In response to rising concern about science illiteracy in the United States, OSA and SPIE have launched a new program, “Hands-On Optics,” which targets middle school students. It is designed to inspire an interest in technology by bringing optics-related activities into after-school and other extracurricular science programs.

“Hands-On Optics,” or HOO, is made possible through a $1.7 million National Science Foundation (NSF) Informal Science Education grant. The program includes two other key partners: the National Optical Astronomy Observatory (NOAO), which is developing the materials, and the Math Engineering Science Achievement (MESA) program, which works in schools in several states to improve the quality of science education.

HOO was officially launched in July, when a group of teachers from California and Washington and volunteer optics professionals received an intensive lesson in how to instruct students using HOO materials and training kits. Teachers from those states are the first to test the materials because of strong MESA programs there.

“The visual nature of optics-based classroom activities—integrating images, colors and technology—provides an exciting hook into science, engineering and mathematics,” said SPIE Executive Director Eugene Arthurs, who is a co-principal investigator for the HOO project. “The hope is that HOO will provide similar experiences and spark future scientists, but we recognize that much more in-depth research is required to relate the impact of middle school programs to future career choices.”

The principal investigator on the project is Anthony Johnson, who served as OSA president in 2002. Johnson said a key goal of HOO is to reach communities which traditionally have been underrepresented in the sciences. The MESA program is helping HOO reach such students in that it already has an established science education program in disadvantaged school districts across the nation.

HOO’s origins go back to 2001, when OSA and SPIE held a series of workshops with optics professionals and educators. The workshops were designed to explore the quality of science education in the United States and identify best practices for teaching optics. As a result of the workshops, the two organizations designed their program for students in middle school. The groups agreed that targeting kids before high school is critical, Johnson said.

Stephen M. Pompea, also a co-principal investigator of HOO and manager of science education at NOAO, said he believes that “optics is certainly one of the most powerful ways to interest kids in science—it hone(s) their observational skills, is aesthetically powerful and gratifying, and stimulates their curiosity. It hooks them. It doesn’t hurt that kids will also learn that optical engineering is a key to many of their favorite gadgets.”

At the University of Southern California in July, NOAO officials trained Teachers and optics professionals gathered in California in July to learn about the new optics education program aimed at middle schoolers.
nearly 40 teachers and optics professionals in how to use three new HOO programs and kits: “Laser Challenges,” “Kaleidoscope Adventures” and “Magnificent Magnifications.” Richard Farnsworth, manager of the Science and Technology Education Program at the Lawrence Livermore National Laboratory (LLNL), attended the training session. He said he plans to train LLNL volunteers to use the materials so they can offer workshops at schools throughout the Bay area and the San Joaquin Valley.

Johnson also attended the California training session. “What impressed me most was the rapport between the teachers and the optics professionals,” he said. “The exchange between these two groups was clearly two-way—the teachers were quite comfortable learning optics basics from the optics professionals and the optics professionals genuinely wanted to learn how to teach at the middle school level. The teachers were not shy about what they did not understand and the optics professionals were indeed ‘professional’ in their desire to translate their knowledge at the appropriate level without being condescending. It was a remarkable workshop.”

This fall, organizers are presenting the new program to hands-on science museums and technology centers at the Association of Science Technology Centers’ annual meeting in San Jose. HOO is expected to grow and eventually be incorporated into science programs across the nation.

Jason Briggs is OSA’s education program manager. Stephen M. Pompea, manager of science education at NOAO, contributed to this article, which is based on work supported by NSF under grant number ESI-0307949.

For more information about “Hands-On Optics” or to volunteer as an instructor, visit the Web site, www.Hands-On-Optics.org, or write Jason Briggs of the OSA Membership Department at hands-on-optics@osa.org.