

5-1956

Definition of Science, An Operational Classroom Technique

David G. Barry

Mankato State Teachers College

Follow this and additional works at: <https://digitalcommons.morris.umn.edu/jmas>



Part of the [Science and Mathematics Education Commons](#)

Recommended Citation

Barry, D. G. (1956). Definition of Science, An Operational Classroom Technique. *Journal of the Minnesota Academy of Science, Vol. 24 No.1, 72-73.*

Retrieved from <https://digitalcommons.morris.umn.edu/jmas/vol24/iss1/16>

This Article is brought to you for free and open access by the Journals at University of Minnesota Morris Digital Well. It has been accepted for inclusion in Journal of the Minnesota Academy of Science by an authorized editor of University of Minnesota Morris Digital Well. For more information, please contact skulann@morris.umn.edu.

DEFINITION OF SCIENCE,
AN OPERATIONAL CLASSROOM TECHNIQUE

DAVID G. BARRY

State Teachers College, Mankato

Few words are heard more frequently and used with more apparent authority than the words science, scientific, and scientist. With these words there is usually a projected impression of dependability and certainty, almost of infallibility. The idea of the scientific test is widely discussed as a means of determining the reliability of materials on the consumer market. Science classrooms are filled with equipment and are called laboratories. The true nature of science lies beyond the physical equipment, but in the minds of many the technical equipment has become a symbol of authority and infallibility. Results of research in science are accepted, and respected by students. Yet there is a decreasing percentage of the incoming student populations that are interested in scientific work. If science is so well accepted and depended upon, what could possibly limit the numbers attracted to the profession?

One possible reason is suggested here. The concepts of science, scientist, and scientific are difficult to translate into words. Many workers in areas of science are not in agreement concerning the nature of science. The problem is acute in science teaching. An examination of basic textbooks shows variation in the definitions of these terms. Further, many text books make no attempt at definition. The Columbia Encyclopedia states: "Science (from *Scientia*, knowledge), accumulated and systematized learning, in general usage restricted to the knowledge of natural phenomena." Raymond Seeger, Acting Assistant Director of the National Science Foundation stated his definition: "Science is that knowledge which has been accumulated by the use of the scientific method under the direction of a scientist." The author takes the position that these definitions create a view of science that is static, even dogmatic. They are definitions which can only be fully understood by a well trained scientist. Many workers in science conduct classes on the basis of such definitions. Frequently, the mass of accumulated knowledge is presented to the student in a dogmatic manner. Many textbooks are written in the same manner. Thus if the beginning student gains a broad appreciation of science as a human endeavor he frequently must do it in spite of his teachers. Many students may be inhibited from reaching this level of appreciation. Others may feel no challenge in science with which they can identify and seek elsewhere. It is possible that this view of science as a body of knowledge so concisely stated is in part responsible for some of our methods of teaching and development of student experiences which are unsuccessful in attracting more and more outstanding students into science study.

The mental security based on the cold objectivity and infallibility

of science seems to be an illusion. Much opinion equates this view of science with its technical successes in modification of our physical standards of living. Science and applied technology become synonymous in this opinion. Many teachers are guilty of teaching only the technical aspects of science. The results reduce Science from a philosophic struggle for a workable interpretation of man and the universe to the status of a technique. Science is not just a technique but is a human endeavor which operates on the premise that man can know and understand himself and his environment. It is filled with poorly constructed hypotheses and poorly supported theories. Yet it has been successful enough to bring man to the level of the atomic scientist because its fundamental position seeks rational understanding of natural phenomena.

The author proposes an operational definition of science which is a result of several years work with students and an attempt to create an educational situation for the student which allows personal identification. Science is man's attempt to acquire dependable information and understanding about himself and his environment, in order to establish policies of behavior which may lead to a more harmonious existence for the individual and for his society. This definition and its elements are developed and referred to consistently throughout the term. Thus they acquire a more complete meaning for the student. In analysis: "Man's attempt", expresses science as a peculiarly human endeavor. "Dependable information" expresses the nature of scientific methodology and the criteria which can be used for determination of dependability of information; scientific empiricism is basic to these criteria and thus the definition offers a realization that science has many levels of operation, all valid at their own level. The terms "information and understanding" interrelate as sequential elements in their necessary order. This sequence places the mass of information often referred to as science in its proper perspective. Purpose is expressed as the ultimate philosophic goal of research and education in science, the purpose being the improvement of the state of man by intellectual adaptation of results to form policies of behavior compatible with human values rather than applications of results as infallible law. Policies can be modified with the advent of future knowledge. The last element expresses the positive view that man can approach a more complete realization of the potentialities of the free individual and his society.

This definition of science is proposed on the assumption that it may stimulate criticism and examination toward solution of creating a scientific attitude in the mind of the student. The definition of science stated in this paper encompasses the value of systematized, organized knowledge and as well offers the student opportunity and challenge to participate daily in a progressive human endeavor whose directional goal is as Conant says, "A continued reduction in the degree of empiricism in our undertakings."