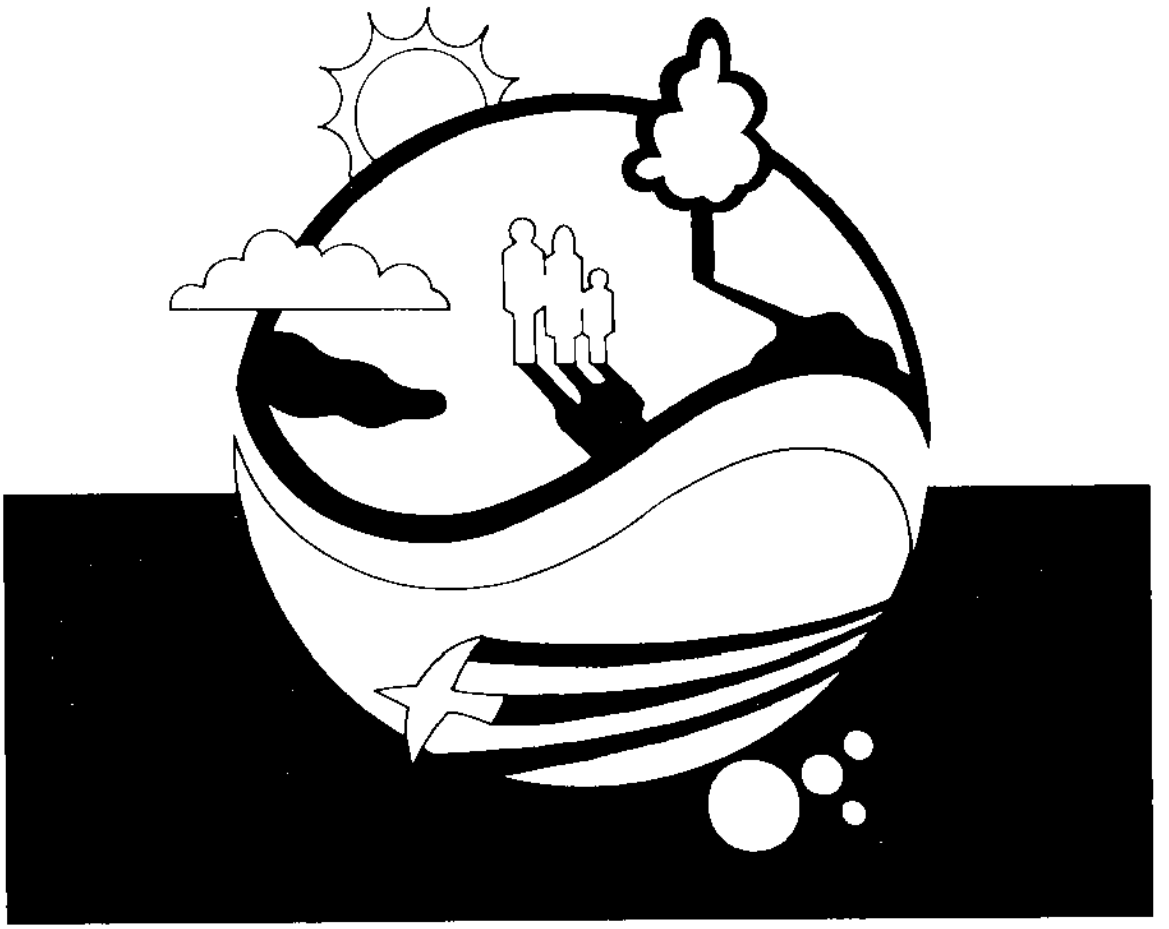
THE ENERGY SOURCEBOOK
HIGH SCHOOL



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INTRODUCTION

Today's students are tomorrow's workers, leaders, consumers, and voters. They will live in a world that will undoubtedly be more highly technological than the present. Because of this certainty, quality education at all levels has become more critical than ever before.

The need for improved science and mathematics education has been stressed in a variety of forums recently. A solid foundation in these two subject areas is essential to preparing students for not only the kinds of work they are most likely to desire as adults but also the kinds of issues with which they will grapple. An understanding of basic scientific, technological, and environmental concepts is becoming more and more necessary in order to participate effectively in the social, economic, and political processes of today's world.

Recent studies show that students in American schools lag behind their peers in other developed countries in academic achievement. This is particularly apparent in measures of science and mathematics proficiency. Fewer American college students are entering demanding academic programs in science and engineering; as our need for these professionals increases, our supply is decreasing. Many American adults are functionally illiterate in science and technology, and industries spend tens of billions of dollars each year training workers who are inadequately prepared. Lack of the skills needed in our technologically advanced society is costly in many ways—to us all. It also deprives people of the opportunities of which they might take advantage were they equipped to do so.

One of the proposed courses of action to mitigate this coming crisis is to boost science and mathematics education. To this end, the "Energy Sourcebooks" are developed and offered to help teachers prepare their students for tomorrow's world.

The purpose of the "Energy Sourcebook—High School Unit" is to integrate energy education into the existing curricula by providing instructional materials that are specific to the Tennessee Valley. The book contains plans for a variety of learning experiences and addresses energy issues with a balanced approach. It is heavily concentrated in science (especially physical science) and, to a lesser degree, math. The "Sourcebook" is intended to aid teachers in teaching not only basic science but the real-life application of these principles in energy studies.

DEVELOPMENT

The "Sourcebook" was developed in three stages. High school teachers were selected to write the activities with the assistance of education specialists. Teams of teachers were given the task of developing and writing the activities for each chapter. The second step involved testing the activities in the classroom. More teachers were selected to use the activities in their classrooms. From the evaluations provided by the testing teachers, revisions were made. Finally, technical reviews, editing, and illustrations completed the "Energy Sourcebook—High School Unit." The first edition of the "Sourcebook" for high school was completed and printed in 1986. Revisions and preparation for reprinting were begun in 1989.

ORGANIZATION

"The Energy Sourcebook" has six chapters. Each of them has complete plans for classroom activities and demonstrations and a glossary of energy terms.

Six kinds of energy resources are most important in the Valley region. Solar energy applications and the electricity produced by hydropower and by nuclear and coal-fired generating plants are significant energy resources. Energy conservation is considered an energy resource, as it helps extend supplies of energy. Alternative energy sources—mostly biomass, wind, and waste—are also important. These six energy resources are dealt with in separate chapters of the "Energy Sourcebook." Each chapter begins with a brief overview which provides background information, including historical information, descriptions of current technologies, and environmental concerns relative to the energy source. Following each overview are classroom activities addressing various aspects of the production and use of the particular energy source.

ACTIVITY DESIGN

The first part of each activity contains its objectives, appropriate subject area(s), time requirement, and a comprehensive materials list. This information will aid teachers in determining how best to utilize the activities with their students.

Each activity is divided into three major sections. The "Background Information" section provides information specific to the activity for the teacher's use. The activity itself is outlined in the "Procedure." The third section, "Follow-Up," may be utilized as evaluation and corresponds to the stated objectives. Some activities include an "Extension." This part of the activity is optional. Some may be used as ongoing projects, while others may best be used as additional classroom work for more advanced students or for extra credit. "Resources" are listed at the end of most of the activities and include books, brochures, and other publications used in the development of the activities. These may also serve as sources of further information.

Each activity contains ready-made masters for the handout materials required for the activity's completion. These masters are easily removed from and replaced in the binder for photocopying (or producing a thermofax master for spirit duplication). Some plans also contain a master from which to make a suggested transparency for use with an overhead projector. Transparencies may be made by thermofax or by tracing.

CURRICULUM FRAMEWORK

The "Curriculum Framework" serves to correlate concepts or objectives stated by the Department of Education with the activities, identifying those that teach the specified concepts or objectives. These correlations are included to aid teachers in choosing activities.

PAGINATION

Each chapter is page-numbered separately and is designated with an appropriate letter. For example, the "Hydropower" chapter begins with page H-1, the "Solar Energy" chapter begins with S-1, and so on.