

Knowledge of science declines

As funds for science education, particularly for "science literacy," have decreased, more and more educators have expressed concern that budget cuts would inevitably be reflected in a decline in understanding of scientific matters among the mass of students (SN: 3/15/75, p. 169). Now a national survey indicates that, whatever the causes, just such a decline is taking place.

According to results just issued by the National Assessment of Educational Progress (NAEP), science achievement scores of American school children dropped two percent between the 1969-70 school year and 1972-73. The report concluded that the decline "would appear to correspond to the loss of a half year of learning experience."

Students in three age groups—9, 13 and 17—were asked questions considered appropriate to their education level, many dealing with health and other practical life situations (see box). Almost all areas showed a decline. In 1969, for example, nearly 85 percent of the 13-year-olds knew that malaria was carried by an insect, but in 1972, only 77 percent knew the correct answer.

About the only bright spot in the study was the discovery that rural students of all three age groups are beginning to catch up with students in suburban and city schools, though they remain below the national average. Suburban students still seem to be the best off, but their performance is declining at about the same rate as the national average. Inner city areas showed no improvement in scientific knowledge during the test period, despite enormous expenditures of money

Which of the following diseases is known to be transmitted by an insect?

- Cancer
- Diabetes
- Malaria
- Polio
- I don't know.

Putting sand and salt together makes

- a chemical.
- a compound.
- an element.
- a mixture.
- a solution.
- I don't know.

Sample question for 13-year-olds (top) and 9-year-olds (bottom).

to improve educational conditions there.

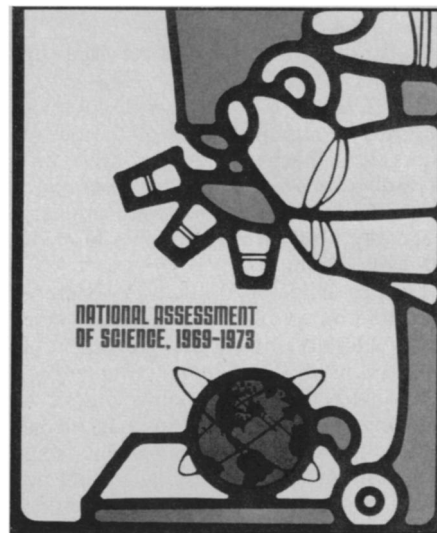
Boys still outperform girls, with the older students showing the greatest difference. The performance of 9-year-old boys was two to three percent above that of girls, and the gap increased to six percent by the end of high school. Black students remained about the same distance behind others during the three-year interval between tests, except for black 13-year-olds, who fell slightly further behind. Students from the Southeastern part of the country still do more poorly than the national average, but the gap narrowed slightly over the three-year period.

The report concludes that the decline in science achievement scores may simply reflect the fact that fewer students are electing to take science courses: "It is possible that achievement levels may be rising among those students enrolled in science curricula." Tests were given to all students, regardless of their formal contact with science, and the results reflect more a failure to prepare the future public to deal with technical matters than a failure to give future scientists a firm grounding in the fundamentals of their subject.

NAEP is conducted by the Education Commission of the States, a Denver-based organization which is conducting similar tests in fields other than science. Project Director J. Stanley Ahmann says the decline in science achievement may only represent a return to levels that prevailed before "unusual emphasis was given to science education in the wake of Sputnik. However, lower scores on several other national tests also suggest a general decline."

Concludes Ahmann: "This is a very poor time for such a decline, because our society is becoming more technological and complex. How can average citizens be expected to keep informed about critical social and environmental issues without a basic knowledge of science?"

Lowell J. Paige, National Science Foundation assistant director for education, says the figures indicating a decline of science achievement among students are probably correct, but that they "overstate the case a bit." The effect of new programs, recently initiated at the high school level to increase student interest in science, for example, would not yet be reflected in these statistics. Also, without knowing what sort of curriculum the students had been exposed to, evaluation of their interest in science would be difficult to make. "It's very difficult to know why student attitudes change toward science," Paige concludes; and despite the gloomy statistics, "students



seem to be going back into science. I'm not at all pessimistic about it."

Richard Trumbull, executive director of the American Institute of Biological Sciences, is concerned about the impact on future citizens. "This is no time for laymen to have less knowledge about a world that is becoming more technical," he says. Students should be taught about science as it applies to their daily lives—"it doesn't have to be a dry subject, just for specialists." □

Astronomy: Too attractive science

"Astronomy is everybody's second science." This oft-quoted phrase is used by Beverly Lynds of Kitt Peak National Observatory as an important reason for the dimensions of the current employment crisis in astronomy. The science is intellectually exciting, popular and attractive. It is relatively simple for persons trained in other branches of physical science to enter astronomy. It is relatively difficult for astronomers (their training tends to be narrow) to go into other branches. Twice as many enter as leave.

The figures are stark—a good deal worse than those for other sciences that are feeling the crunch. Four times as many astronomy Ph.D.'s are being graduated each year as there are positions to fill. In the next five years, it is estimated, 600 new doctors in astronomy will appear. Yet the same estimate gives only 50 to 100 expected openings by retirement and no more than 200 from all causes. There are now about 1,500 practicing astronomers in the United States. In 1970, 623 Ph.D.'s listed themselves as astronomers. The growth has come because of tremendous excitement in the field and because of the space program. But Federal funds for astronomical research, on which astronomy depends drastically,