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Inspection of recent changes in science teaching at the secondary school level reveals two distinct trends: a rejection of outmoded general science courses and an increase in laboratory emphasis.

The rejection of general science courses is usually related to two factors. Much of the subject matter generally included in these courses is now being treated in earlier courses and secondly, most general science courses suffer from a lack of continuity. Subject matter is presented in units which bear little relation to one another and utilize various types of approaches. The result is a potpourri of topics, held together by nothing more substantial than the binding of the book.

The emphasis on the lab approach is no doubt the result of a desire on the part of educators to present science as something other than a compendium of facts and figures. The scope and pace of modern-day scientific developments cannot be met with fact-oriented pedagogy. "Facts" change overnight, they become absorbed in other "facts" as knowledge increases; some are proven false. Courses structured around "telling" about facts are miserably inadequate in conveying the fundamental ideas and concepts of science. They also do not lend themselves to presenting science as inquiry. Inquiry need not be taught to youngsters. Though it may expose itself in various guises, some of which are more amenable to formal guidance than others, the desire to know is always present. Ideally, the investigative approach to science teaching should cultivate this desire and permit the student to discover things through his own efforts. The challenge to the teacher lies in using the discovery approach to initiate discussion and introduce further inquiry. This focuses emphasis on "how" we learn rather than "what" we know.

How do these two trends, one negative and one positive, relate to earth science?

Teaching science through a study of man's environment has two distinct advantages. It affords a unifying purpose and a continuum which relates all subject matter by providing a focal subject. The science of the earth deals with the materials of our planet and the processes which bring about changes. If an inquiry approach is implemented, the question of origin is inescapable and a look at the relationship of the solar system to the universe is integral. The atom-to-universe involvement develops a comprehension of scale in both space and time, affording an effective continuum for the development of frames of reference. Conservation of mass and energy, uniformitarianism, and adaptation to environment are all ideas which become naturally incorporated in an interdisciplinary approach to the science of planet Earth.

A perspective of matter, space and time must be presented through a study of material and energy from man's point of reference—his environment on planet Earth. This affords a framework which includes and ties together all areas of science. Biology, chemistry, mathematics and physics must be dealt with in discussing the materials and processes which shape our environment. Astronomy, geology, geography, oceanography and meteorology deal with aspects of the study of the earth and are all part of earth science. The way in which a study of the earth provides a common denominator for science topics might be illustrated with examples.

Involvement in the *behavior of gases* can be linked to the study of the atmosphere and its role in water transport. Evaporation, condensation and pressure-temperature relationships are all essential aspects in the understanding of water transport and climates. Each of these topics may well be considered without recourse to their role in the atmosphere, but the story of how they are involved in forming clouds, causing rain and winds, and how all of these processes are driven by energy from the sun affords a meaningful interplay of ideas and concepts which relate to the real world. The basics of gas behavior are treated. The treatment is made interesting by relating the ideas to familiar experiences which are then viewed from a different perspective.

The *structure of solids* can be focused on earth materials. All youngsters are fascinated by the way mica separates into thin sheets. A comparison with feldspar which breaks into "blocky" pieces, and quartz which breaks irregularly, sets the stage for a meaningful discussion of the nature of solids. The impact of the discussion is enhanced by allowing the student to discover these differences in behavior. In addition to delivering the message of "things act according to the way they are put together," this confrontation introduces the student to materials which comprise the bulk of the earth's crustal material. This adds more meaning to subsequent discussions of other environmental aspects such as landforms, erosion, and deposition which involve these common earth materials.

Radioactivity can be introduced and discussed from the point of view of its use in dating earth materials. Here again, the subject can be treated without involving the geological application. The latter, however, ties the concept to a real situation and provides a pedagogical vehicle for conveying the concepts of transmutation and half-life. In addition the experience may provide a real basis for the appreciation of geologic time. If properly presented, it can also relate to mineral stability by proposing the problem introduced by the loss or addition of parent or daughter elements.

Each of these topics, behavior of gases. structure of solids, and radioactivity, are in principle treated just as they might be in a general science course, except for one aspect. In that aspect is the strength of earth science as a science-teaching medium. The ideas are presented in the context of experiences or problems that relate to a unifying theme. This theme, a study of man's environment, is the realm of earth science.

Inherent in an earth science approach is the foundation for an appreciation of water and air pollution problems, weather modification studies, the space effort, desalinization studies and a host of topics which will confront a future electorate. Therein lies one salient advantage of an earth science approach for those students who will never again take a science course. Along with their involvement in principles of science, they become exposed to problems which will doubtless remain entwined in politics.

The college-bound student is also better off for having taken an earth science course. He has seen the interplay of matter and energy involving the basic principles of the physical sciences. He discovers that he must use mathematics to express some of the ideas which he has encountered. The appreciation which he has developed for the role of science in man's struggle with his environment will aid him in his choice of a profession. His experience with a laboratory-oriented course may give him early confidence which will stimulate and increase his interest in research.

The laboratory approach, if properly implemented, is a powerful means of conveying the essence of the so-called scientific method. Inquiry through investigation with real objects is enjoyable and rewarding. These experiences should deal with the basic principles that are involved in the natural processes being studied. The student can discover, for example, that light and dark objects absorb radiant energy differently. The laboratory setup may consist of a light, two thermometers and two cans, one black, the other shiny. Alternatively, two pans, one filled with water and the other with soil, can be substituted for the cans. The investigation can be extended by posing questions regarding the effect of the unequal heating on the surrounding air. By his own initiative or through a demonstration, the student may discover (observe) that the resultant differences in air density cause motion which can be seen by releasing chalk dust or smoke in the vicinity. A discussion of winds caused by unequal heating of the land and water masses by the sun is a natural follow-up.

An earth science course is no less amenable to an investigative approach than any other science course and more amenable than most. The added potential of field trips increases the scope of the experience-centered emphasis.

Efforts to outline truly interdisciplinary materials for an earth science course are hampered by the barriers which the individual disciplines have erected. It is difficult to find scientists with the scope and inclination necessary to work with educators in developing a unified approach which adheres to a coherent theme. Geochemistry, geophysics, space physics, and any of the multitude of subject-matter areas that might be listed, can benefit from their incorporation in a course which emphasizes their kinship rather than their differences and relates to the real world.