



## **An Ode to PSSC**

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The PSSC course materials – in their own right – made a significant contribution to the improvement of science education in the USA. In what follows, however, a case will be made to support the assertion that the major contribution of PSSC to science education was as a model for dozens of other curriculum reform projects.

PSSC began its development efforts *before* Sputnik was launched by the Soviet Union in 1957. That is significant! How did the PSSC founders persuade their supporters that a large investment in the improvement of high school physics was justified at that particular time? Acquiring support for curriculum reform projects became much easier *after* Sputnik. The nation was traumatized! “Are we about to lose our leadership in science to our Cold War enemy? We better pull out all the stops to be sure that such a fate does not come to pass.”

Materials development projects proliferated rapidly. At the high school level alone there were – within a decade following Sputnik – a second course in physics, two new courses in chemistry, a biology course with three distinct versions, an earth sciences course, and a course in astronomy. The creativity was not limited to the natural sciences. Materials were developed for courses in mathematics, engineering concepts, anthropology, sociology, and science history.

While the major focus was initially on the high school level, other educational levels were not neglected. This author once served on the staff of an organization funded by the National Science Foundation (NSF) called The Commission on College Physics (CCP). During my two-year stint, the Commission promoted the use of new college physics texts written by scientists at Caltech, UC Berkeley, and MIT. It also stimulated a project centered at RPI that developed a physical science course aimed at prospective elementary school teachers. CCP also made efforts to initiate a second physics major track – the S Curriculum, where S stood for synthesis – designed to provide a solid science background for our leaders in non-research professions such as medicine, law, and politics.

Physics was not the only discipline to benefit from federal support for efforts to improve college courses in science, math, and engineering. CCP had its counterparts in chemistry, biology, earth science, math, and engineering.

Pre-college levels also received attention. Some of the same creative people who contributed to PSSC developed an Introductory Physical Science course (IPS) for use at the junior high school level. Eventually two distinct efforts – both funded by NSF – were made to reform the way science is taught at the middle school level.

Now how does a reform-minded group decide how to proceed once it has acquired funding? They look to see what other groups faced with a similar task have done. And there was the output of PSSC to serve as a model! It is worthwhile to examine in some detail why it was a very effective model.



Most important, PSSC did what is essential to any quality curriculum reform project: It assembled a team of competent scientists who were willing to sacrifice their professional output for a few years in order to contribute to what they saw as a higher cause. Prior to PSSC, most high school science texts were written by people who had no deep education in or knowledge of science. Imagine what this change alone contributed to the accuracy and relevance of the PSSC materials!

A second feature that made the PSSC course different from most of its predecessors was its cohesiveness. A story line was created that spun together mechanics, electricity, optics, thermal physics, and modern physics into a seamless whole. Never before had it been so clearly exhibited that all topics in physics are linked through a small number of governing principles such as the Conservation of Energy.

Another aspect of how PSSC served as a great model for other projects was the scope of the materials that were produced. There was, of course, a textbook. Even more important, the PSSC leaders understood that the laboratory is where students begin to understand and appreciate the methods of science – not only how to make accurate measurements, but to recognize that the results of those measurements determine whether speculations about the way the natural world works are true or false. So lab manuals were key.

By no means did it end there. The PSSC leaders arranged for the production of many films. The quality of these films permitted a major leap forward for physics teachers. As a college physics professor, I used PSSC films often, preferring them to any other audio-visual materials then available. In my view, the use of PSSC films was the only way to help my students learn physics that was as effective as my lectures. Finally, the PSSC fathers stimulated the production of dozens of short, paperback books on science topics such as *The Restless Atom* and *Watching for the Wind*. This collection of books, known as the Science Study Series became – for many young students – more fun to read than science fiction or comic books.

One other characteristic of the way PSSC did business was worthy of emulation. Summer institutes were organized – supported by NSF – for the express purpose of helping high school teachers of physics to become familiar with the thinking behind the PSSC course and the panoply of materials available for its implementation. Once again, it was crucial to the success of this program that competent physicists agree to direct these summer programs. I have first-hand knowledge of their effectiveness. A personal friend, who was then a high school physics teacher but went on to become a national leader in science education, attended a PSSC institute and became a strong supporter of PSSC.

Where would science education in the USA be if PSSC had never existed? Perhaps our scientists – stimulated by Sputnik – would still have devoted themselves to the improvement of science education in the schools. But without the trailblazing efforts of the PSSC visionaries, the process would have taken much longer and gone down many more blind alleys.