PROJECT BASED LEARNING

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To-the-Point Advice, Tools and Tips for Your First Project

PROJECT BASED LEARNING FOR THE 21ST CENTURY

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Acknowledgements

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SPOTLIGHT PROJECT #1

Project #1: Product Comparison

(9th grade Science)

THE PROJECT IN BRIEF

Project Title: Product Comparison

Project Author: Kristine Kurpiewski, ASPIRA Early College Middle School, Chicago

Subject Area: Introductory Science

Grade Level: 9th

Duration: 12 hours of class time

Driving Question: Which consumer products are most reliable?

Project Summary: Students function as a research team determining the most reliable brand of a product — that is, the one that best does what it is supposed to do. The teams choose a product commonly found at a supermarket and determine which of its qualities are most important for consumers. These qualities must be testable. The teams choose three examples of the selected product, create a hypothesis, then design and perform an experiment to test it. The teams exchange products and experimental protocols with another group, embark on a second round of testing to compare results, and discuss their conclusions in a PowerPoint presentation given to an audience.

Major Student Products: Research summary with data table; written report of testing protocols and hypothesis; oral presentation and defense of test results and interpretation.

For More Information: This project has not yet been posted to a website; email info@bie.org for contact information.

How the Project Was Conceived and Planned

Kristine Kurpiewski teaches Introductory Science in urban Chicago at the ASPIRA Early College High School, and knows her adolescent students well. They are a diverse mix of 9th graders who often need their skills built from the ground up. They are more motivated by classroom work that reflects their everyday experience than they are by textbooks and worksheets. And since sitting still for long periods of time can be a challenge, they enjoy being active learners. So Kristine turned to Project Based Learning. She wanted to design a project to introduce her students to the scientific method at the beginning of her course.

Driving Question: Which consumer products are most reliable?

The seed of her project came from a familiar resource—a textbook she had used for years in middle school. Buried in the inter-chapter pages of the teacher's guide was a suggestion for a weeklong series of labs that focus on the scientific method, which Kristine had been slowly expanding over the years to increase their depth and breadth. She wanted a project that would tie the multiple lab experiences together. Her inspiration came during a visit to a local supermarket when she read the competing claims for quality and safety on the labels of several well-known products. What if she put students into groups that would function as independent product testing laboratories? She could then train her students to think and act like scientists while they examined familiar household goods.

With the project idea firmly in hand, Kristine turned to the Illinois Learning Standards. She found a cluster she wanted to focus on: conducting controlled experiments; collecting and organizing data; formulating alternative hypotheses; defending conclusions to an audience.

How the Project Was Managed

To begin, Kristine raised students' interest in the project by leading a discussion about whether we can always believe the claims made about various products we buy. She showed students some examples of product tests in *Consumer Reports* magazine. During the first week of the project Kristine trained her students how to develop and refine a hypothesis, design an experiment with controlled variables, and record data. Then students worked in groups of four to design testing protocols for a consumer product that could easily be found in local stores, such as paper towels, batteries, adhesive tape, diapers, and laundry detergents.

During the second week of the project each group ran multiple tests on its product. For example, the paper towel groups focused on water absorption and tensile strength, pouring various amounts of water on towels and pulling on them with increasing weight. Batteries were tested for how long they last, tape for its strength. One lucky group counted the number of chocolate chips in cookies. The testing procedure was designed and written up carefully so it could be replicated by other "scientists," just like it would be in the real world. Students then switched protocols and products with another group and enacted a second round of testing. During the project's final week, each group analyzed both sets of testing data and then created a PowerPoint presentation that was delivered to students and faculty, who functioned in two roles: concerned citizens and critical lab supervisors.

Reflecting on the Project

According to Kristine, the results of *Product Comparison* exceeded her expectations. The Driving Question was answered; students could say which products were best and support their conclusion with sound evidence. Her students were actively engaged, thinking hard, and mastering the scientific skills listed in the standards. They were learning how to work together as a group, manage their time and materials, and present to an audience. One of the unintended outcomes of Kristine's project turned out to be cross-curricular; students saw that they were applying skills in they had learned in math class to their science investigations. Her math teacher colleagues noted that students stopped asking why they needed to learn the metric system, because they knew from their lab work in Kristine's room that scientists use grams and millimeters, not ounces and inches.

Reflecting on the outcomes achieved, Kristine noted:

"My students did gain a lot. After this project they know exactly what to do during an experiment. I barely have to prompt them. They have a template for a lab experiment in their notebooks. When they have to do an experiment now, they say, "We know how to do this. We've done this before. We know how to write a hypothesis. We know how to design an experiment.

"At first I was concerned about spending three weeks on this project but when I look back I realize how much my students learned and how much time I save by not having to re-teach the same thing over and over again. I realize how important it was to take my time and do this right."