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Introduction

Project learning engages students in creating, testing, polishing, and producing something. An observable indicator that students have completed a project is a tangible, student-produced object such as a book, a script, or an invention. Students go into the project with the end-product in mind. They know from the outset that they have a specific amount of time—a week, a month, a quarter, or a semester—to complete the product. They know the project guidelines and how the final product will be evaluated before they begin working. This knowledge helps them to self-evaluate as they do the project. They know the target toward which they are working, so they can analyze, refine, discard, polish, and shape the product as they go. They may do a performance or make a presentation or demonstration as a final project activity—it is a presentation or performance of their own product. The student-made object is the key to distinguishing between project learning and performance or presentation learning.

This is hands-on learning at its best; the result is authentic, lifelong learning. When a group of thirty-somethings were asked to tell what they remembered the best about their middle school years, one individual said, "I remember doing a project about African ants. We did a diorama of African anthills, made puppets of the ants, wrote a script for a puppet show, and presented the puppet show when I was in the fourth grade. I still remember most of what we learned about African ants as we did the project." Another person added, "When I was in the fifth grade, the teacher divided the class into small groups and had each group do a project about some wonder of an ancient civilization. My group did the pyramids and sphinx that are near modern Cairo, Egypt. We constructed the pyramids so that they opened and we could show hidden passages and chambers. We furnished and decorated the chambers to represent the burial chambers of Egyptian nobility. I don't remember much of the rest of fifth grade. I suppose I remember the pyramids so well because we did them as a project." A third person said, "When I was in the fifth grade, some friends and I wrote a play about the Wright brothers. The teacher had said that each group in the class was to do a play about some American inventor and the impact of a particular invention on our lives. We asked if we could do Orville and Wilbur Wright as one inventor because they worked together. The teacher liked the play so well that she let us present it to the whole school during an assembly—I still remember many of the details of that play." In each case, individuals re-

membered best what they had learned actively. As they collected and sorted through information, decided what to keep and what to discard, redesigned and refined the final product, and, ultimately, celebrated success, they acquired information that stuck with them.

Students learn how to learn as they do projects. They become more skillful information collectors and organizers. They learn how to analyze information to decide whether it is useful. They develop more skillful questioning techniques and discover that getting the right information is often a matter of asking the right question. They become less defensive when critiqued as they learn how to evaluate their own work and look for ways to improve their products. They discover the joy of celebrating success. And they realize that doing effective learning involves being willing to take risks, make mistakes, become confused, and learn with and from others.

PROJECT CATEGORIES

Guidelines for projects do not all look and sound alike. Some projects have very tight parameters. Others point students in a general direction and then give them lots of freedom. This book includes five kinds of projects: structured, topic-related, genre-related, template, and open-ended projects. A single project may combine two of these types. Some projects simply seem to be difficult to categorize. The following descriptions may serve as a springboard for the creation of projects as well as a way to classify them.

Structured Projects

Structured projects ask for products that fit very specific guidelines. Students are told that their product must be a certain size, contain specific materials or parts, be able to perform a specific job or function, and meet defined quality standards. Students are given a set amount of time to make the product—a week, a month, a quarter, or a semester. They are asked to demonstrate the completed products to show that these products meet the guidelines. Products that fulfill the specifications are rated successful. Those that cannot do the job or meet the quality standards are disqualified.

One of the best-known structured projects, one familiar to many science teachers, is the Egg Drop. In this project, students are asked to design a container that will keep a raw egg from breaking when container and egg are dropped from a height of six feet. They are told that the container may be made of any material and filled with any cushioning of their choice so long as the combined weight of egg, container, and cushioning does not exceed a specified total (perhaps 500 grams). Students are also told that the container may have maximum dimensions, thirty centimeters per side for example. Students are given a limited amount of time to design and test the product and bring it to class. On the due date, all Egg Drop containers are tested. If a container and egg make it through the drop intact, the container