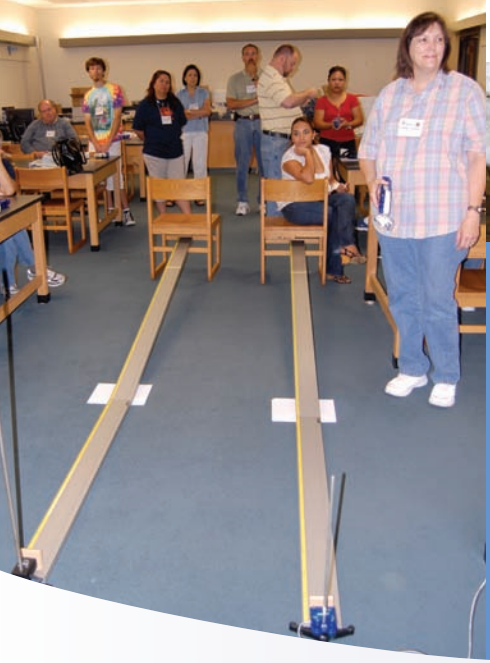
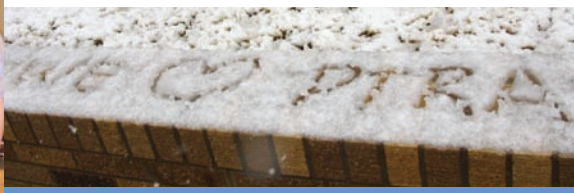
PTRA

Professional Development for Teachers
in Physics & Physical Science

Customized Workshops led by AAPT Physics Teaching Resource Agents

AAPT American Association of Physics Teachers



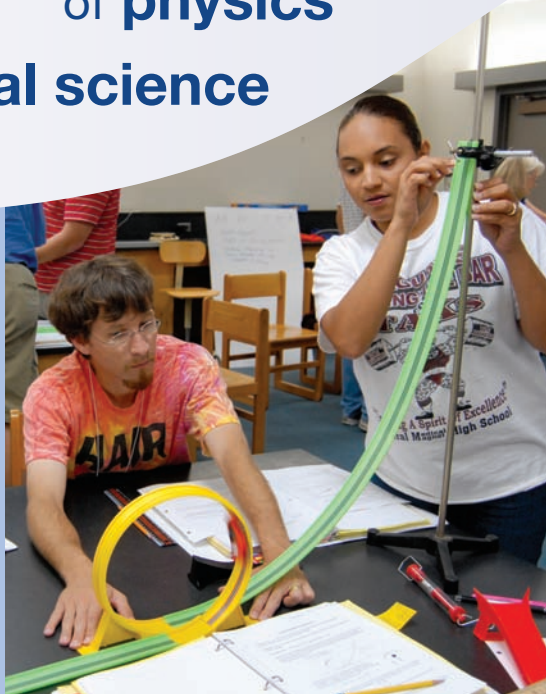


Students deserve

outstanding teachers

of **physics**

and **physical science**



Our future will be built on the knowledge and skills of informed professionals and citizens who have an understanding of the sciences.

As science evolves, so too does physics teaching. Education in physical science or physics for students and teachers at all stages becomes essential—particularly at the middle and high school levels.

Among the 22,000 middle and high school teachers who teach physics and physical science in the United States, the majority have not had the opportunity to engage in comprehensive studies of the subject they teach. Pre-college physics and physical science teachers must have advanced competency in their content area, and must be highly creative and effective in their teaching.

This is where the AAPT Physics Teaching Resource Agents (PTRA) program is most effective. PTRA is a professional development model that helps all teachers become outstanding teachers. Our customized workshops in physics and physical science provide the right approach by building on decades of experience and tapping into a large network of master teachers who are continually engaged in physics studies.

We invite you to join our professional development institutes to refine your physics knowledge and hone your teaching skills. Regardless of your experience and mastery, you will grow. If you are a principal, science supervisor, school executive, or contributor, we invite you to support and engage your teachers in our institutes.

The **benefits** to you will be **noticeable** and **long lasting**.

The **benefits** to the students, **countless**.

AAPT/PTRA BACKGROUND

The American Association of Physics Teachers (AAPT) initiated the Physics Teaching Resource Agents (PTRA) Program in 1985—with support from the National Science Foundation (NSF) and the American Physical Society (APS)—with the mission of improving the teaching and learning of physics and physical science for all teachers and students in the United States.

AAPT/PTRA is the leading in-service physics professional development program. It is effective for middle school and high school teachers. It provides professional development on physics content, teaching techniques based on research in physics education, and integration of technology into curriculum.

The program maintains a nationwide cadre of more than 150 accomplished high school teacher-leaders who are trained and continually involved in professional development. These teacher-leaders are certified as PTRAs by AAPT to lead workshops throughout the country.

These 150 experienced PTRAs have participated in national leadership institutes where they have developed their skills on a wide range of topics—to assist their fellow teachers. The program has involved more than 30 universities and college physics departments partnering to provide the summer institutes and follow-up sessions.

INTERESTING CURRICULA AND TOPICS

Applied curricula that parallel common teaching subjects.

The AAPT/PTRA teacher institutes provide knowledge and pedagogical strategies for effective physical science and physics teaching. The institutes provide teachers with techniques for engaging their students, such as modeling, inquiry, instructional cooperative learning, the use of toys, and the latest technology. The latest, widely tested models for teaching and engaging students are used. Effective physics teaching requires knowledge of student initial concepts and how students process and learn new content.

Because our future depends on teache

TAILORED WORKSHOPS

Flexible. Customized. From lecturing to engaged learning.

One-day professional development workshops lend themselves to stand-alone topics such as graphical analysis and microcomputer-based laboratories. The workshops conducted as part of the AAPT/PTRA program cover physics topics such as kinematics, dynamics, momentum, energy, electricity, magnetism, waves, optics, and sound that are included in state and national standards.

INVOLVED LEARNING

Hands-on. Learning by doing.

Teachers who attend the institutes engage in continuous learning. In their teaching, they focus on pedagogy and the larger picture rather than minute teaching details. Evaluation of the program indicated teachers were more confident in what they taught and were more willing to implement new strategies and inquiry based techniques in their classroom practice. The training has a positive impact on professional growth and teachers feel comfortable incorporating more technology into their instruction.

INFUSED TECHNOLOGY AND LATEST TECHNIQUES

Applied computer data acquisition and analysis.

Advanced technology provides useful tools to assist teachers. Several companies have developed a large number of probes, data-acquisition devices, and software that can be used with computers to collect and analyze data in the laboratory. Other companies have developed calculators that interface with these devices and provide portable platforms for data-gathering and analysis. PTRAs integrate these tools as appropriate into the teacher institutes.

Not all schools have access to advanced technology, so alternative low-cost means of data collection are introduced. In addition, many simulations that can be used interactively with students have been developed and are available on the web. The institute leaders introduce teachers to these simulations.

NATIONWIDE PRESENCE

Offered anywhere, with partnering sites around the nation.

AAPT/PTRA programs have covered many regions of the country. This includes five-year programs for urban school districts ranging from New York to San Francisco. The PTRA program offers professional development workshops on physics education topics for groups of schools and school districts on a fee-for-service basis. For example, workshops have been conducted in Philadelphia and for school districts in New Jersey. These are typically one-day workshops on focused topics. The AAPT/PTRA program regularly presents one-day workshops at regional and national NSTA conferences, Teacher Days at APS meetings, and at AAPT section meetings.

IN-DEPTH, EFFECTIVE PROFESSIONAL DEVELOPMENT

Extensive effects outlasting actual workshops.

Research has shown that teachers need a minimum of 80 hours of professional development to integrate new approaches and activities into classrooms. The workshops led by our PTRAs provide each participant with valuable professional development.

Teachers stay connected through listservs, and depend on a suite of special teaching resource guides, authored by PTRAs. Additional online resources are available through the Physics Front of comPADRE.org (Communities for Physics and Astronomy Digital Resources in Education), a part of the National Science Digital Library (NSDL)—a network of well-organized, digital collections of high-quality educational materials in physics and astronomy. These collections connect to a wide range of digital resources, including curricular materials, and online journals.

"I think that it has been one of the best things that I have ever been involved with… I know my students see the effects…"

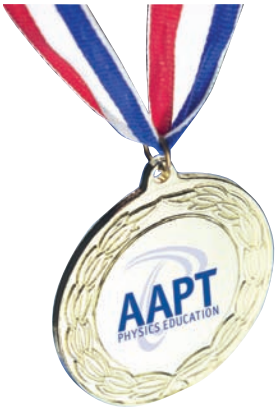
*"Focus has shifted from **quantity** to **quality**."*

*"I use the **computer** much more in my classroom."*

AWARD-WINNING INSTITUTE LEADERS

Caring. Knowledgeable. Accommodating.

Potential national PTRAs are selected based on physics content mastery, creativity, successful teaching experience, familiarity with physics education research, and the capacity for professional leadership. Before PTRAs can teach a workshop they must be certified by attending a summer national leadership institute. More than 100 of the PTRA High School teachers have been recognized by their states, their peers, and from national organizations because of their outstanding teaching and ability to motivate their students.



NOTABLE AWARDS RECEIVED BY PTRAs

- Presidential Award for Secondary Science
- AAPT Excellence in Pre-College Teaching Award
- State's Teacher of the Year
- Tandy Scholar Award
- *USA TODAY* All-American Teaching Team
- Einstein Distinguished Education Fellowship
- AAPT Distinguished Service Citation
- Woodrow Wilson Fellowship Program
- APS Outstanding High School Physics Teachers

AAPT/PTRA IN ACTION

- The AAPT/PTRA program has been active for over 25 years.
- Thousands of teachers have benefited from our workshops and institutes.
- More than 500 PTRAs have attended one or more national summer leadership institutes.
- Approximately 150 active PTRAs have attended a summer institute in the past three years.
- More than 60 topics and modules exist for PTRA certification.
- More than 1,900 workshops have been offered to date.
- More than 3,000 yearly workshop hours are invested by teachers who attend the annual Summer National Leadership Institutes.
- More than 73,500 hours have been invested by teachers who have attended the PTRA Rural program.
- 35 universities, four-year colleges and two-year colleges are currently involved as partners.
- PTRAs work with colleges and universities to develop proposals for foundations and state grants.

*"PTRA has **changed** how I look at **student involvement** in my classroom."*

"I have added more technology to the program such as probes for force, motion detectors, and dynamics tracks."

"It is now a student-centered classroom, not teacher-centered."

Because it **matters,** our program goals are **ambitious.**

To provide all physics teachers the opportunity to continue growing professionally and become not just competent, but creative and effective in their teaching.

To identify outstanding leader-teachers, tap them as PTRAs, and engage them in the annual Summer National Leadership Institutes.

To develop print and electronic resources and modules designed to serve not only as workshop resources but also as long-term references for practicing teachers.

To be recognized as a leading provider of accessible, high-quality in-service programs in physics and physical science for pre-college teachers at all levels and for all academic backgrounds.

We invite you to participate in our professional development institutes. If you consider yourself, or a teacher you know, a potential PTRA leader, we invite you to become or nominate a teacher to become a PTRA.

Contact AAPT for the name of your local PTRA leader(s), or for more information about the program, workshop costs, CEUs, etc.

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