

Encouraging More Science in the Elementary School

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Abstract

Elementary school teachers try to incorporate science into their curriculum, but do not always succeed. Sometimes all they need is a little help. Especially in the lower grades, where there are 20 or more students to a class, it is difficult to keep the students focused and on task. This paper explores an alternative that aids the teacher and allows students to demonstrate their abilities in science.

The Science Intern program was started six years ago, using 4th and 5th grade students to help with experiments in the classroom. Since its inception, the students' science scores have increased, their self-esteem has risen, and their interest in science has been sparked. This paper outlines the program, and shows the advantages this program can bring to the schools and the students.

I. Introduction

Students learn by doing, and students can show what they've learned through exhibition. This is one of the main precepts of Re-Learning¹. Is it better to have a student work problems on a test, or to be able to explain the concepts of an experiment to other students? Are students more interested in science if they read about it, or if they do it? At Tombaugh Elementary, a Re-Learning school, the answer to these questions is that actions speak louder and more to the point than words in a book. Having students experience something first hand is worth much more than having them read about it.

However, having students sit down at a table, read a lab and follow the instructions just does not work for the early elementary students. Pairing the young students with older ones and then letting them do the experiments does work. The older children can follow directions and help explain the procedures to the younger child. In this way, teachers can do more science in their class, since they can have older students supervising the younger ones.

This is the basic idea behind the Science Intern program. Older students in the school, 4th and 5th graders, are trained to work with certain experiments. Once trained, the students can be asked to help other classes in the school to do their experiment. Since there is usually just one teacher per class, these students give teachers freedom to do more with their students. Workshops are held monthly to give teachers the opportunity to learn the same experiments that the interns work with.

II. Program Description

The Science Intern program was started 6 years ago to allow students an opportunity to learn more science in addition to what they were already getting in class. Each child could select which experiments they would like to do. Every month focuses on a different topic area that is to be covered in the elementary curriculum. At Tombaugh Elementary, the topics offered are:

- Solids, liquids, gases, matter, earth, air, water
- Human Body, dental health, nutrition
- geology, rocks, fossils, (earth)
- forces, simple machines
- color, light, and sound
- space, seasons
- Weather/climate (seasons)
- Oceans (water)
- life cycles, plants, animals, desert, habitat

For each topic covered, there are 15 – 20 different experiments available. The students come to a special room in the school one day a week during their lunch recess time. During this time, they work on their experiments, learn the concepts involved and practice the experiments until they understand what they are doing. After they have mastered one experiment, they can go on and try other experiments. The students are free to select what months they want to come, and what experiments that they want to work on. There is a limit of 4 students per experiment. If the experiment a student wants has reached its limit, that student may still do the experiment, but they won't be asked to help to do the experiment for another class. They can, however, sign up for a different experiment. This way the students are encouraged to try different experiments, and not all of the interns learn just one experiment.

When a teacher requests interns for their class, the science intern coordinator discusses the experiments that the teacher wants with that teacher, and then selects interns that have studied the desired experiments. After obtaining the intern teacher's permission, the science intern then works with the class and helps them to do the assigned experiment. The intern is required to make up any missed class work. This becomes an opportunity for the intern to obtain experience in oral communication, critical thinking skills, and in demonstrating the knowledge they have acquired.

III. Results

The first several years of the program were a learning experience. Deciding on which experiments worked well, and making changes in others to suit the student's needs took time. Many teachers kept forgetting about the interns, and so didn't ask to have them come. The students always got to present some experiments for the school's stargazing night, but didn't get as many requests to help as they wanted. As seen in the table below, with each passing year, the number of requests for interns has increased.

Year	# Presentations	#4 th grade Interns	#5 th grade Interns	Total number of Interns
1993-94	5	48	47	95
1994-95	5	37	41	78
1995-96	6	58	33	91
1996-97	6	16	30	46
1997-98	12	47	45	92
1998-99	10	75	44	119
1999-2000	16 so far	62	51	113

Out of these numbers of interns, some elect to do only one unit. There is usually a small group (around 10) who will work on all of the units per grade level. The number of science interns fluctuates from year to year, but tends to be around 100. Tombaugh Elementary School has a student population between 700 to 800 students. The average standardized test scores in science were observed to see if the intern program had any impact. The scores are given in the table below:

Year	Average Science Score	Type of Test
1992-93	53.3	ITBS, 3 rd grade
1993-94	54.8	ITBS, 3 rd grade
1994-95	51.9	ITBS, 3 rd grade
1995-96	53.9	ITBS, 3 rd grade
1996-97	55.4	ITBS, 3 rd grade
1997-98	54.0	Terra Nova, 4 th grade
1998-99	61.8	Terra Nova, 4 th grade
1999-2000	Not taken yet	Terra Nova, 4 th grade

Since much of the standardized testing was done for 3rd grade instead of 4th there is little statistical data on which to base an analysis. However, teacher input concerning the students has always been overwhelmingly positive. Teachers have commented on how well the students explain their experiments, how well they handle questions, and how well they work with the other students. The 4th and 5th grade teachers who have supplied students for the intern program use the program to help the child become more self confident, to develop their science skills, or to allow that student to develop their interest in science. Documentation of this input is needed, but the rewards of this program seem to be self-evident. A survey of science interns and teachers is planned within the next year.

Bibliography

1. Re-Learning, 10 Common Principles at: <http://www.essentialschools.org/aboutus/phil/10cps.html>

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