Outreach and hands-on activities

Science Outreach Catalyst Kits

- Organizers: Society of Physics Students
- Purpose: Contains exploratory physics and science activities that are specifically designed to use in outreach presentations to elementary, middle, and high school students. The website also contains a list of outreach demonstration guides.
- Website: https://students.aip.org/chapter-resources/outreach

Materials Science Classroom Kits

- Organizers: Ceramic and Glass Industry Foundation
- Purpose: Features nine lessons for K–12 students that comply with Next Generation Science Standards. The lessons introduce students to all the basic classes of materials: ceramics, composites, metals, and polymers.
- Website: https://foundation.ceramics.org/teacher-resources/science-kits/materials-science-classroom-kit

Competitions

FIRST Robotics Competition

- Organizers: FIRST (global nonprofit)
- Purpose: Starting with a Kit of Parts, teams of high school students design, program, and build industrial-sized robots to compete in an action-packed game each January.
- Website: https://www.firstinspires.org/robotics/frc

FIRST Tech Challenge

- Organizers: FIRST (global nonprofit)
- Purpose: Students work together with their mentors to design and build robots to compete in a dynamic and exciting challenge each September.
- Website: https://www.firstinspires.org/robotics/ftc

AAPT High School Physics Photo Contest

- Organizers: American Association of Physics Teachers
- Purpose: Provides students an opportunity to explore natural and contrived phenomena by creating visual illustrations and written analysis of various physical concepts.
- Website: https://www.aapt.org/Programs/PhotoContest/index.cfm

AAPT PhysicsBowl

- Organizers: American Association of Physics Teachers
- Purpose: International high school competition each spring (March or April). School teams compete regionally with other school teams. Students will take a 40-question, 45-minute timed, multiple-choice test under their school's supervision.
- Website: https://www.aapt.org/Programs/PhysicsBowl/index.cfm

International Physics Olympiad Competition*

- Organizers: Host country's Ministry of Education or similar institution, in collaboration with the International Board.
- Purpose: Test the highest level of knowledge, critical thinking, problem solving, proper practices of presentation and analysis, and hands-on skills in theoretical and experimental physics among secondary school students.
- Website: https://ipho-unofficial.org

*Each year, the American Association of Physics Teachers and the American Institute of Physics sponsor a competition for high school students to represent the United States at the International Physics Olympiad Competition: https://aapt.org/physicsteam/PT-landing.cfm.

Regeneron Science Talent Search

- Organizers: Society for Science
- Purpose: Science and mathematics competition for high school seniors that requires them to conduct independent science, math, or engineering research. The first place prize is $250,000—the largest scientific prize available to a high school student in the United States—with prizes awarded at all stages of the competition.
- Website: https://www.societyforscience.org/regeneron-sts

Mentoring

Adopt-a-Physicist

- Organizers: Led by Sigma Pi Sigma with aid from the American Association of Physics Teachers.
- Purpose: Connects classes with the physicists of their choice through online discussion forums that are active for a set three-week period.
- Website: https://www.adoptaphysicist.org/webdocs/about.cfm

Physicists To-Go

- Organizers: APS
- Purpose: Bring a physicists to classrooms virtually to discuss career path and/or content to groups of students
- Website: https://www.aps.org/initiatives/physics-education/k-12/physicists-to-go

Grant opportunities

CGIF Project Grants

- Organizers: Ceramic and Glass Industry Foundation
- Purpose: Provides funding to support projects that expand materials science education in local communities.*

- Website: https://foundation.ceramics.org/grants/project-grants

*PULSE Chapters could design materials experiments with a physics focus to align with their learning goals.

Book recommendations*

*Some clubs may prefer to have a book-club element to their activities. Books written by science communicators can help make esoteric physics topics more accessible to high school students.

Einstein and the Quantum: The Quest of the Valiant Swabian
- Author: A. Douglas Stone
- Summary: The untold story of Albert Einstein's role as the father of quantum theory.
- Link: https://press.princeton.edu/books/paperback/9780691168562/einstein-and-the-quantum

Zero: The Biography of a Dangerous Idea
- Author: Charles Seife
- Summary: Follows this innocent-looking number from its birth as an Eastern philosophical concept to its struggle for acceptance in Europe, its rise and transcendence in the West, and its ever-present threat to modern physics.
- Link: https://www.penguinrandomhouse.com/books/332273/zero-by-charles-seife

The Feynman Lectures on Physics
- Author: Robert Leighton (Volume I) and Matthew Sands (Volumes II & III)
- Summary: Edited versions of Feynman's lectures created by his coauthors.
- Link: https://www.feynmanlectures.caltech.edu