



Children should learn to appreciate Science, Mathematics and Technology in School. Shouldn't Scientists, Mathematicians and Technologists all help?

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Summary

The nation does not appreciate science, mathematics and technology, all central to the future of the country and the planet. The Natural Science and Engineering Research Council of Canada worries about the supply of professionals in these fields for the next century. We have too few women in science, technology and mathematics. Education in science, mathematics and technology should start in the schools. The nation has many professionals in industry, the universities and government agencies. A national scientific society could lead and co-ordinate a long-term nation-wide program to bring a significant fraction of these professional scientists, mathematicians and technologists into the schools, enhancing educational programs.

The program would complement the efforts of teachers of science, technology, and mathematics, and would have to be integrated with the normal curriculum — emphasizing basic principles. Interaction would have to be intense at the local level, between local science, technology and mathematics groups and institutions on the one hand, and teachers and school boards on the other.

Employers would provide the time. Provinces through schoolboards and schools would provide the travel and lodging expenses.

Successful analogues are the various provincial and national programs of "Writers-

in-the-Schools". Scientists, mathematicians and technologists, better funded to start with, should be able to do at least as well. Scientists, mathematicians and technologists would serve the nation well.

The issue

The world's population as a whole must appreciate science, mathematics and technology so that the planet survives. Our nation's population — including our future leaders — must appreciate science, mathematics and technology so that the nation can earn its way in the world, and so that we contribute to the survival of the planet. One way to generate appreciation of science, technology and mathematics is to reach school children.

The issue is then: how can we reach children in time so that appreciation of science, technology and mathematics is ingrained? Appreciation should start in the schools. But the nation's teachers of science and mathematics can surely not keep up with the rapid developments in science, technology and mathematics, and should be helped.

An approach to a solution

Canada has many practising scientists, mathematicians and technologists in its companies, universities and federal and provincial government agencies. These employers could release a significant fraction of their staff for a day or so a year to visit the schools, and enhance the appreciation of science, mathematics and technology in the young generation.

The impact could be large: Dartmouth and Halifax have many professional scientists, mathematicians and technologists; if only 10 per cent of them devoted one day per year of their employer's time to visiting and one day per year of their own time to preparation, many schools could receive a scientist, mathematician or technologist each year for a morning or afternoon. Indeed, are there not more geologists and geophysicists in Calgary than such a program could accommodate? Could the massive numbers of scientists, mathematicians and technologists in Ottawa and Hull not work wonders for those disciplines in the schools of Ontario and Quebec?

Such a program would need devoted work locally — by local scientific, mathematical and technological societies and chapters of national societies working with school boards, schools and teachers. The visits would have to be co-ordinated with the curriculum, so that teachers saw the program as a genuine aid, not as an unwelcome competitor for scarce time. Basic principles would have to be emphasized. The co-ordination would not necessarily be restricted to the sciences, mathematics and technology; appropriate visits could enhance subjects such as Geography and History — all subjects and issues needing science, mathematics and technology. The program could be used to

promote appreciation and understanding of urgent national and global matters — the environment, global change, energy.

Such a program would benefit from co-ordination provincially and nationally. An organization such as the Royal Society of Canada could act as the national catalyst, working with national and local societies and with provincial departments of education. National leadership could catalyze the formation of provincial cadres of scientists, mathematicians and technologists available to serve in the schools.

An analogue: Writers in the Schools

Writers visit schools through provincial and national programs. The Writers' Union of Nova Scotia works with School Boards and makes it possible for schools to engage writers to visit schools for half or whole days at a time. The Children Books' Centre in Toronto organizes visits by writers all across Canada during National Book Week in November each year (a Nova Scotia children's writer to Burin, Ontario, or to the Northwest Territories, as actual examples).

The costs of these programs are: stipend (\$200 per day); travel; lodging. They are met in several ways (and my details may be wrong): Canada Council (about half the writer's stipend); the province (the other half of the stipend); travel and lodging — the school or school board.

I observe the schools pay *something*, and meet and entertain the visitor, particularly important in the more remote areas: schools must have a stake.

I note too that writers need stipends — they usually have no other employer. This is not normally the case for scientists, mathematicians and technologists, so instead of seeking stipends from Canada Council and School Boards, we should seek them from the employers — by release to take part in this national community service. Special arrangements should be made for consultants, so that their contributions to such a program is not missed.

Costs of "Scientists, Mathematicians and Technologists in the Schools"

The program would be funded by:

The employer contributing the time of the participant for preparation and visiting, and the participant contributing some of his or her spare time for preparation and travelling on weekends; this would be a day or so in total for each of them.

The school boards, provinces and schools paying costs of travel and lodging.

The schools paying contributors an honorarium of say \$25 per morning or afternoon *in addition* to their normal salaries, so that they can at least show their families or friends that the extra work they contributed was recognized in a small way. A government central agency, foundations and school organizations would have to share the costs of consultants, as with writers-in-the-schools.

Costs of running the program nationally

I have not worked this out. One co-ordinator with administrative support and some funds for materials could do a lot on at least a pilot program, I suspect, working with local groups and school boards across the country. Individuals who organize "Writers-in-the-Schools" programs could help with these estimates.

Problems

A dedicated teacher of Physics and Mathematics in Grades 11 and 12 points out to me that time in the classroom is precious, and that he objects to theft of time by visiting firepersons. I have attempted to meet this criticism by insisting that the program be tied to the curriculum, and emphasize basic principles: visits must not be a soft option for lazy students. Students must be encouraged to understand what is important, not be entertained by flashy soap operas.

This same teacher organizes a one-day field "geophysics" program and invites professionals to work with him, but true to his feelings, he organizes the field work on a Saturday, following lessons tied to the normal curriculum in physics and mathematics

but dealing with the essence of the geophysics to come. He points out too that attitudes of high-school students are rather fixed and that we should aim at younger children, still eager to learn and be impressed. Indeed, a national program could start modestly, with Grade Primary or Maternel, and grow with a grade a year, like early French Immersion.

My friend's comments tell us that we should seek the advice of teachers and school boards before embarking on this program in any particular region, moulding it to their local specifications. Should we not be prepared to bring scientists, mathematicians and technologists to the schools on Saturdays?

The long-term promise

If we start now with the lowest grades then with a rolling twelve-year plan we could have the nation's pupils and teachers regarding the program as their inalienable right within a generation of school children! And generations of children saying "thank you" to those who helped. And leaders of society who were scientifically, mathematically and technologically literate.

Who should lead?

Should a national organization such as the Royal Society of Canada not persuade national figures such as David Suzuki and Gordon Penrose ("Dr. Zed" of *Owl* and *Chickadee*), or local figures such as Murray Wickwire in Halifax and Art King in St. John's to lead and get such a program off the ground?

What about the name?

I like "Rent-a-Scientist". It's catchy. But it is rather flippant, some might object, and so another might be better.

Finally

What about summer camps? The Royal Society's Summer Camps in Science, Mathematics and Technology? Children! Meet Your Dinosaur with GAC!

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The Geological Survey of Canada will hold its
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