investigations in science often require children to use instruments to take measurements like temperature, length, weight etc.

The particular technique and co-ordination necessary to manipulate apparatus will help pupils develop specific ***physical skills*** of co-ordination so important at primary level.

Measurements in science, most of the times, lead to the manipulation of numerical values, necessitating the development of ***mathematical skills*** like the ability to plot graphs and interpret them, to recognise proportional relationships etc.

However, the major reason for doing science is getting children thinking about what they are doing and why they are doing it. Experimental investigations require children to ask questions, hypothesise, solve problems, make inferences, draw conclusion etc. Given such a perspective, science is often considered as one means of developing ***thinking skills*** in pupils.

"At this level Science should be used as a tool for fostering attitudes and familiarising children with the scientific method"



Attitudes

Science has its own was of working, better known as the scientific method. Although different scientists may claim to follow different approaches, common ways of designing and conducting an investigation can be identified. Primary science aims to introduce pupils to these ***ways of working***.

Science can serve to help pupils become more aware of and ***appreciate*** their environment. This does not imply solely the biological aspect of nature, but also the physical and chemical phenomena they may experience. The implications of ***living together*** with other organisms can help children understand the implications of environmental issues like pollution, urbanisation etc. Pupils may be introduced to ***social issues*** concerning our environment, and the on-going controversy between conserving our surroundings against pollution and hazards produced by industry which provide our daily commodities.

Science education in the 5-11 age range can help many aspects of the development of young children. Emphasis at this level should be on the actual scientific concepts, or knowledge, and be used more as a tool for fostering attitudes and familiarising children with the scientific method. Therefore, at the Primary level, the process of doing science is much more important than the actual content covered.

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