DOCUMENT RESUME

ED 258 844 SE 045 843

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TITLE Illinois Secondary School Course Offerings, 1982. Special Report on Science.
INSTITUTION Illinois State Board of Education, Springfield, Dept. of Planning, Research and Evaluation.
PUB DATE Jun 84
NOTE 33p.
PUB TYPE Reports - Descriptive (141) -- Statistical Data (110)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Biology; Chemistry; *Courses; Earth Science; *Enrollment; *Enrollment Trends; Females; General Science; High Schools; Junior High Schools; Males; Physics; School Demography; Science Curriculum; Science Education; *Secondary School Science; *Sex Differences; State Surveys
IDENTIFIERS *Illinois

ABSTRACT

This report synthesizes the findings of the Illinois statewide curriculum census projects of 1977 and 1982. The census was designed to produce normative data relative to offerings and enrollments in Illinois public secondary schools and establish a source of information on secondary school curriculum. Statistical information include: (1) demographic characteristics of the schools; (2) population profiles of science students; (3) science curricular offerings; and (4) male versus female enrollments in the sciences. Data are also categorized by enrollment sizes and community types (rural, suburban, independent and central city). Findings reveal that diversification of course offerings exist in the surveyed schools showing a range of 45 to 59 different courses. Enrollment figures indicate that the sciences serve only a minority of the total student population (approximately 3 percent in Physics and 6 percent in Chemistry) and that male enrollments exceed female enrollments. It was noted that limited courses exist which are oriented to contemporary societal issues and problems. Implications are given to aid in decision-making for teacher preparation, inservice needs, specific curricular needs, and basic research. (ML)

Illinois
Secondary School
Course Offerings

Illinois
State Board of
Education

Research
and Statistics

Special Report on Science

ILLINOIS SECONDARY SCHOOL COURSE OFFERINGS, 1982

Special Report on Science

June, 1984

DEPARTMENT OF PLANNING, RESEARCH AND EVALUATION
RESEARCH AND STATISTICS SECTION

FOREWORD

In 1977 the Illinois State Board of Education in cooperation with the Illinois Association for Supervision and Curriculum Development conducted a Census of Secondary School Course Offerings. This was the first statewide census of basic curriculum data in Illinois. The Census was designed to produce normative data relative to offerings and enrollments in Illinois public secondary schools and establish a source of information on secondary school curriculum. A second Census was conducted in 1982 to update the original database.

The Census project was directed by Dr. William L. Humm, Research and Statistics Section, Illinois State Board of Education. This special report on science was written by Dr. Donald K. Hamilton, College of Education, Western Illinois University and edited by Dr. Humm. It is based on statistics from the Census project databases for 1977 and 1982.

Observations and conclusions in this report are those of the writer and do not necessarily represent the policies or views of the Illinois State Board of Education or the State Superintendent of Education.

Donald G. Gill
State Superintendent of Education

Special Report on Science

Summary Highlights

The most commonly reported science offerings in the junior high and high school grades include general science (grades 7, 8, and 9), earth science, biology, chemistry, and physics.

With the variety of course offerings reported it is possible for individual schools in different community settings to offer courses which make the science program somewhat unique.

Science enrollment of males exceeds that of females. However, female enrollment in the biological sciences typically exceeds that of males, while male enrollment in the physical sciences and remedial science typically exceeds that of females.

While most high school students take at least a year of science in high school, courses in upper level, advanced science such as chemistry and physics enroll a relatively small percent of the total student population.

While the proportion of enrollment in high school biology, chemistry, and physics increased slightly since 1977, the proportion of enrollment in all science courses decreased by about 2%. Overall enrollment in junior high school science decreased since 1977 by just over 1%.

The decrease in science enrollment in the high schools and junior high schools was due to a decline in male enrollment in science, as the relative proportions of female enrollments in science in 1982 changed only slightly from those of 1977.

Courses reflecting contemporary societal issues and problems are infrequently found in the science curricula, and where they are found, they have minimal enrollments.

ILLINOIS SECONDARY SCHOOL OFFERINGS, 1980
SPECIAL REPORT ON SCIENCE

An analysis of enrollment data from the Illinois Census of Junior High and Secondary School Course Offerings can reveal the "state of the art" at a time when current practices in science education are under critical review from many quarters. The researcher, curriculum developer, state agency or any other individual or group acting as a change agent needs to be able to look at specific grade level data, and concomitantly evaluate that data as it relates to the total school science curriculum. In order to provide a meaningful mechanism for data evaluation, the presentation here will begin at the state level with global data, and move down to individual grade analysis.

THE SCHOOLS IN THE CENSUS: DEMOGRAPHIC CHARACTERISTICS

Census data were collected from 489 public junior high schools and 719 public high schools. The participating schools represent 82 percent of the junior high schools and 99 percent of the high school in the defined population of the Census.

Schools were classified by grade level composition, by school size, and by community type. Schools classified as junior high schools were typically two-year, grade 7-8 schools (92 percent). Another 6 percent were three-year, grade 7-9 schools. High schools included four-year, grade 9-12 schools (88 percent); three-year, grade 10-12 schools (3 percent); and junior-senior high schools including grades 7-12 (6 percent).

There is a direct relationship between school size and community type, with larger schools located in central cities and smaller schools in rural areas. This relationship is particularly strong for high schools, as indicated in Table 1. Most of the rural high schools (99 percent) had under 1000 students, even when six-year (7-12) schools were included. On the other hand, 61 percent of the urban schools had enrollments over 1000. Table 2 shows the range and quartile data for high schools in the Census.

TABLE 1. ILLINOIS PUBLIC HIGH SCHOOLS INCLUDED IN THE CENSUS OF COURSE OFFERINGS BY SIZE AND COMMUNITY TYPE, 1981-82.

	Community Type					
Size	Central City	Suburb	Independent City	Rural	All	%
1-199	4	3	1	181	189	26.3
200-499	1	19	44	130	194	27.0
500-999	10	28	36	28	102	14.2
1000-1699	38	57	17	2	114	15.9
1700-2599	36	61	1	0	98	13.6
2600+	6	15	0	1	22	3.1
ALL	95	183	99	342	719	
%	13.2	25.5	13.8	47.6		
	88%	88%	98%	99%		

TABLE 2. ENROLLMENT SUMMARY STATISTICS FOR PUBLIC HIGH SCHOOLS INCLUDED IN THE CENSUS OF COURSE OFFERINGS, 1981-82

Mean	Smallest	10th Percent	25th Percent	MEDIAN	75th Percent	90th Percent	Largest
826	33	119	191	452	1350	2100	4614

Table 3 presents data by school size and community type for junior high schools. Junior high schools generally enrolled over 500 students (93 percent) in central cities, between 200 and 1000 in suburbs (93 percent) and independent cities (80 percent), and under 500 (97 percent) in rural areas. Table 4 gives the range and quartile data for junior high schools in the Census.

TABLE 3. ILLINOIS PUBLIC JUNIOR HIGH SCHOOLS INCLUDED IN THE CENSUS OF COURSE OFFERINGS BY SIZE AND COMMUNITY TYPE, 1981-82

	Community Type					
Size	Central City	Suburb	Independent City	Rural	All	%
1-199	0	13	15	102	130	26.6
200-499	2	103	48	39	192	39.3
500-999	22	115	17	5	159	32.5
1000 +	4	3	1	0	8	1.6
	93%	93%	80%	97%		
ALL	28	234	81	146	489	
%	5.7	47.9	16.6	29.9		

TABLE 4. ENROLLMENT SUMMARY STATISTICS FOR PUBLIC JUNIOR HIGH SCHOOLS INCLUDED IN THE CENSUS OF COURSE OFFERINGS, 1981-82

Mean	Smallest	10th Percent	25th Percent	MEDIAN	75th Percent	90th Percent	Largest
403	40	94	180	370	592	757	1198

POPULATION DATA - STUDENTS TAKING SCIENCE

As the demographic data indicate, school enrollment was broken down into six categories at the high school level and four categories at the junior high level. Total high school science enrollment for each of the school enrollment categories is summarized in Table 5. The data reported are year equivalent course enrollments, but will be referred to in this report as "number of students taking science," "number of students enrolled," or as "enrollment in course."

TABLE 5. STUDENT SCIENCE ENROLLMENTS IN ILLINOIS HIGH SCHOOLS

Size	Number of Schools Offering Science	Number of Students in Schools Offering Science	Number of Students Taking Science	Percent of Students Taking Science
1-199	187	25,413	14,005	55.1
200-499	193	62,683	31,531	50.3
500-999	101	73,293	32,658	44.6
1000-1699	116	155,612	71,832	46.2
1700-2599	97	205,490	102,063	49.7
2600 +	20	68,931	34,245	49.7

The range in percentages of students taking science was from 44.6% to 55.1%. The schools with an enrollment of less than 200 students had the highest percentage (55.1%) of the student body enrolled in science courses. It should also be noted that approximately 50% of the students in the state's high schools were not enrolled in a science course during the 1981-82 school year.

The junior high population census data is represented in Table 6.

TABLE 6. STUDENT SCIENCE ENROLLMENTS IN ILLINOIS JUNIOR HIGH SCHOOLS

Size	Number of Schools Offering Science	Number of Students in Schools Offering Science	Number of Students Taking Science	Percent of Students Taking Science
1-199	128	13,219	12,447	94.2
200-499	190	50,449	46,535	92.2
500-999	159	91,596	91,306	88.8
1000 +	8	8,838	6,975	78.9

The data in Table 6 indicate a range in percentages of students taking science in the junior high schools in Illinois from 78.9% to 94.2%. A similarity is noted with the data in Table 5 as the small schools (less than 200 enrollment) had the highest percentage of students enrolled in science courses. It is of interest to note that although these percentages are considerably greater than those associated with the high schools, they suggest that some students in the State of Illinois are not taking any science courses in grades 7-8, or that in some cases, the instruction is less than a full year in length.

THE SCIENCE CURRICULUM

The theme of the National Science Teacher's Association convention as far back as 1960 was "Science K-12." Since that time it has become commonplace to look at science education as an articulated program through all of the grades. On the other hand, the science curricula that were developed on a national scale in the post-Sputnik days were generally single grade level programs. The analysis which follows will:

1. Examine the "typical" natural science curriculum as proposed in the "Special Report on Science" which utilized data from the 1977 census and make comparisons with current data.

2. Outline the grades 7-12 science curriculum in the various school enrollment ranges.

3. Compare the grades 7-12 science curriculum in the various community types.

4. Make comparisons in grades 7-12 of science course participation by the two sexes.

The Typical Natural Science Programs in Illinois High Schools

One of the advantages in the current census analysis is the opportunity to compare 1981-82 data with the 1976-77 data. In the 1977 document "typical" was defined as courses which enrolled in excess of 2% of the state enrollment. Courses were listed by popularity and the "typical" courses identified and utilized for further comparisons. - Table 7 provides comparative data from the two censuses. An additional column has been added to indicate the numbers of students taking the identified courses.

TABLE 7. SCIENCE COURSES IN WHICH THE LARGEST RELATIVE PROPORTIONS OF ILLINOIS HIGH SCHOOL STUDENTS ARE ENROLLED

Course Title	# Schools Offering 1977	# Schools Offering 1982	% of State Total 1977	% of State Total 1982	# of Students Enrolled 1982	% of Students Enrolled 1977	% of Students Enrolled 1982	% of School's Enrollment 1977	% of School's Enrollment 1982
Biology	620	652	88.1	90.7	81,695	12.5	13.8	14.2	14.9
Chemistry	597	623	84.8	86.6	36,359	5.4	6.1	5.8	6.5
Physical Sci. 1st & 2nd Yr.	307	313	43.6	43.5	26,864	4.9	4.5	9.2	8.5
General Sci. Grade 9	291	312	41.3	43.4	21,975	4.6	3.7	11.7	11.1
Earth Science	227	241	32.2	33.5	19,169	3.1	3.2	6.2	6.3
Physics 1st Yr.	535	545	76.0	75.8	16,948	2.4	2.9	3.0	3.4
Biol. 2nd Yr. Advanced	354	375	50.3	52.2	10,760	2.1	1.8	3.8	3.3
BSCS Yellow/ Spec.	45	26	6.4	3.6	4,428	1.3	0.8	11.7	12.0
Biol.-Life Sci.	85	91	12.1	12.7	5,553	1.0	0.9	6.7	5.7
Remedial Sci.	37	45	5.3	6.3	4,169	1.1	1.0	10.0	7.6
BSCS Green/Blue	52	40	7.4	5.6	5,264	1.0	0.7	11.1	11.7
PSSC Physics	21	18	3.0	2.5	1,175	0.2	0.2	2.8	3.5
Chem. Study	24	19	3.4	2.6	2,384	0.4	0.4	5.1	6.8

The number of schools offering biology, chemistry, physical science, general science, earth science, physics, advanced biology and life science increased during the five year interval between 1977 and 1982. The percent of students enrolled in biology, chemistry, and physics increased, with all other science offerings showing a decrease. There was an increase in the percentage of schools' enrollment in biology, chemistry, physics, earth science, BSCS yellow version biology, BSCS green/blue version biology, and Chem. Study and a decrease in the remaining offerings.

In summary, the first seven courses listed in Table 7 account for 74.7% of the science enrollments, an increase of 4.4% in the interval between the 1977 and 1982 census. It should be noted that advanced biology fell below the 2% category to 1.8% of the students enrolled in the state. There was a concomitant decrease in enrollments in the remaining courses, all of which fell below the 1% mark of the percentages of students in the state. PSSC physics and Chem Study chemistry were added to the table to provide data for those interested in the enrollment figures of the former "big three alphabet" programs, i.e., BSCS biology, PSSC physics and Chem Study chemistry.

The Typical Natural Science Programs in Illinois Junior High Schools

Nine natural science courses enroll 2% or more of the Illinois junior high school students. These nine courses make up 96.8% of the junior high enrollments in science courses. Enrollments in general science, grade 7, are up 1.2% and in grade 8, are down 1.2%, with the combination of the enrollments in these two courses accounting for 76.7% of the students taking science in the junior high school. The percentage of state enrollment in ISCS, grade 7, dropped from 3.1% to 2.0%, and ISCS in grade 8 dropped from 2.5% to 2.0%.

The percentages of enrollment in biology, life science, physical science, and earth science have changed little since the 1977 census. There remain eight additional selections, introductory physical science (IPS), remedial science, health-biology, environmental science, Harvard project physics, ecology/conservation, advanced biology, space science aeronautics, and aviation which collectively accounted for approximately 3% of the state enrollment. Table 8 provides comparative data from the two censuses.

TABLE 8. SCIENCE COURSES IN WHICH THE LARGEST RELATIVE PROPORTIONS OF ILLINOIS JUNIOR HIGH SCHOOL STUDENTS ARE ENROLLED

Course Title	# Schools Offering		% of State Total		# of Students Enrolled	% of Students Enrolled		% of School's Enrollment	
	1977	1982	1977	1982	1982	1977	1982	1977	1982
Gen. Sci. Gr. 7	364	402	79.3	82.2	58,855	34.5	35.7	43.8	43.9
Gen. Sci. Gr. 8	358	385	78.0	78.7	54,062	34.0	32.8	44.0	42.9
Gen. Sci. Gr. 9	28	16	6.1	3.3	3,575	2.0	1.2	19.0	18.7
ISCS Grade 7	33	23	7.2	4.7	3,252	3.1	2.0	47.1	42.6
ISCS Grade 8	30	21	6.5	4.3	3,336	2.5	2.0	43.6	44.6
Biology I	36	27	7.8	5.5	3,348	2.1	2.0	17.7	20.2
Bio.-Life Sci.	49	48	10.7	9.8	6,755	4.2	4.4	35.7	37.7
Phy. Sci. I & II	34	35	7.4	7.2	3,764	2.3	2.4	22.5	21.2
Earth Science	47	47	10.2	9.6	5,694	3.4	3.9	26.8	29.7

THE SCIENCE CURRICULUM IN THE VARIOUS SIZES OF SCHOOLS

Schools of Less than 200 Enrollment

In the junior high schools in this category, general science was being offered at grade 7 (47.5% of the schools) and grade 8 (46.6% of the schools). The ISCS (Intermediate Science Curriculum Study) program was being utilized by 3.2% of the schools in both grades 7 and 8. This figure has decreased about 0.6% between the 1977 and the 1982 Census. Other offerings, including IPS (Introductory Physical Science), environmental science, life science, and physical science accounted for less than 3% of the schools sampled in this category.

The offerings in the high schools in this category are significant in that the data include 7th and 8th grade general science which suggest that approximately 16% of the schools have grades 7-12 programs. The sequencing of courses follows the format of general science, biology, chemistry and physics, supplemented by a diverse selection from among 14 offerings in the life sciences, and 8 different offerings in the physical sciences. The "alphabet programs", BSCS, IPS, PSSC, Chem Study, HPP, each have less than one percent of the enrollments in the state. Table 9 summarizes the science curriculum in the schools of less than 200 enrollment.

TABLE 9. GRADES 7-12 SCIENCE CURRICULUM FOR SCHOOLS OF LESS THAN 200 ENROLLMENT

	Junior High School			
Course Title	# Schools Offering Course	% of State Total (Schools)	% of State Enrollment in Course	% of School's Enrollment in Course
Gen Sci. (7)	112	86.2	40.4	47.5
ISCS (7)	7	5.4	3.3	49.0
Gen. Sci. (8)	109	83.8	38.5	46.6
ISCS (8/9)	7	5.4	3.2	48.2
Earth Science	6	4.6	2.4	47.7
Life Science	7	5.4	2.7	46.0
All Others*			2.9	

(Table 9 is continued on the next page)

Table 9 (continued)

Course Title	# Schools Offering Course	% of State Total (Schools)	% of State Enrollment in Course	% of School's Enrollment in Course
		High School		
Gen. Sci. (7)	32	16.9	3.4	22.2
Gen. Sci. (8)	30	15.9	3.3	23.0
Gen. Sci. (9)	89	47.1	7.9	16.7
Biology	167	88.4	15.9	17.7
BSCS/Green/Blue	5	2.6	0.4	20.7
BSCS/Yellow	3	1.6	0.2	19.6
Ecol. Conservation	10	5.3	0.3	6.3
Environmental Sci.	5	2.6	0.2	6.2
Advanced Biology	78	41.3	3.2	7.6
Physiology/Anatomy	12	6.2	0.3	5.2
Other Life Sci.**			1.8	
Physical Science	65	34.4	6.3	17.9
Earth Science	30	15.9	2.3	14.4
Chemistry	128	67.7	5.8	8.4
Adv. Chemistry	11	5.8	0.2	3.9
Physics	101	53.4	2.4	4.4
Other Phys. Sci.***			0.2	

* Includes environmental science, earth science, IPS, life science, and physical science.

** Includes remedial science, general studies biology, health biology, microbiology, botany, zoology, and life science.

*** Includes chemistry/physics, career chemistry, independent study chemistry, and Harvard project physics.

In comparing the 1977 and 1982 census data, the percent of the state enrollment increased in: General Science Grade 7 (+3.0%), High School Physical Science (+0.4%), and Chemistry (+1.2%), and decreased in ISCS Grade 7 (-0.5%), ISCS Grade 8/9 (-0.6%), Life Science (-2.2%), Earth Science (-2.0%), General Science Grade 9 (-1.5%) and High School Earth Science (-0.3%). The percentages in Biology remained virtually unchanged (+0.1%).

Schools of 200-499 Enrollment

The sequencing of courses in this range parallels that found in the smaller schools; however, the percent of students taking the courses is consistently lower than that found in the smaller schools. Approximately 6% of the high schools ir this category include grades 7 and 8. In the 9-12 schools, the curriculum offers the standard assortment of courses including general science, biology, chemistry and physics supplemented from among thirteen selections in the life sciences and thirteen selections in the physical sciences. The science curriculum in schools with an enrollment range of 200-499 is listed in Table 10.

TABLE 10. GRADES 7-12 SCIENCE CURRICULUM FOR SCHOOLS OF 200-499 ENROLLMENT

Junior High School

Course Title	# Schools Offering Course	% of State Total. (Schools)	% of State Enrollment in Course	% of School's Enrollment in Course
Gen. Science (7)	152	79.2	37.0	46.7
ISCS (7)	8	4.2	1.6	36.9
Gen. Science (8)	149	77.6	36.4	45.7
ISCS (8/9)	6	3.1	1.3	37.1
Earth Science (7-9)	19	9.9	3.6	39.8
Phys. Science (7-9)	8	4.2	1.9	41.8
Life Science (7-9)	21	10.9	4.7	48.4
All Others (7-9)*			1.6	

High Schools

Course Title	# Schools Offering Course	% of State Total (Schools)	% of State Enrollment in Course	% of School's Enrollment in Course
Gen. Sci. (7)	11	5.7	0.8	16.0
Gen. Sci. (8)	11	5.7	0.9	17.3
Gen. Sci. (9)	85	43.8	6.7	15.2
Biology	180	92.8	15.5	16.8
Advanced Biology	104	53.6	3.0	5.6
BSCS/Green/Blue	7	3.6	0.6	16.9
BSCS/Yellow	3	1.5	0.3	16.0
Ecology/Conserv.	15	7.7	0.2	3.1
Environmental Sci.	11	5.7	0.4	6.7
Physiology/Anatomy	32	16.5	0.6	3.7
Other Life Sci.**			2.3	
Physical Sci.	70	36.1	5.1	13.9
Earth Science	37	19.1	2.1	10.9
Chemistry	179	92.3	6.0	6.5
Advanced Chemistry	34	17.5	0.6	2.8
Physics	156	80.4	2.3	2.8
Other Phys. Sci.***			1.4	

* Includes remedial science, ecology/conservation, environmental science, botany, biology, HPP/IME/TSM/TOPIC, IPS, and space science/aeronautics/aviation.

** Includes remedial science, general studies biology, health biology, microbiology, botany, zoology, and life science.

*** Includes advanced physical science, career chemistry, independent study chemistry, advanced physics, Harvard project physics, IPS, space science/aeronautics/aviation, astronomy, meteorology, and geology.

In comparing the 1977 and 1982 census data, the percent of the state enrollment increased in: Earth Science, 7-9 (+0.6%), High School Earth Science (+0.4%), Biology, (+1.3%), Chemistry (+1.3%), and decreased in: General Science Grade 7 (-0.4%), ISCS Grade 7 (-2.0%), General Science Grade 8 (-2.2%), ISCS Grades 8/9 (-2.5%), and Life Science (-0.4%).

Schools of 500-999 Enrollment

In this enrollment range, the enrollment increases in the diverse offerings causing a subsequent drop in the enrollment in the standard courses of general science, biology, chemistry and physics. There is a slight increase in the number of electives, including 15 selections in the life science and 16 selections in the physical sciences. This science curriculum for schools in the enrollment range 500-999 is displayed in Table 11.

TABLE 11. GRADES 7-12 SCIENCE CURRICULUM FOR SCHOOLS OF 500-999 ENROLLMENT

Junior High Schools

Course Title	# Schools Offering Course	% of State Total (Schools)	% of State Enrollment in Course	% of School's Enrollment in Course
General Sci. (7)	132	83.0	35.1	42.5
ISCS (7)	8	5.0	2.2	44.1
General Sci. (8)	122	76.7	30.9	41.1
General Sci. (9)	9	5.7	1.1	15.0
ISCS (8/9)	8	5.0	2.5	46.6
Earth Sci. (7-9)	19	11.9	3.7	26.7
Biology (7-9)	18	11.3	2.3	17.0
Life Science (7-9)	18	11.3	4.2	35.0
Physical Sci. (7-9)	21	13.2	2.8	19.4
All Others*			4.0	

High Schools

Course Title	# Schools Offering Course	% of State Total (Schools)	% of State Enrollment in Course	% of School's Enrollment in Course
General Sci. (9)	30	29.1	3.2	11.3
Biology	88	86.3	12.5	14.9
Advanced Biology	65	63.7	2.2	3.5
BSCS/Green/Blue	7	6.9	1.3	16.7
BSCS/Yellow	4	3.9	0.4	9.4
Ecology/Conservation	10	9.7	0.2	2.2
Environmental Sci.	10	9.7	0.2	1.9
Physiology/Anatomy	19	18.6	0.6	3.1
Other Life Sci.**			3.0	
Physical Sci.	44	43.1	3.8	8.9
Earth Science	36	35.3	3.4	9.4
Chemistry	94	92.2	6.3	6.9
Advanced Chemistry	33	32.4	0.7	2.0
Physics	89	87.3	2.6	3.0
Other Phys. Sci.***			1.5	

* Includes remedial science, health-biology, environmental science, biology, HPP/IME/TSM/TOPIC, IPS.

** Includes remedial science, ISCS, general studies biology, health-biology, microbiology, botany, zoology, life science.

*** Includes chemistry/physics, Chem Study chemistry, honors chemistry, career chemistry, independent study chemistry, advanced physics, HPP, IPS, honors physics, space science/aeronautics/aviation, astronomy/meteorology, geology.

In comparing the 1977 and 1982 census data, the percent of the state enrollment increased in: General Science Grade 7 (+2.0%), Physical Science, 7-9 (+0.3%), Advanced Biology (+0.4%), High School Earth Science (+0.4%), Chemistry (+1.1%), Physics (+0.8%), and decreased in: ISCS Grade 7 (-1.1%), General Science Grade 8 (-0.4%), General Science Grade 9 (-1.4%), High School General Science Grade 9 (-0.5%), and High School Physical Science (-2.1%).

Schools with 1000-1699 Enrollment

In this enrollment range, there is a continued decrease in the percentages of students taking the standard courses, accompanied by a greater diversity of offerings. The high schools are all grade 9-12 schools. There is sufficient enrollment in the so-called "alphabet" programs to include them among the major offerings. The science curriculum for grades 7-12 in the 1000-1699 enrollment range is listed in Table 12.

TABLE 12. GRADES 7-12 SCIENCE CURRICULUM FOR SCHOOLS OF 1000-1699 ENROLLMENT

Junior High Schools

Course Title	# Schools Offering Course	% of State Total (Schools)	% of State Enrollment in Course	% of School's Enrollment in Course
General Sci. (7)	6	75.0	27.7	37.6
General Sci. (8)	5	62.5	22.9	36.8
General Sci. (9)	2	25.0	5.2	22.0
Earth Sci. (7-9)	3	37.5	8.9	23.7
Biology	2	25.0	4.3	17.9
Life Sci. (7-9)	2	25.0	6.6	25.1
Physical Sci. (7-9)	2	25.0	1.4	5.5
All Others (7-9)*	1	12.5	1.9	16.4

High Schools

Course Title	# Schools Offering Course	% of State Total (Schools)	% of State Enrollment in Course	% of School's Enrollment in Course
General Sci. (9)	41	35.3	4.1	11.2
Biology	101	88.6	12.7	14.2
Adv. Biology	57	50.0	1.5	3.0
Ecology/Conserv.	20	17.5	0.4	2.4
Environmental Sci.	21	18.4	0.7	4.1
BSCS/Green/Blue	11	9.6	1.0	10.6
BSCS/Yellow	5	4.4	0.6	14.3
Physiology/Anatomy	38	33.3	0.8	2.2
Remedial Sci.	19	16.7	1.5	8.5
Microbiology	13	11.4	0.2	1.5
Zoology	17	14.9	0.2	1.5
Life Science	33	28.9	1.5	5.2
Other Life Sci.**			1.7	
Physical Science	54	47.4	3.0	6.3
Earth Science	59	51.8	3.5	6.7
Chemistry	105	92.1	5.5	6.0
Adv. Chemistry	53	46.5	0.7	1.6
Chem. Study Chemistry	8	7.0	0.5	6.5
Honors Chemistry	11	9.6	0.3	3.1
Physics	96	84.2	2.4	2.8
Adv. Physics	19	16.7	0.2	1.4
PSSC Physics	8	7.0	0.2	3.2
Other Phy. Sci.***			2.2	

* Includes remedial science.

** Includes general studies biology, ISCS, health-biology, botany.

*** Includes chemistry/physics, applied physical science, career chemistry, independent study chemistry, HPP, IPS, space science/aeronautics/aviation, astronomy/meteorology, geology.

No comparison will be made for junior high school science courses in the 1000 and above enrollment category, as the number of schools in this category is quite small and decreased from 15 in 1977 to 8 in 1982. For high schools, the percent of the state enrollment increased in: Biology (+0.8%), Chemistry (+0.3%), Physics (+0.4%), and decreased in: General Science Grade 9 (-0.8%), and Advanced Biology (-0.4%).

School with 1700-2599 Enrollment

Only high schools are included in this enrollment range. The science curriculum in grades 9-12 in schools with the enrollment range of 1700-2599 is listed in Table 13.

TABLE 13. GRADES 9-12 SCIENCE CURRICULUM FOR SCHOOLS OF 1700-2599 ENROLLMENT

	High Schools			
Course Title	# Schools Offering Course	% of State Total (Schools)	% of State Enrollment in Course	% of School's Enrollment in Course
General Sci. (9)	27	27.6	2.4	8.8
Biology	95	96.9	14.7	15.2
Adv. Biology	61	62.2	1.4	2.3
BSCS/Green/Blue	3	3.1	0.4	12.2
BSCS/Yellow	8	8.2	0.9	11.2
Ecology/Conserv.	17	17.3	0.4	2.5
Environmental Sci.	17	17.3	0.8	4.2
Physiology/Anatomy	31	31.6	0.7	2.1
Other Life Science*			3.5	
Physical Science	68	69.4	6.1	8.8
Earth Science	65	66.3	3.6	5.4
Chemistry	96	98.0	6.3	6.5
Adv. Chemistry	46	46.9	0.6	1.4
Chem. Study Chemistry	4	4.1	0.4	10.4
Honors Chemistry	24	24.5	0.5	2.0
Physics	85	86.7	3.1	3.6
Adv. Physics	17	17.3	0.3	1.4
PSSC Physics	7	7.1	0.3	3.8
Honors Physics	20	20.4	0.4	1.9
Other Physical Sci.**			1.6	

* Includes remedial science, ISCS, general study biology, health-biology, microbiology, botany, zoology, life science.

** Includes chemistry/physics, advanced physical science, career chemistry, independent study/chemistry, HPP, IPS, space science/aeronautics/aviation, astronomy/meteorology, geology.

In comparing the 1977 and 1982 census data, the percent of the state enrollment increased in: Biology (+1.3%), Chemistry (+0.4%), Physics (+0.4%), and Physical Science (+0.3%), and decreased in: General Science Grade 9 (-1.8%), and Advanced Biology (-0.5%).

Schools with 2600 or More Enrollment

Only high schools are included in the enrollment range of 2600 or more. The science curriculum in grades 9-12 for these schools is displayed in Table 14.

TABLE 14. GRADES 9-12 SCIENCE CURRICULUM FOR SCHOOLS OF 2600 OR MORE ENROLLMENT

	High Schools			
Course Title	# Schools Offering Course	% of State Total (Schools)	% of State Enrollment in Course	% of School's Enrollment in Course
General Sci. (9)	8	36.4	3.2	8.5
Biology	21	95.5	12.4	12.9
Adv. Biology	10	45.5	1.7	3.7
BSCS/Green/Blue	2	9.1	0.5	5.8
BSCS/Yellow	3	13.6	1.5	12.3
Microbiology	7	31.8	0.3	1.0
Ecology/Conserv.	3	13.6	0.4	3.1
Environmental Sci.	5	22.7	0.2	0.8
Physiol/Anatomy	11	50.0	0.7	1.4
Remedial Biology	3	13.6	0.7	5,3
Other Life Sci.*			2.4	
Physical Science	12	54.5	2.8	5.4
Earth Science	14	63.6	2.8	4.4
Chemistry	21	95.5	6.9	7.2
Adv. Chemistry	11	50.0	0.5	0.9
Chem. Study	5	22.7	1.1	5.4
Physics	18	81.8	4.2	5.0
PSSC Physics	3	13.6	0.4	3.4
Other Phys. Sci.**			2.2	

* Includes remedial science, ISCS, health biology, botany, zoology, life science.

** Includes chemistry/physics, independent study chemistry, IPS, honors physics, space/aeronautics, astronomy/meterology, geology.

In comparing the 1977 and 1982 census data, the percent of the state enrollment increased in: Biology (+1.7%), Chemistry (+1.6%), and Physics (+1.3%), and decreased in: Physical Science (-2.2%), General Science Grade 9 (-0.5%), and Advanced Biology (-0.5%). It should be noted, however, that the number of high schools in this enrollment range decreased from 48 in 1977 to 22 in 1982. This substantial change may have contributed significantly to the changes in the proportions of course enrollment observed.

THE SCIENCE CURRICULUM IN SCHOOLS OF VARIOUS COMMUNITY TYPES

In the analysis of data relating to community type, two factors were taken into consideration in the preparation of Tables 15-18, i.e., percent of schools offering a course and the percent of state total (enrollment) taking the course. The reasoning for adding the percent of schools offering a course was that it became evident that in certain community types a particular course was considered of such importance that it was being offered by a high percentage of the schools even though the enrollment in that course did not make up a significant proportion of the total state enrollment. In Tables 15-18, all courses which were offered by more than 25% of the schools in that category and all courses in which the enrollment was more than 2% of the state total enrollment are included.

Comparisons across community type indicate only minor variations in percentage of state enrollments between rural and suburban categories in all offerings. There were significant variations in the data in the other categories. In the independent city and central city data, the percentage of students enrolled in general science is approximately 10% less than the rural and suburban schools. Enrollment in ISCS courses is consistent in rural, suburban and independent city communities, and does not appear in central city data. The central city data, however, reflect a much higher percentage of state enrollment in biology (5.1%) and life science (7.9%) than do the data for the other three community types. The enrollments in earth science at the junior high level varied from a low of 2.4% in the suburban communities to a high of 9.1% in the central city communities.

The percent of enrollment varied in biology from a high of 15.3% in rural communities and suburban communities to 13.0% in independent city schools, to a low of 11.1% in the central city schools. BSCS biology enjoyed the highest percent of enrollment in the suburbs (1.7%), but did not rank at the 2% "typical" level in any community. Chemistry and physics enrollments varied little from community to community. The central city data were unique in that remedial biology was offered in more than 25% of the schools with a concomitant enrollment of 2.0% of the state's students qualifying this course as "typical." Two other offerings, honors chemistry and honors physics, were unique in the central city data in that both were offered by more than 25% of the schools in that category. Physiology/anatomy was a popular offering (33.3%) in the suburban schools.

TABLE 15. THE SCIENCE CURRICULUM IN RURAL COMMUNITIES

Junior High Schools

Course Title	# Schools Offering Course	% of State Total (Schools)	# Students Taking Course	% of State Total Taking Course	% School Enrollment
Gen. Sci. Gr. 7	120	82.2	7,586	38.2	48.0
Gen. Sci. Gr. 8	118	80.8	7,192	36.2	45.9
ISCS Grade 7	7	4.8	448	2.3	42.1
ISCS Grades 8/9	7	4.8	583	2.9	54.7
Life Science	14	9.6	1,188	6.0	40.3
Physical Sci.	6	4.1	401	2.0	39.9
Earth Science	12	8.2	917	4.6	45.0
Other JH Sci.*			395	2.0	

High Schools

Gen. Sci. Gr. 9	153	44.7	5,473	6.2	14.9
Biology	315	92.1	13,400	15.2	16.2
Adv. Biology	174	50.9	2,563	2.9	5.1
BSCS Green/Blue	9	2.6	305	0.3	18.1
BSCS Yellow	5	1.5	113	0.1	9.1
Physical Science	127	37.1	4,954	5.6	14.1
Chemistry	278	81.3	5,408	6.1	6.9
Physics	229	67.0	2,034	2.3	3.0
Earth Science	62	18.1	2,309	2.6	11.2
Other HS Sci.**			6,714	7.7	

* Includes environmental science, biology and IPS.

** Includes general science grade 7, general science grade 8, general science grades 10-12, ISCS 8/9, remedial biology, ecology/conservation, physiology/anatomy, health-biology, environmental science, microbiology, botany, zoology, life science, chemistry/physics, advanced physical science, career chemistry, independent study chemistry, advanced physics, HPP, space science/aeronautics/aviation, astronomy/meteorology, geology.

A comparison of the 1977 and 1982 census data in rural communities reveals an increase in: General Science Grade 7 (+4.5%), General Science Grade 8 (+1.4%), High School General Science (+0.5%), Biology (+1.2%), Chemistry (+1.2%), Physics (+0.2%), and Earth Science (+0.3%), and a decrease in: ISCS Grade 7 (-2.5%), ISCS Grades 8/9 (-2.8%), Life Science (-1.0%), Junior High School Physical Science (-0.4%), and Junior High School Earth Science (-1.1%).

TABLE 16. THE SCIENCE CURRICULUM IN SUBURBAN SCHOOLS

Junior High Schools

Course Title	# Schools Offering Course	% of State Total (Schools)	# Students Taking Course	% of State Total Taking Course	% School Enrollment
Gen. Sci. Gr. 7	201	85.9	38,373	38.3	44.9
Gen. Sci. Gr. 8	194	82.9	35,086	35.0	43.6
ISCS Grade 7	9	3.8	2,039	2.0	46.3
ISCS Grades 8/9	8	3.4	2,177	2.2	48.1
Life Science	16	6.8	3,244	3.2	45.1
Physical Sci.	21	9.0	2,902	2.9	25.2
Earth Science	17	7.3	2,356	2.4	23.0
Other JH Sci.*			5,231	5.2	

High Schools

Gen. Sci. Gr. 9	52	28.4	6,350	2.3	8.8
Biology	160	87.4	41,839	15.0	16.6
Adv. Biology	92	50.3	4,599	1.7	3.4
BSCS Green/Blue	20	10.9	3.040	1.1	10.8
BSCS Yellow	14	7.7	3,552	1.3	12.0
Physical Sci.	85	46.4	11,770	4.2	8.2
Chemistry	168	91.8	20,211	7.2	7.7
Physics	150	82.0	8,990	3.2	3.9
Earth Science	102	55.7	10,996	3.9	6.1
Phys./Anatomy	61	33.3	2,185	0.8	2.1
Adv. Chemistry	98	53.6	2,631	0.9	1.5
Other HS Sci.**			30,111	11.0	

* Includes general science grade 9, remedial science, ecology/conservation, health biology, environmental science, botany, biology, HPP, and IPS.

** Includes general science grade 7, general science grade 8, general science grades 10-12, remedial science, ISCS, general study biology, ecology/conservation, health biology, environmental science, microbiology, botany, zoology, life science, chemistry/physics, advanced physical science, Chem Study chemistry, honors chemistry, career chemistry, independent study chemistry, advanced physics, PSSC physics, HPP, IPS, honors physics, space science/aeronautics/aviation, astronomy/meteorology/geology.

A comparison of the 1977 and 1982 census data in suburban communities reveals an increase in: General Science Grade 7 (+2.2%), Physical Science (+0.3%), Biology, (+3.1%), Chemistry (+1.1%), Physics (+0.6%), and a decrease in: General Science Grade 8 (-0.5%), ISCS Grade 7 (-1.4%), ISCS Grades 8/9 (-0.3%), Life Science (-0.3%), Earth Science (-0.2%), General Science Grade 9 (-0.4%), Advanced Biology (-0.5%), and Physical Science (-0.9%).

TABLE 17. THE SCIENCE CURRICULUM IN THE INDEPENDENT CITY SCHOOLS

Junior High Schools

Course Title	# Schools Offering Course	% of State Total (Schools)	# Students Taking Course	% of State Total Taking Course	% School Enrollment
Gen. Sci. Gr. 7	60	74.1	7,565	31.0	42.5
Gen. Sci. Gr. 8	55	67.9	6,920	28.3	39.9
ISCS Grade 7	7	8.6	765	3.1	35.3
ISCS Grades 8/9	6	7.4	576	2.4	30.5
Biology	4	4.9	532	2.2	20.4
Life Science	10	12.3	1,168	4.8	5.2
Physical Sci.	3	3.7	249	1.0	13.2
Earth Science	11	13.6	1,236	5.1	40.2
Other JH Sci.*			1,342	5.5	

High Schools

Course Title	# Schools Offering Course	% of State Total (Schools)	# Students Taking Course	% of State Total Taking Course	% School Enrollment
Gen. Sci. Gr. 9	35	35.4	2,983	4.4	13.3
Biology	87	87.9	8,713	13.0	14.9
Adv. Biology	56	56.6	1,410	2.1	3.4
BSCS Green/Blue	5	5.1	811	1.2	17.0
BSCS Yellow	5	5.1	389	0.6	10.4
Life Science	14	14.1	886	1.3	5.9
Physical Science	41	41.4	2,203	3.3	7.9
Chemistry	94	94.9	3,816	5.7	5.8
Adv. Chemistry	39	39.4	440	0.7	1.4
Physics	89	89.9	1,638	2.4	2.7
Earth Science	32	32.3	2,035	3.0	7.4
Other HS Sci. **			4,151	6.2	

* Includes general science grade 9, remedial science, environmental science, advanced biology, IPS, space science/aeronautics/aviation.

** Includes general science grade 7, general science grade 8, remedial science, ISCS grades 8/9, remedial biology, ecology/conservation, physiology/anatomy, health biology, environmental science, microbiology, botany, zoology, chemistry/physics, Chem Study chemistry, career chemistry, independent study chemistry, advanced physics, PSSC, HPP, IPS, space science/aeronautics/aviation, astronomy/meteorology, and geology.

A comparison of the 1977 and 1982 census data in independent city communities reveals an increase in: junior high Biology (+0.3%), junior high Earth Science (+0.7%), Biology (+0.3%), Advanced Biology (+0.3%), Chemistry (+0.3%), Physics (+0.2%), and a decrease in: General Science Grade 7 (-1.2%), General Science Grade 8 (-4.3%), junior high Life Science (-0.5%), high school Physical Science (-0.3%) and high school Earth Science (-0.4%).

TABLE 18. THE SCIENCE CURRICULUM IN THE CENTRAL CITY SCHOOLS

Junior High Schools

Course Title	# Schools Offering Course	% of State Total (Schools)	# Students Taking Course	% of State Total Taking Course	% School Enrollment
Gen. Sci. Gr. 7	21	75.0	5,332	26.2	35.9
Gen. Sci. Gr. 8	18	64.3	4,864	23.9	38.5
Gen. Sci. Gr. 9	4	14.3	809	4.0	24.2
Biology	6	21.4	1,040	5.1	21.5
Life Science	8	28.6	1,913	7.9	24.1
Physical Sci.	5	17.9	346	1.7	8.6
Earth Science	7	25.0	1,851	9.1	30.8
Other JH Sci.*			858	4.2	

High Schools

Course Title	# Schools Offering Course	% of State Total (Schools)	# Students Taking Course	% of State Total Taking Course	% School Enrollment
Gen. Sci. Gr. 9	40	42.1	7,168	4.5	10.8
Remedial Sci.	30	31.6	4,909	3.1	9.3
Remedial Biology	27	28.4	3,254	2.0	6.9
Biology	90	94.7	17,742	11.1	11.4
Adv. Biology	53	55.8	2,187	1.4	2.1
BSCS Green/Blue	1	1.1	13	0.0	1.4
BSCS Yellow	2	2.1	374	0.2	15.9
Life Science	11	11.6	809	0.5	4.5
Physical Science	60	63.2	7,936	5.0	7.2
Chemistry	83	87.4	6,922	4.4	4.7
Adv. Chemistry	13	13.7	188	0.1	1.0
Honors Chem.	31	32.6	1,465	0.9	2.2
Physics	77	81.1	4,285	2.7	3.1
Honors Physics	24	25.4	943	0.6	1.7
Earth Science	45	47.4	3,828	2.4	5.1
Other HS Sci. **			4,680	2.9	

* Includes other general science, natural science, and IPS.

** Includes general science grade 7, ecology/conservation, physiology/anatomy, health biology; environmental science, microbiology, botany, zoology, chemistry/physics, PSSC, HPP, space science/aeronautics, aviation, astronomy/meteorology, and geology.

A comparison of the 1977 and the 1982 census data in central city communities reveals an increase in: junior high Biology (+1.6%), junior high Life Science (+3.6%), junior high Physical Science (+1.0%), Earth Science (+5.4%), Physics (+0.2%), high school Earth Science (+0.3%) and a decrease in: General Science Grade 7 (-1.8%), General Science Grade 8 (-3.2%), General Science Grade 9 (-6.0%), high school General Science Grade 9 (-2.7%), Biology (-1.3%), and Advanced Biology (-0.1%).

MALE VS. FEMALE ENROLLMENTS IN THE SCIENCE CURRICULUM

In the Various Community Types

In making comparisons among the four community types in regard to enrollment by sex, certain patterns emerge. The female enrollments tend to exceed the male enrollments in the life sciences. The male enrollments tend to exceed the female enrollments in physics, earth science and physical science. There is practically no difference in female and male enrollments in chemistry. Tables 19-22 list the selected courses in the science curricula in the various community types.

TABLE 19. MALE VS. FEMALE ENROLLMENTS IN THE CENTRAL CITY SCIENCE CURRICULUM

Course Title	# Male Enrolled	# Female Enrolled	Difference # Male-# Female	Percent Difference	% State Total Male	% State Total Female
Gen. Sci. Gr. 7	2,741	2,591	150	2.8	26.3	26.2
Gen. Sci. Gr. 8	2,471	2,393	78	1.6	23.7	24.2
Biology	508	532	-24	-2.3	4.9	5.4
Life Science	836	777	59	3.7	8.0	7.9
Physical Sci.	191	155	36	10.4	1.8	1.6
Earth Science	952	899	53	2.9	9.1	9.1
Gen. Sci. Gr. 9	3,826	3,342	484	6.7	4.8	4.2
Remedial Sci.	2,718	2,191	527	12.0	3.4	2.8
Biology	8,438	9,304	-866	-5.1	10.5	11.8
Adv. Biology	900	1,286	-386	-17.6	1.1	1.6
Phys./Anatomy	269	486	-217	-28.7	0.3	0.6
Phys. Science	4,278	3,657	621	7.8	5.3	4.6
Chemistry	3,346	3,576	-230	-3.3	4.2	4.5
Honors Chem.	600	865	-265	-18.0	0.8	1.1
Physics	2,674	1,610	1,064	24.8	3.3	2.0
Earth Science	2,043	1,784	259	6.7	2.5	2.3

Note: The enrollment ratios of males to females for high school is 50.5:49.5.

Male enrollments exceeded female enrollments significantly in five of the sixteen courses listed in Table 19 and female enrollments exceeded male enrollments significantly in five of the sixteen courses. Female enrollments exceeded male enrollments significantly in biology, advanced biology, physiology/anatomy, chemistry, and honors chemistry. Male enrollments exceeded female enrollments significantly in physics, high school physical science, earth science, general science grade 9, and remedial science. The two extremes were physiology/anatomy which had 28.7% more females enrolled than males, and physics which had 24.8% more males enrolled than females.

TABLE 20. MALE VS. FEMALE ENROLLMENTS IN THE SUBURBAN SCIENCE CURRICULUM

Course Title	# Male Enrolled	# Female Enrolled	Difference # Male- # Female	Percent Difference	% State Total Male	% State Total Female
Gen. Sci. Gr. 7	19,322	19,050	272	0.7	37.6	39.0
Gen. Sci. Gr. 8	17,802	17,284	518	1.4	34.6	35.4
Biology	767	828	-61	-3.7	1.5	1.7
Life Science	1,613	1,631	-18	-0.1	3.1	3.3
Physical Sci.	1,480	1,422	58	1.9	2.9	2.9
Earth Science	1,224	1,131	93	3.9	2.4	2.3
ISCS Grade 7	1,049	990	59	2.8	2.0	2.0
ISCS Grades 8/9	1,076	1,101	-25	-1.1	2.1	2.3
Gen. Sci. Gr. 9	3,443	2,907	536	8.4	2.4	2.1
Remedial Sci.	458	354	104	12.8	0.3	0.3
Phys./Anatomy	850	1,335	-485	-22.1	0.6	1.0
Biology	20,352	21,487	-1,135	-2.7	14.3	15.7
Adv. Biology	2,101	2,497	-396	-8.6	1.5	1.8
Chemistry	10,294	9,916	378	1.8	7.2	7.3
Honors Chem.	316	265	51	8.7	0.2	0.2
Physics	5,806	3,184	2,622	29.1	4.1	2.3
Honors Physics	221	156	65	17.2	0.2	0.1
Earth Science	6,104	4,891	1,213	11.0	4.3	3.6

Note: The enrollment ratio of males to females for high schools is 51.1:48.9.

Male enrollments exceeded female enrollments significantly in five of the eighteen courses listed in Table 20, and female enrollments exceeded male enrollments significantly in three of the eighteen courses. Female enrollments exceeded male enrollments significantly in biology, advanced biology and physiology/anatomy. Male enrollments exceeded female enrollments significantly in general science grade 9, remedial science, physics, honors physics and earth science. The two extremes were physiology/anatomy which enrolled 22.1% more females than males and physics which enrolled 29.1% more males than females.

TABLE 21. MALE VS. FEMALE ENROLLMENTS IN THE SCIENCE CURRICULUM IN THE INDEPENDENT CITY SCHOOLS

Course Title	# Male Enrolled	# Female Enrolled	Difference # Male- # Female	Percent Difference	% State Total Male	% State Total Female
Gen. Sci. Gr. 7	3,865	3,699	166	2.1	30.5	31.5
Gen. Sci. Gr. 8	3,507	3,413	94	1.3	27.6	29.1
Biology	269	263	6	1.1	2.1	2.2
Life Science	567	601	-34	-2.9	4.5	5.1
Physical Sci.	144	105	39	15.6	1.1	0.9
Earth Science	633	603	20	1.6	5.0	5.1
Gen. Sci. Gr. 9	1,614	1,368	246	8.2	4.7	4.2
Phys./Anatomy	98	190	-92	-31.9	0.3	0.6
Biology	4,353	4,360	-7	-0.0	12.6	13.4
Adv. Biology	624	785	-161	-11.4	1.8	2.4
Chemistry	1,909	1,906	3	0.0	5.5	5.9
Physics	1,143	495	648	39.5	3.3	1.5
Earth Science	1,089	946	143	7.0	3.1	2.9

Note: The enrollment ratio of males to females for high schools is 51.7:48.3.

Male enrollments exceeded female enrollments significantly in two of the thirteen courses listed in Table 21. Female enrollments exceeded male enrollments significantly in physiology/anatomy, biology, and advanced biology. Male enrollments exceeded female enrollments significantly in general science grade 9 and physics. The two extremes were physiology/anatomy in which 31.9% more females were enrolled than males, and physics in which 39.5% more males were enrolled than females.

TABLE 22. FEMALE VS. MALE ENROLLMENTS IN THE SCIENCE CURRICULUM IN RURAL COMMUNITIES

Course Title	# Male Enrolled	# Female Enrolled	Difference # Male- # Female	Percent Difference	% State Total Male	% State Total Female
Gen. Sci. Gr. 7	3,919	3,667	252	3.3	37.7	38.8
Gen. Sci. Gr. 8	3,662	3,529	133	1.8	35.2	37.3
Biology	609	579	12	0.9	5.7	6.1
Physical Sci.	197	203	-6	-1.5	1.9	2.2
Earth Science	453	464	-11	-1.1	4.4	4.9
Gen. Sci. Gr. 9	2,998	2,475	523	9.5	6.6	5.8
Phys./Anatomy	274	394	-120	-17.9	0.6	0.9
Biology	6,371	7,028	-657	-4.9	14.0	16.3
Adv. Biology	1,163	1,400	-237	-9.2	2.6	3.3
Phy. Science	2,699	2,255	444	8.9	5.9	5.2
Chemistry	2,716	2,692	24	0.0	6.0	6.3
Physics	1,340	694	646	31.7	3.0	1.6
Earth Science	1,278	1,031	247	10.6	2.8	2.4

Note: The enrollment ratio of males to females for high schools is 51.4:48.6.

Male enrollments exceeded female enrollments significantly in four of the thirteen courses listed in Table 22. Female enrollments exceeded male enrollments significantly in physiology/anatomy, biology and advanced biology. Male enrollments exceeded female enrollments significantly in physics, earth science, physical science, and general science grade 9. The two extremes were physiology/anatomy with 17.9% more females than males enrolled and physics with 31.7% more males than females enrolled.

In Schools of Varying Enrollments

An examination of the census data across the varying population ranges reveals the same generalization in relationship to female vs. male enrollments in science courses that has been reported in the different community type data. Male enrollments exceeded female enrollments in physics, earth science, general science, and remedial science whereas female enrollments exceeded male enrollments in physiology/anatomy and biology.

In Table 23, data reflecting female vs. male enrollments in selected junior high and high school courses are displayed. This table is similar to one found in the 1977 report but uses year equivalent course enrollment for comparison of 1977 and 1982 data.

TABLE 23. FEMALE VS. MALE ENROLLMENTS IN SELECTED SCIENCE COURSES

Course Title	# Male Enrolled	# Female Enrolled	% of State Total Male 1977	Male 1982	Female 1977	Female 1982
Junior High School						
Biology	1,634	1,713	2.0	1.9	2.2	2.1
Life Science	3,625	3,588	4.3	4.2	4.2	4.4
Physical Sci.	2,012	3,588	2.5	2.3	2.2	2.3
Earth Science	3,263	3,095	3.4	3.8	3.4	3.8
High School						
Gen. Sci. Gr. 9	11,881	10,092	4.9	3.9	4.3	3.5
Gen. Studies Bio.	1,933	1,724	1.0	0.6	0.9	0.6
Physical Sci.	14,435	12,426	5.3	4.8	4.6	4.3
Earth Science	10,515	8,652	3.3	3.5	2.8	3.0
Biology	39,513	42,179	12.0	13.0	13.0	14.5
Phys./Anatomy	1,490	2,406	0.4	0.5	0.7	0.8
Adv. Biology	4,788	5,968	1.9	1.6	2.2	2.1
Microbiology	515	562	0.2	0.2	0.2	0.2
Chemistry	18,266	18,090	5.4	6.0	5.3	6.2
Adv. Chemistry	2,290	1,364	0.6	0.8	0.4	0.5
Honors Chemistry	714	826	0.1	0.3	0.2	0.4
Physics	10,963	5,983	3.3	3.6	1.6	2.1
Adv. Physics	735	306	0.2	0.2	0.1	0.1
Honors Physics	686	634	0.1	0.2	0.1	0.2

The data in Table 23 reveal a similar proportion of enrollment in courses in the junior high schools in 1977 and 1982. The greatest increase (+0.4%) was in Earth Science. In the high schools there was a decrease in the proportion of science enrollment between 1977 and 1982. The greatest decrease was (-1.0%) in the male enrollment and (-0.8%) in the female enrollment in General Science Grade 9. Biology enjoyed the greatest increase (+1.0% male, +1.5% female) in the percent of state enrollments between 1977 and 1982.

Chemistry (+0.6% male and +0.9% female), Physics (+0.3% male and +0.5% female), and Advanced Chemistry (+0.2% male and +0.2% female) were other subjects that displayed a positive gain in both of the sex categories.

CONCLUSIONS

From the voluminous quantity of data presented in this report, only a finite number of possible conclusions can be presented here. Looking back to the 1977 report, the major theme of the document was what could be considered a "typical" science curriculum in a multitude of independent settings. The number of course offerings in the enrollment data varied from 45 in the schools of less than 200 enrollment to a maximum of 55 in the enrollment range 500-1000. Across the community types, there were 48 different course offerings in the rural schools, 50 different offerings in the central city schools, 54 different offerings in the independent city schools, and 59 different offerings in the suburban schools.

With the variety of permutations available, the science curriculum in a given school in the state of Illinois has the potential to be unique.

This does not imply a lack of commonalities in the data, but is intended to point out the magnitude of the diversification that exists.

The commonalities include a sequence of courses, general science, earth science, biology, chemistry and physics, beginning in grade 7 and ending in grade 12. Notably absent from this list are the "alphabet" curricula which came about as the result of massive federal expenditures in the late 1960's and early 1970's. It should be pointed out, however, that where they exist, the "alphabet" courses generally enroll a higher percent of the students in a given school population than do the more traditional courses at the same grade level.

The first generation "alphabet curricula" in science education have all but disappeared from the scene.

Although this analysis did not deal with requirements, the percentages of participation in science courses at all levels clearly define a program of limited scope.

The science curriculum in Illinois schools in 1982 serves only a minority of the total student enrollment.

Of particular concern are the percentages of the state total enrollments in Chemistry (approximately 6%) and Physics (approximately 3%).

Although the analysis of the male vs. female enrollments did not reveal any surprises, the general conclusion from this evaluation is:

In the science curriculum, male enrollments exceed female enrollments.

In recent times, it has been proposed that the science curriculum more clearly relate to societal issues and problems, yet the data show that course titles that reflect these areas of study (i.e., environmental science, ecology, etc.) are available to only a small proportion of the student population. Further, the extent to which such issues and problems are addressed in other more traditionally titled courses is unknown.

Course titles reflecting contemporary societal issues and problems are all but absent from the science curricula, and where they exist, these courses have minimal enrollments.

IMPLICATIONS

From the perspective of a biologist, who sees strength in diversification, the science curricula in the State of Illinois would reflect a rich potential. To those who might suggest more required courses, the census data might respond, "In what?" The myriad of offerings would enable students to meet a course requirement and still not be exposed to any appropriate level of scientific literacy. The census data clearly come down on the side of those groups which suggest that emphasis in the curriculum be placed on "outcomes."

The College Entrance Examination Board in a 1983 document "What Students Need to Know and Be Able to Do" supports the emphasis on student outcomes as a challenge to schooling in the 1980's. The Illinois State Board of Education has taken the position of favoring student outcomes over mandated course requirements, a policy which is supported by the diversity of findings in this document.

To the educator, government agency and publisher, information found here provides a data base on which competent decisions can be made in regard to teacher preparation, inservice needs, specific curriculum needs, and basic research. In anticipation of the possible uses of these data, this report has included a vast assortment of tables. Responses can be provided to legitimate concerns expressed from a variety of quarters. The American Association for the Advancement of Sciences in its perspectus "Education in the Sciences, A Developing Crisis" states, "The AAAS believes the immediate --and central--goal must be to improve science and mathematics education in the junior and senior high schools." In the "Nation at Risk," concern was expressed that "there was a steady decline in science achievement scores of U.S. 17-year-olds as measured by national assessments of science." The National Science Teachers Association in its document "What Research Says to the Science Teacher" identifies a science curriculum ' ed on personal needs, societal issues, salient knowledge, and care knowledge and awareness. The cry goes out for massive expenditures. The Census data in retrospect indicate that what was done before has had its limitations.

A number of task force groups are currently addressing the whole spectrum of issues relating to the science curriculum in the schools in the State of Illinois. Recommendations from the various groups followed by implementation of change must be accompanied by ongoing data collection such as that

found in this report. The census provides an essential measure of the "state of the art," and the ability to base competent judgements on hard data is critical at this juncture in science education evolution. In the future, agents of change will continue to demand knowledge available through subsequent census reports.

DLN/2127h

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Printed by the Authority of the State of Illinois
July 1984 3M 4-1219B86 No. 309

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