

ENVIRONMENTAL SCIENCE

Inquiries in Science Series: Examining Energy Resources. Carolina Biological Supply. \$249.95.

Overview of Product

“Examining Energy Resources” is a hands-on kit in the *Inquiries in Science Series*. It is intended primarily for high schools, but its versatility makes it easy to modify for introductory courses at the college level. It is designed to help students understand the relevant real-world concepts surrounding alternative energy sources. By rotating through several stations and observing different energy technologies, students have the opportunity to investigate and engineer forms of renewable energy. Investigations include producing coal and hydrogen gas, and experiments with a photovoltaic cell. As a culminating activity, students engineer a working wind turbine and experiment to optimize energy output.

Learning Goals & Standards

It is evident when one opens the teacher’s manual that a lot of thought has been put into the development of the *Inquiries in Science Series*. The Learning Goals and Content Standards are clear and concise and give a brief overview of what students are expected to do and how they will be assessed. If you’re a teacher like me who has to cite every standard covered in each lesson plan, Carolina has done a great job of including these in the teacher’s manual. The manual was great. I could tell it was designed by teachers, because it had background information, helpful hints, student misconceptions, and other resources to extend the activity.

Materials & Preparation

One great feature is that all the materials are packed in a box for easy storage. I found it very simple to set up the six lab stations around my classroom. I was able to have all six stations up and ready to go in about 20 minutes. Carolina provides most of the materials, and the ones not supplied can be purchased at a big box store or easily brought from home.

Instruction

The kit is designed around the 5E model of instruction: engage, explore, explain, extend, and evaluate. I have a class of 24 and had my students work in groups of four (the kit is designed for classes of 30). One of the best parts of the kit was the ease with which I could modify the inquiries to meet my needs, which is not always possible with some kits. The teacher’s manual also provided suggested assessments to use, which were very helpful and easily modified.

The activities are broken up according to the 5 E’s. The engage portion created a lot of discussion and was a great way to introduce the topic of renewable energies. I was surprised by the misconceptions my students held about energy and electricity. The engage phase gave me the opportunity to address these. During the explore and explain portion, my students completed three tasks. They created coal gas by heating up coal shavings, created hydrogen gas, and explored solar photovoltaic cells. I had my students rotate through the three stations, which I had to break up over two class sessions. I suggest you build in a little extra time, because some of my students let the gas escape before being able to light the coal or hydrogen gas and had to start over.

The part of the kit that my students had the most fun with and that generated the most discussion was the extend portion, which had my students construct a wind turbine and measure the output. I had my students do a little background research on wind turbines before construction. When the testing of the turbines took place, it turned into a class completion over which group could produce the most voltage. The competition aspect really got my students excited about the activity. One suggestion: since the students test their own designs, I had to keep watch to make sure that the tests were fair in terms of the distance between the fan and the turbines.

Summary

Overall, I was very happy with the *Examining Energy Resources* kit. I found the content to be accurate and developed in a way that promoted my students’ understanding of energy resources. My students found the activities interesting and were required to be active participants. I also found the resource adaptable, and there was discussion in the teacher’s manual that helped me to adapt it. The kit included assessments that helped me determine whether there was increased student learning. Finally, and most importantly, the kit created significant conversation and reflection by my students about energy resources and the energy future of the United States.

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