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ARE WE BUYING OUR SCIENCE STUDENTS?

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In recent years, several reports have addressed perceived crises in science education in the United States, including:

- A Nation at Risk. Produced by the National Commission on Excellence in Education, USOE, Washington, D.C., 1983.
- Science and Mathematics in the Schools: Report of a Convocation produced by the National Academy of Sciences, 1982.
- Fifty State Survey of Initiative in Science, Mathematics and Computer Education, produced by the Education Commission of the states, Denver, Colorado, 1983.

In 1983, the Iowa legislature enacted House File (H.F.) 532 to improve teacher preparation and reduce student exodus from science courses. The following components were part of that bill.

- Students who graduate from Iowa high schools after January 1, 1984, and complete seven units of math and science courses (three of which must be in advanced math, physics or chemistry) could qualify for up to \$500 toward tuition at an Iowa college.
- High schools (grades 9-12) would receive \$50 for each individual enrolled in first-year foreign language courses, and \$25 for each student enrolled in advanced mathematics and physics or chemistry courses.
- Teachers who graduate from college after January 1, 1983, with a major in math or science and who had an Iowa Guaranteed loan to repay, would receive up to \$6000 from the state to help repay that loan if he or she taught chemistry, physics or advanced math in an approved Iowa public or private school.
- Individuals currently teaching who would like to teach advanced math or science could receive tuition aid from the state for advanced training up to \$1,500 per year.

Have such national and state efforts encouraged more students to enroll in science courses in Iowa's public high schools?

Careful examination of Table 1 indicates that during the last three academic years, students enrolled in grades 9-12 have declined significantly statewide from 160,028 in 1982-83 to 153,830 in 1984-85. During this same time period, total enrollment in science courses has increased by 7,862 students. Has this increase been the direct result of financial initiatives such as H.F. 532?

Since the benefits of the legislation did not go into effect until 1983, academic year 1984-85 would be the first affected directly by the initiatives. Data from 1982-83 is provided for comparison.

Table 1
STUDENT ENROLLMENTS IN SCIENCE COURSES
IN
IOWA PUBLIC HIGH SCHOOLS*
(3 YEAR COMPOSITE)

Course	1982-83	1983-84	1984-85	
Biology	38,051	37,034	38,382	(+ 1,348)**
Chemistry	14,818	16,278	17,308	(+ 1,030)
Physics	6,912	7,357	8,300	(+ 943)
Earth Science	11,748	11,639	11,701	(+ 62)
Physical Science	15,452	14,396	14,982	(+ 586)
Life Science	3,054	4,460	3,648	(- 812)
General Science	12,282	13,454	14,629	(+ 1,175)
Physiology	2,653	2,722	2,659	(- 63)
Environmental Science	2,675	4,042	3,898	(- 144)
Totals	107,645	111,382	115,507	(+ 4,125)
9-12 Enrollments	160,028	155,217	153,830	(- 1,387)
Percentage of Students enrolled in science courses	67%	71%	75%	

* Data from the Basic Educational Data Survey (BEDS) System, Iowa Department of Public Instruction, Des Moines, 1/85.

** Enrollment increase/decrease between 1983-84 and 1984-85 School Years.

In courses related to life science (life science, physiology, biology), with the exception of biology, there has been a general decline in student enrollments between 1983-84 and 1984-85. Life science and physiology courses show a reversal of the increase between 1982-83 and 1983-84. This reversal may be due to the emphasis that H.F. 532 legislation places upon physical science related courses.

An analysis of the physical science courses (physics, physical science) indicate significant enrollment increases between 1983-84 and 1984-85. In the case of physical science, this was an enrollment pattern reversal.

Earth science has also experienced an enrollment decline between 1982-83 and 1983-84, but the pattern was reversed the next year with 62 more students taking the course in 1983-84 than in 1982-83.

General science courses have been experiencing consistent, although slow growth during the past five years. This pattern has continued, with a large increase between 1983-84 and 1984-85.

Many teachers today feel that general science courses at grades 7-9 meet the needs of this age student more directly than do the traditional life, earth, and physical science courses.

Environmental science courses have also experienced an enrollment pattern reversal between 1982-83 and 1984-85. This again may be due to the legislative emphasis on physical science courses and courses which meet student needs for seven units of math and science in order to apply for \$500 college scholarships. In some instances, environmental science may not meet the science course requirements due to non-science approved staff teaching the course and/or course content.

In summary, significant enrollment increases have occurred in many of Iowa's science courses in grades 9-12 between the 1983-84 and 1984-85 academic years.

In general, these increases have been in physical science, earth science and general science courses. With the exception of biology, most life science and environmental science courses have experienced enrollment pattern reversals with increases between 1982-83 and 1983-84 and declines between 1983-84 and 1984-85.

The data suggests that something occurred about 1983 which resulted in changes in science enrollments in Iowa's high schools. To state that there is a direct cause and effect relationship between these enrollment patterns and federal and state financial initiatives may be premature. However, continuation of such legislative efforts may provide more conclusive evidence in the next couple of years.

More importantly, these programs may be changing student as well as parental and societal attitudes about the value of science.

One thing is certain, total enrollments in science courses in Iowa's public high schools are increasing in both actual numbers and percentages.