



❖ Supplemental Resource:

o *All About Balls: A Preschool Project*

by Lillian Katz



All about Balls: A Preschool Project

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The Project Approach to early childhood education is one that incorporates project work as a major part of the curriculum. A project is defined as an in-depth extended investigation of a topic—ideally one worthy of the children's time and energy. Project work provides contexts in which developing and emerging literacy and numeracy skills are applied in such a way that their uses and purposes are readily understood and accepted by the children.

Project work is usually conducted in three phases. The first phase includes exploring and sharing experiences, ideas, and information the children already have related to the topic. Phase 1 closes with consensus on the research questions to be addressed by the investigation. The second phase is a period of data gathering, first-hand observations of phenomena related to the topic, interviewing experts, and other information-gathering strategies, depending on the ages of the participants. During phase 2, children work in small groups and individually on related subtopics. They begin representing their findings using a variety of media and emerging basic skills. The final phase includes a debriefing concerning what has been found out, bringing the investigation to a conclusion, and preparing reports to be shared within the class as well as with other classes, parents, and others in the community who might be interested in the children's findings.

Below is a brief summary of a project undertaken by a group whose teacher incorporated project work even though for various reasons she was unable to take them outside of the school for field trips. Some time was spent on the project on most days of the week over a period of about a month. In the course of this investigation, many of the children asked the teacher to help them represent a wide range of mathematical facts and concepts. Many asked for assistance in writing captions, labels, and descriptions of events recalled and observed.

Phase 1

The teacher began by suggesting to her group of 4- and 5-year-olds that they ask their families, relatives, neighbors, and friends to contribute any kind of old ball to a collection they were making in their preschool class for a study of balls.

Within a week, the class had a collection of 36 balls of many different kinds. The collection included tennis, Ping-Pong, cricket, croquet, billiard, golf, and bowling balls, as well as volleyballs, basketballs, a soccer ball, baseballs, a

football, a beach ball, a Whiffle ball, and some marbles. A bubble gum ball and cotton ball were also included. One child added a world globe to the collection as well.

As the collection grew, the teacher encouraged discussion about how the balls varied. In the course of the discussion, she developed a topical web indicating the many features of the balls in the class collection that could be studied in detail. These features included surface texture, size, circumference, weight, height of bounce, and so forth. However, there was some hesitation among the older children in the group about whether or not the globe was a ball.

The issue of the globe led to a discussion about whether a ball was only something to be played with. This led the teacher to bring in some picture books showing the common uses of ball bearings in various simple machines and a discussion of balls serving as wheels on some kinds of desk chairs. In the course of one of these discussions, the teacher introduced the concept of *sphere* and the term *spherical*, which many of the children enjoyed discussing and arguing about. The term *circumference* was also introduced into the discussion and recalled by some of the children. The question of whether or not the (American) football was a ball also became a focal point for heated debate.

Phase 2

Small groups of children volunteered to undertake specific investigations to answer the questions generated by the class in discussion with their teacher and indicated on the topic web.

Before the small group investigations were launched, the children made predictions of the outcomes. For example, one group weighed the balls and checked their predictions concerning which of them would be the heaviest and lightest. Their predictions indicated their strong association of size and weight, and their empirical findings yielded further curiosity and discussion. They were not quite ready to grasp the complexity of the concept of density!

One group of children, working in pairs, used string and struggled to ascertain the size of each of the balls by cutting the string to the length of the circumference. This process invariably required several attempts before successful measurement was achieved. Students then displayed the strings representing size by hanging them vertically in serial order on a chart displayed on a bulletin board with a caption prepared by two children indicating

the differences between the predictions and findings with respect to size.

Another small group used blocks and a plank to create inclined planes of various angles down which some of the balls were rolled. At first, the children studied which balls would roll the fastest and farthest down the plank and along the floor. Then they conducted the same procedure on a linoleum floor, on a carpet, on grass, and on gravel surfaces outside their classroom to observe the differences in the distance of free roll once down the plank. In the course of this exploration and discussion with their teacher, the children enjoyed applying the term *resistance* to describe the slowing down of the balls' roll caused by grass and gravel compared to the linoleum and carpet surfaces. This group also compared their findings to their predictions.

A group of the younger children made rubbings of the surface of each of the balls. These findings led them to launch a discussion of the variations of surface texture in the collection with their classmates who were involved in other aspects of the investigation. All the children expressed surprise at the wide variety of surfaces represented in their collection.

Another small group created a block structure several feet in height and, using a tape measure suspended from the top of it, predicted and then measured as best they could the height of the bounce of each ball. Contrary to their predictions, and much to their surprise, not all of the balls bounced!

The teacher engaged the children in a discussion of what might be inside each of the balls, in the course of which she explored with them the terms *hollow*, *solid*, *empty*, and *full*. With the exception of the golf ball, all of the balls were opened and their contents examined. The children were unable to open the bowling ball in the classroom and had to seek the assistance of a parent volunteer.

Following the close examination of the properties of the balls in the collection, the children discussed the variety of ways in which balls are used in games. They discussed which balls are struck by bats, clubs, mallets, and racquets, and which balls are caught, thrown, and moved by hands and feet. They also surveyed their parents on which games they played and which games they enjoyed watching. Bar graphs and pie charts were created by the children with their teachers' support and guidance to indicate in three columns the questions posed in the survey, the predicted answers, and the actual answers.

Phase 3

In phase 3, the children completed their investigation. They prepared a display of their findings, including documentation showing them at work during the investigation. They concluded with an open-house evening for their parents with whom they shared their work by presenting the story of their investigation, and whom they accompanied around the displays ready to answer any questions they had.

In the course of work that lasted about a month, the children engaged in measuring, drawing, reading, and creating stories; creating graphs and pie charts; looking

things up in the local library with the help of the librarian and many parents; examining books about sports; and finally reporting to parents the story of their investigation and their findings.

Many parts of the investigation presented difficulties. For example, getting the strings around balls to measure the circumference and ascertaining the height of their bounce required considerable skill and persistence, both of which were strengthened by the work undertaken. As the children participated in preparing displays of their findings, they asked the teacher to write words that they could copy onto their drawings and charts. As they made predictions concerning various findings, the teacher encouraged them to explain the bases for them. As the work proceeded, their readiness to share their reasoning increased substantially.

This project provided contexts for analyzing, hypothesizing, predicting, observing, recording, and representing research findings. It provided settings for extensive discussions, working out disagreements, arguing, and checking the facts. It also provided contexts and pretexts for cooperation, individual initiative, sharing responsibilities, and many other developing intellectual as well as social capacities and dispositions. Children of all cultures and language backgrounds can become deeply engaged in the kinds of intellectual explorations such items in their own environments can provide.

Additional Resources on the Project Approach

All of these items can be ordered from ERIC/EECE by calling 800-583-4135.

Bencke, Sallie. (1998). *Rearview Mirror: Reflections on a Preschool Car Project*. Publication available from ERIC/EECE (Catalog #220; \$10).

Katz, Lilian G. (1994). *The Project Approach*. ERIC Digest. EDO-PS-94-6. Available at no cost from ERIC/EECE.

Katz, Lilian G., & Chard, Sylvia C. (1998). *Issues in Selecting Topics for Projects*. ERIC Digest. EDO-PS-98-8. Available at no cost from ERIC/EECE.

Helm, Judy H. (1998). *The Project Approach Catalog 2 by the Project Approach Study Group*. Publication available from ERIC/EECE (Catalog #219; \$10).

Internet Resources on the Project Approach

Early Childhood Research & Practice
<http://ecrp.uiuc.edu/>

Helm, Judy H. (1996). *Project Approach Catalog by the Project Approach Study Group*.
<http://ericece.org/pubs/books/project.html>

Project Approach Listserv
PROJECTS-L@postoffice.csu.uiuc.edu
For information on subscribing to PROJECTS-L, go to
<http://ericece.org/listserv.html> or call 800-583-4135.

The Project Approach in Early Childhood & Elementary Education
<http://www.project-approach.com/>

ERIC/EECE Project Approach Page
<http://ericece.org/project.html>