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Teachable Moments

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The discovery investigations described in this article were conducted with high school students in regular classes and those designed for slow learners. They happened during what I call, "teachable moments," and they grew spontaneously as time and weather permitted. Joy and expectation by students and teacher marked each investigation. Each celebrated a new awareness of the "old" everyday world. Each actively grew in scope and student-teacher involvement. All of our discoveries led to mutual fulfillment. None required costly materials; all yielded priceless learning experiences.

May Day—Play Day

The day is the fifth of May. The sun has warmed the earth deliciously for hours. Dandelions, tulips, daffodils, and dogwood add color to the green of spring. It is a great day to be

alive. With slow shuffling feet, the children file into the red brick building. The sunny landscape is replaced by an artificially lighted interior. A bell rings. School begins. For some few members of this captive audience, the passive routine will be broken; today is a special day. Today the world outside the school beckons. Today offers a "teachable moment."

Students carrying paper, rulers, and pencils joyfully tumble out of the building. Singly or in pairs they stretch and stoop, peer and poke, measure and count. They are gathering data for individual or team studies on plant diversification. Their instructions were minimal: seek as many different types of plants as possible; measure their heights metrically, if possible (approximate for trees); draw a leaf of each plant showing placement, pattern, and venation, and draw each plant's flower indicating structures of sta-

men, pistil, and petal. Exclamations fill the air: "But I never knew grass had flowers!" "Dandelions are plants? I thought they were weeds." "Needles are what?"

Later on a rainy day perhaps, the data will be collated. Bar graphs will be prepared to indicate the numbers of plants within height ranges and petal numbers. Percentages showing the number of flowering plants and the number with netted and parallel veined leaves in the survey will be computed. Forgotten taxonomy will be resurrected—monocot, dicot, angiosperm, and gymnosperm—will come alive in students' minds. Definitions of compound as well as simple flowers, leaf patterns, and vegetative reproduction, will be reinforced.

What better place to study diversification of plants than your own backyard on a glorious day in May. A new crop of plants deserves a fresh look at life.

Chili Hot Pot

"The way to a man's heart is through his stomach." "An army travels on its stomach." And less-than-eager students are motivated to learn by the lure of food!

Thirteen students participated in the investigation "Chili Hot Pot," a unit on nutrition. We chose to feature chili because it is a tasty, economical entree. Considerable research on the nutritional composition of chili preceded the actual "hands-on" dicing, slicing, frying, and mixing.

Students performed chemical analyses (presence of fat, protein, starch, glucose, chloride, water, and percentage composition of water) for each ingredient. Math emerged as an important tool of science. Because our facilities are limited, students wearing a white lab coat took turns performing the different analyses at a desk in front of the class. The shy gained a security blanket; the extroverts assumed roles as "mad" scientists! Everyone eagerly participated. We shared results so that tests only needed to be performed once. Excitement and expectation filled the room.

When the time arrived to prepare the ingredients, all the students pitched in to play chef, diener, and diner. A friendly competition developed to prove who was the greatest food-chopper in the group, and many eager cooks stirred and seasoned the base. We refrigerated the chili base, and students left the class eagerly anticipating the next day's activities.

A day later, the students met me at the door, most anxious to begin. A salad and garlic bread were chosen to accompany the chili feast and activity escalated as students tossed the salad and heated the bread. Like the Pied-Piper's tune, the aroma of freshly heated bread carried from cooking area to science room, and guests appeared for the festivities. To the chili base, we added cans of kidney beans. Flasks of lemonade appeared. Good camaraderie as well as good food were enjoyed by all.

In the days that followed, we computed nutritional value and cost. Students prepared nutritional data booklets by using mimeographed material from a current magazine. They analyzed cost using the daily newspapers. After they determined the cost per serving, I challenged students to come up with another meal of equal nutritional value at the same or a lesser cost. Biology, chemistry, and math had blended together, as had the ingredients of the chili, to create a most palatable product.

"A Worm is to Wriggle"

Directions for this activity follow. Devise and complete an investigation on innate behavior and learning potential of members of a species. Bring to school six members of a species (ants, earthworms, sowbugs, crickets, grubs, etc.) in a "livable-container." Identify each member as to weight and size. Try to get a variety in the members as to size and agility. Prepare a chart for your data indicating each member's response to a given stimulus. Some suggested areas of study are: temperature changes, changes in light intensities, touch, water, odors, gravity, sound, color, and shape. A shoe-box maze may be constructed for gathering data on trial-and-error learning as well as on conditioning. Draw conclusions based on your data. Indicate modifications for procedures that would enable further research.

Let the fun begin. Move back. Learning needs room to flourish.

Nutrition Education

. . . from p. 279

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Bacteriophage

. . . from p. 271

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