



EXPLORE CHANGING IDEAS ABOUT OUR UNIVERSE IN YOUR CLASSROOMS

Perimeter Institute for Theoretical Physics is an independent, non-profit, research institute whose mission is to make breakthroughs in our understanding of our universe and the forces that govern it. Such breakthroughs drive advances across the sciences and the development of transformative new technologies. Located in Waterloo, Canada, Perimeter also provides a wide array of research, training, and educational outreach activities to nurture scientific talent and share the importance of discovery and innovation with students, teachers, and the general public.



01 Perimeter Explorations
The Mystery of Dark Matter
Teacher's Kit



What is dark matter? Recently, physicists have discovered that this mysterious, unseen material accounts for about 90% of mass in the universe. This grade 11 and 12 classroom kit provides teachers with print and digital resources to support hands-on student exploration of concepts related to gravity and orbital motion, gravitational lensing, measuring mass of galaxies, and theories of dark matter.

The hard-case classroom kit includes a 48-page Teacher's Guide, a Teacher's Support CD (including a PDF version of the guide and modifiable versions of student activities), and a 30-minute video in DVD or digital (mp4) format.

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| 978-09917521-3-3 | The Mystery of Dark Matter Teacher's Kit (Includes Teacher's Guide and CD, and Video DVD) |
| 978-09917521-2-6 | The Mystery of Dark Matter Video DVD |
| 978-09917521-4-0 | The Mystery of Dark Matter Digital Video (mp4) |

02 Perimeter Explorations
The Challenge of Quantum Reality
Teacher's Kit



Quantum physics is considered by many to be the single most important advance in our understanding of the universe. This grade 11 and 12 classroom kit provide teachers with print and digital resources to support student exploration of concepts related to the double-slit experiment, the wave-particle duality, the nature of electrons , and interpretations and applications of quantum physics.

The hard-case, classroom kit includes a 48-page Teacher's Guide, a Teacher's Support CD including a PDF version of the guide and modifiable versions of student activities, and a 30-minute video in DVD or digital (mp4) format.

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| 978-09917521-8-8 | Challenge of Quantum Reality Teacher's Kit (Includes Teacher's Guide and CD, and Video DVD) |
| 978-09917521-7-1 | Challenge of Quantum Reality Video DVD |
| 978-09917521-9-5 | Challenge of Quantum Reality Digital Video (mp4) |

03 Perimeter Explorations
Beyond the Atom: Remodelling Particle
Physics Teacher's Kit



What is everything made of? Help your students learn more about the details of scientific advances in our understanding of the building blocks that make up everything in the cosmos. This grade 11 and 12 classroom kit provide teachers with print and digital resources to support student exploration of concepts including hands-on activities related to Rutherford's scattering experiments, bubble chamber investigations, "The Particle Zoo", and very recent learning from CERN and the Large Hadron Collider.

The hard-case, classroom kit includes a 44-page Teacher's Guide, a Teacher's Support CD including a PDF version of the guide and modifiable versions of student activities, and a 30-minute video in DVD or digital (mp4) format.

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| 978-1-927633-03-8 | Beyond the Atom: Remodelling Particle Physics Teacher's Kit (Includes Teacher's Guide and CD, and Video DVD) |
| 978-1-927633-02-1 | Beyond the Atom: Remodelling Particle Physics Video DVD |
| 978-1-927633-04-5 | Beyond the Atom: Remodelling Particle Physics Digital Video (mp4) |

01 Perimeter Inspirations
Everyday Einstien: GPS & Special
Relativity Teacher's Kit



The Global Positioning System (GPS) is a navigational tool that can pinpoint your location to within a few metres. GPS is an everyday technology that incorporates a number of effects from Einstein's theories of general and special relativity. This grade 9 to 12 classroom kit provides teachers with print and digital resources to inspire students' understanding through hands-on GPS activities and simulations with connections to relativity.

The hard-case, classroom kit includes a 20-page Teacher's Guide, a Teacher's Support CD including a PDF version of the guide and modifiable versions of student activities, and a 7-minute video in DVD or digital (mp4) format.

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| 978-1-927633-08-3 | Everyday Einstein: GPS & Relativity Teacher's KIT (Includes Teacher's Guide and CD, and Video DVD) |
| 978-1-927633-07-6 | Everyday Einstein: GPS & Relativity Video DVD |
| 978-1-927633-09-0 | Everyday Einstein: GPS & Relativity Digital Video (mp4) |

02 Perimeter Inspirations
Process of Science Teacher's Kit



How do scientists think? Students will think like scientists as they collaborate together and communicate in creative ways to answer curiosity-driven questions. This grade 7 to 12 classroom kit provides teachers with print and digital resources to inspire students to explore the habits of mind that scientists practice through hands-on activities that encourage them to be curious, creative, and collaborative.

The hard-case, classroom kit includes a 44-page Teacher's Guide, "Why is it like that? Photo Cards, and a Teacher's Support CD including a PDF version of the guide and modifiable versions of student activities. This kit also includes the *Alice & Bob in Wonderland* animations, *MinutePhysics* video segments and the *Scientifically Speaking* rap audio file in DVD format.

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| 978-1-927633-13-7 | Process of Science Teacher's KIT (Includes Teacher's Guide and CD, Photo Cards, and Video DVD) |
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03 Perimeter Inspirations
Revolutions in Science Teacher's Kit



Inspire students to look at the BIG IDEAS of science with the *Alice & Bob in Wonderland* animations as they ask simple questions about our world that lead to profound revolutions in science. This grade 9 to 12 classroom kit provides teachers with print and digital resources to inspire students' understanding of general relativity, quantum mechanics, and special relativity in a fun and informative way.

The hard-case, classroom kit includes a 44-page Teacher's Guide, a Teacher's Support CD including a PDF version of the guide and modifiable versions of student activities, and a DVD with 3 *Alice & Bob in Wonderland* animations: *What keeps us stuck to earth?*, *How can atoms exist?*, and *Where does energy come from?*.

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| 978-1-927633-17-5 | Revolutions in Science Teacher's KIT (Includes Teacher's Guide and CD, and Video DVD) |
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01 Perimeter Investigations
Measuring Planck's Constant Lab Kit

Planck's constant lies at the heart of quantum physics. This lab kit presents a laboratory activity in which grades 11 and 12 students measure Planck's constant using a simple electronic circuit. The lab teacher's guide is packaged with all materials required to carry out the lab in the classroom.

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| 978-1-927633-20-5 | Measuring Planck's Constant Lab Kit (Includes Labe Guide and Materials Pack) |
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CUSTOMIZED TEACHER PROFESSIONAL DEVELOPMENT WORKSHOPS

Work alongside leading Physicists from Perimeter Institute's Educational Outreach Team in high school teacher professional development programs customized to your state standards.

Our 1 to 3 day modern physics teacher workshops focus on concepts and instructional approaches that make modern physics concepts accessible, interesting and practical for 9th to 12th grade teachers and students. Perimeter Teacher Workshops focus on topics including:

- Classroom Activities for Dark Matter
- Hands-On Wave-Particle Duality
- Practical Particle Physics
- Everyday Einstein – The Global Positioning System (GPS)
- Process of Science
- Revolutions in Science

To book customized teacher workshops in your school district, contact:

Greg Dick, Director of Educational Outreach

gdick@perimeterinstitute.ca

INTERNATIONAL SUMMER SCHOOL FOR YOUNG PHYSICISTS (ISSYP) AT PERIMETER INSTITUTE JULY 2014

North American and international senior high school students are welcome to apply to have the opportunity to explore fascinating ideas in theoretical physics during this challenging two-week program on-location at Perimeter Institute in Waterloo, Canada each July. Students from around the world are selected to participate in this exclusive program exploring the weird quantum world of atoms and subatomic particles, black holes, warped spacetime and the expanding universe.

The ISSYP includes:

- Presentations and small group mentoring sessions by Perimeter Institute researchers on cutting edge theoretical physics: hot topics such as superstring theory, quantum computing and dark matter
- Mini-courses on modern physics designed to deepen their insights into Einstein's ideas and the quantum nature of our universe
- Hands-on labs, tours of neighbouring research facilities, and other exciting activities with like-minded students from around the globe

To learn more about ISSYP 2014, please visit our website at www.issyp.ca.

Order resources at
www.perimeterinstitute.ca/store



or contact us at
onlineorders@perimeterinstitute.ca

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EINSTEINPLUS INTERNATIONAL WORKSHOP FOR TEACHERS ON MODERN PHYSICS AT PERIMETER INSTITUTE JULY 2014

North American and international teachers are welcome to apply learn how to incorporate innovative teaching strategies with classroom tested materials during this one-week, intensive, workshop, on location at Perimeter Institute in Waterloo, Canada each July. All content has strong connections to high school curriculum. Teachers also get exposure to the latest developments in theoretical physics from researchers who are leaders in their fields.

Sessions include:

- Innovative teaching strategies suitable for all areas of physics
- Quantum Physics Wave-particle duality and the electron double-slit experiment
- GPS and Relativity
- Dark Matter as an application of uniform circular motion
- Measuring Planck's Constant using simple electronic circuit

To learn more about EinsteinPlus 2014, please visit our website at www.einsteinplus.ca.