

Physics for the Next Generation: The Patterns Approach

This course is designed to enable educators to use an innovative approach to teaching physics that integrates storylines, project-based learning, modeling, and spreadsheet coding to engage students in the three dimensions of the Next Generation Science Standards (NGSS). The essential question that drives the approach is: “How do we find and use patterns in nature to predict the future, make data-informed decisions in the present, and understand the past?”

The approach focuses on facilitating students to use the big ideas of science to explain phenomena and solve problems. Participants, working through the design principles and curricular examples, will be prepared to guide their own students in taking on:

1. The role of scientists in order to construct and make meaning of the big ideas of science and
2. The role of engineers in order to use the big ideas of science to design data-informed solutions to real-world problems.

The course is composed of a week-long virtual workshop in June and two shorter, virtual follow up meetings in the fall.

DATES: June 21–25, 2021, plus two follow up meetings in the fall (TBD)

TIME: 11:00 a.m. to 5:00 p.m. EDT (with a one-hour break for lunch)

LOCATION: Zoom

PRICE: \$500

Courses are subject to cancellation if minimum enrollment is not met.

Course Highlights

- Learn how to use the design principles to incorporate real-world problems and storylines into physics courses
- Become familiar with strategies for guiding students in identifying and sense making of the common mathematical and graphical patterns in nature
- Analyze and integrate the Patterns Approach with the performance expectations of the NGSS
- Engage in a classroom project on bungee jumping that teaches concepts of energy and spreadsheet coding
- Guide students in analyzing data and constructing meaning through student talk
- Explore a classroom project on encoding, sending, and decoding digital information that engages students with the big ideas of waves to design a solution
- Use differentiated supports to help all students argue from evidence, including writing claim-evidence-reasoning style arguments (CERs)

VIRTUAL COURSE



The way mathematics is woven into the curriculum actually makes physics concepts more accessible, especially for students who have previously struggled with math. The training itself was enjoyable because the curriculum is fun, and I believe [the] Patterns [Approach to] physics will be accessible, enjoyable, and educational for my students.”

- Jesse Braxton, Physical Science Teacher
The Workshop School, Philadelphia, PA

Financial support may be available; visit www.knowlesteachers.org/knowles-academy to learn more. Optional graduate course credit is available; additional fees apply. Course is subject to cancellation if minimum enrollment is not met.

To register for this course or to learn more, visit www.knowlesteachers.org/knowles-academy.



The Knowles Academy offers state-of-the-art professional development experiences for teachers. All Academy courses are designed and facilitated by experienced teachers who understand the complexities of teaching in today's world. All courses include one semester or year of mentoring to assist teachers as they work to successfully implement what they've learned in their own classrooms. Participation in the Knowles Academy also gives teachers access to a national network of educators who share resources and ideas, and support each other to continually improve their teaching practice.

Key Knowles Academy Features



Teachers Supporting Teachers

Teachers learn best from other teachers. All professional development that we provide includes experienced teachers as facilitators and coaches.



Professional Community Development

Teaching can be isolating. All of our professional development services are designed to build teacher community so that participants can continue to support each other's learning and professional growth long after the professional development experience ends.



Long-term Support for Sustainable Change

Effective teacher professional development must be sustained and tied to classroom practice. All Knowles Academy courses include long-term support from coaches, opportunities for teachers to ground their learning in their current practice, and engage with other Knowles Academy participants over an extended period.



Professional Expertise & Leadership

Designing and implementing effective professional development requires a diverse range of expertise and experience. All of our professional development services draw and build on the expertise developed within the Knowles community over the last 20 years.

ABOUT KNOWLES

The Knowles Teacher Initiative supports the efforts of high school mathematics and science teachers to improve education in their classrooms and beyond. Visit www.knowlesteachers.org to learn more.

All Knowles Academy courses can be customized to meet the specific needs of schools and districts.
www.knowlesteachers.org/knowles-academy