

Designing Instructional Tasks to Increase Student Engagement and Learning in Science



Transforming Mathematics & Science Education

Through this Knowles Academy course, science teachers will work in small, collaborative groups as they learn to increase the cognitive demand of the tasks in their lessons and provide more opportunities for students to talk about science—tactics that lead to an increase in student engagement.

This sustained professional development course is designed to support teachers who aim to provide their students with a connected and conceptual understanding of science content. Through an introductory three-day, in-person workshop; a one-day, concluding in-person workshop; and ongoing coaching, this program will help science teachers provide increased opportunities for students to learn by supporting their use of high cognitive demand tasks and productive talk in their classrooms. Teachers will become more closely acquainted with the disciplinary practices described by the Next Generation Science Standards, as well as the *5 Practices for Orchestrating Task-Based Discussions in Science*. Using these resources as a framework, teachers will learn to engage students in authentic science in ways that are aligned with the changing landscape of education in the U.S.

Date: July 16–18, 2019; Early Fall 2019*

Time: 8:30 a.m.–4:00 p.m.

Location: Moorestown, NJ

Price: \$800 value

Optional Graduate Course Credit Available - Additional Fees Apply



Course Objectives:

- Identify the cognitive demands of tasks and consider how the tasks influence students' opportunities to learn
- Outline the content of an upcoming unit and consider how the tasks in their textbook/curriculum support students' opportunities to learn
- Explore the *5 Practices For Orchestrating Productive Task-Based Discussions in Science* framework
- Plan lessons using a cognitively demanding task and the 5P framework
- Gain experience considering the alignment of the scientific learning goal and the task, and other enactment factors, by providing feedback on other teachers' lessons
- Analyze data from lessons, including other participants' lessons and their own, to reflect on the students' opportunities to learn science
- Develop strategies to analyze and support the scientific talk in their classroom

"Following my Knowles training on task design, I have kept the spirit of high cognitive demand in my tasks. I now have a better perspective on what makes a task cognitively demanding, and what kinds of scaffolds I need to get my students there."

Emily Berman
Chemistry and Environmental Science
Teacher, Blackstone Academy Charter
School, Pawtucket, RI



For Teachers, By Teachers

The Knowles Academy offers professional development services that are designed and facilitated by experienced teachers.

- 01 Teachers supporting teachers:** Teachers learn best from other teachers. All professional development that we provide includes experienced teachers as instructors and coaches.
- 02 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.
- 03 Long-term support for sustainable change:** Effective teacher professional development must be sustained and tied to classroom practice. All Knowles Academy programs include long term support from coaches, opportunities for teachers to ground their learning in current practice, and engage with other Knowles Academy participants over an extended period.
- 04 Professional expertise and 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 17 years.

The Knowles Teacher Initiative supports the efforts of high school mathematics and science teachers to improve education in their classrooms and beyond. We are committed to supporting a national network of mathematics and science teachers in developing as leaders and collaborators, facilitating exploration and innovation and ultimately improving mathematics and science education in the U.S. Visit www.knowlesteachers.org to learn more.

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Agenda:

Teachers will receive ongoing coaching that is initiated by a three-day, in-person workshop and concluded by a one-day, in-person workshop.

Day 1: Tasks in the curriculum:

Exploring cognitive demand

- Engage in scientific tasks as learners
- Explore the cognitive demands of scientific tasks
- Modify tasks to increase cognitive demand
- Analyze current unit for cognitive demand

Day 2: Tasks in our lesson plans:

Supporting opportunities to learn

- Revisit cognitive demands of tasks
- Explore and understand the 5 *Practices for Orchestrating Productive Scientific Discussions*

Day 3: Tasks in our lesson plans:

Supporting our students' opportunities

- Establish conditions for critical friendship
- Plan a lesson using the 5 Practices
- Organize and plan for collecting and analyzing data from that lesson

Between Workshops:

- Teach the lesson planned on Day 3
- Analyze data and reflect on the lesson with other participants

Day 4: Tasks in enactment: Supporting student discourse

- Explore productive talk in classrooms frameworks
- Examine cases of productive talk in classrooms
- Reflect on the talk that happens in your own classroom

* Dates are subject to change; course is subject to cancellation if minimum enrollment is not met

All Knowles Academy courses can be customized to meet the specific needs of schools and districts. To register for this course or to learn more, visit www.knowlesteachers.org/knowles-academy.