

Knowles Academy

At Knowles Academy, we offer high-quality professional development experiences for teachers across the country, with a commitment to making them accessible to all. Knowles is committed to ensuring that all math and science teachers have access to the highest quality professional learning and has established the Knowles Academy as an effort to improve math and science education by supporting its national network of teachers. Our courses and workshops, designed and facilitated by experienced teachers who understand the complexities of today's teaching landscape, ensure that every teacher can benefit.

Knowles Academy Courses & Workshops address:

- *Moving from Teacher-Centered to Student-Centered:* We provide support for moving towards hands-on and student-centered learning, ensuring that teachers can create engaging and effective learning environments. Our goal is to support teachers in making the shift from teacher-centered to student-centered classrooms, enhancing the learning experience for students.
- *Building Teacher Capacity:* We offer tools and strategies that build teachers' capacity for high quality instruction regardless of the curriculum or courses they teach, increasing student engagement and deeper learning in math and science.
- *Closing Equity and Opportunity Gaps:* Our courses are dedicated to addressing inequitable outcomes and closing the opportunity gap. We work to provide the tools and strategies needed to level the playing field for all students.
- *Addressing STEM Learning:* Our professional learning is designed and delivered by math and science teachers for teachers, ensuring that it's practical, relevant, and directly applicable to the classroom.

Courses

The Knowles Academy offers a variety of formats for each of our eight courses, catering to both in-person and online preferences. Our courses are flexible and can be customized to fit different schedules, including 1-day, 2-day, 3-day, or 12-hour online sessions. Designed and implemented by experienced science and math teachers within the Knowles Network, our courses can be customized to meet the specific needs of schools and districts. Additionally, we provide free or low-cost versions of these courses on a biennial cycle, available both online and in person on predetermined dates throughout the year. If you are interested in learning about our upcoming course, check out our [website](#) or email: academy@knowlesteachers.org

Promote Sensemaking with Science & Math Practices

SNHU Course Code: EDSC 505KF

Overview:

Moving students beyond rote memorization and fostering genuine inquiry and sense-making can be challenging. Our course supports educators in this journey, guiding them to become facilitators of student-driven exploration. Throughout the course, participants engage in hands-on explorations of phenomena, learning how to guide students in constructing, evaluating, and refining ideas. Participants learn to critically assess and redesign curricular materials to maximize student proficiency in science and math practices. Participants emerge with a newfound perspective on science and math education, equipped with tools and strategies to redefine their classrooms as vibrant hubs of exploration. They leave with a deepened appreciation for the transformative power of student-led inquiry and a renewed commitment to cultivating critical thinkers and lifelong learners.

Highlights

- Engage in an inquiry experience as a learner to develop and articulate an understanding of the practices scientists use and how engagement in scientific practices supports the development of scientific knowledge
- Analyze data from classroom observation video and classroom vignettes to reflect on opportunities for students to engage in the NGSS science practices
- Identify indicators of student engagement in the practices of science and consider how these scientific practices influence students' opportunities to build the core ideas of science that are the target of instruction
- Develop a framework to evaluate current curricular materials and to design future lesson sequences that provide increased opportunities for students to engage in the practices of science
- Apply frameworks to analyze data from lessons, including other participants' lessons and their own, to reflect on students' opportunities to engage in the practices of science
- Redefine what it means to do science in your classroom

Associated workshops

Exploring a Physical Science Phenomenon through the Practices of Science

Exploring a Life Science Phenomenon through the Practices of Science

Designing & Implementing Engaging Lessons

SNHU Course Code: EDSC 503KF (science) & EDSC 505KF (math)

Overview:

Designing and modifying engaging learning experiences for students that are accessible, rigorous, and effective in strengthening students' conceptual understanding can be challenging. Our course is designed for educators and equips participants with the skills and knowledge necessary to modify and implement learning experiences that cater to all students' needs while promoting a deeper conceptual understanding of the content.

Participants will learn strategies to orchestrate productive classroom discussions, ensuring that all students actively participate in authentic mathematics and science practices. By the end of the course, participants will apply a framework that will support them in creating engaging learning environments where every student sees themselves as capable "doers" of math and science.

Highlights

- Expand on a definition of what it looks and sounds like for students to authentically engage in science and math learning
- Take a learner stance and consider a variety of possible student experiences as participants engage in math and/or science
- Identify and modify authentic math and/or science tasks that are cognitively demanding and accessible for all students
- Build a toolbox of strategies for implementing authentic tasks and engaging all students in learning science and/or math content

Associated Workshops

Promote Sensemaking in Math through Lesson Design

Promote Sensemaking in Science through Lesson Design

Increase Participation: Strategies for Effective Groupwork

SNHU Course Code: EDTS 501KF

Overview:

Facilitating successful collaborative groupwork in science and math education can be challenging due to difficulties in crafting collaboration-dependent tasks, ensuring focused productivity, and addressing workload and participation imbalances among students. Our course, designed for educators dedicated to enhancing math and science engagement, introduces Complex Instruction (CI) as a research-backed instructional strategy. Participants will delve into strategies to improve collaboration through groupwork, learning how to address common pitfalls while engaging students with challenging content. By the end of the course, teachers will possess a toolkit of strategies to improve group dynamics, foster participation, and deepen student engagement in collaborative settings. Armed with these skills, participants will be equipped to create collaborative learning environments where every student can thrive, ultimately shaping the next generation of scientists and mathematicians who value and excel in teamwork.

Highlights

- Identify the components of Complex Instruction (CI) and develop specific plans for implementing components of CI in their classroom
- Use participation quizzes, role interventions, and status treatments to disrupt traditional participation patterns
- Develop instructional tasks that use the multiple abilities treatment.
- Redefine what it means to be "smart" in your classroom
- Plan, enact, and reflect on lessons that use Complex Instruction

Associated Workshops

Increasing Participation in Groupwork

Actionable Norms for Effective Groupwork

Discipline-Rich Project-Based Learning

SNHU Course Code: EDTS 502KF

Overview:

Math and science education play a crucial role in empowering individuals to make informed decisions for personal well-being and active civic engagement. However, there are challenges in effectively implementing project-based learning (PBL) to enhance student learning and engagement in these subjects. Learn how project based learning (PBL) can support student engagement in learning complex content and practice standards in Math & Science. Participants will build their capacity for planning and implementing projects that situate learning within real-world contexts. Participants will be equipped with a project planning framework and tools to create engaging, real-world projects that support student learning and engagement in complex content and practice standards. By the end of the course, teachers will be better prepared to provide all students with access to rigorous math and science instruction through PBL, ultimately empowering their students to make informed decisions in their personal and civic lives.

Highlights

- Engage in PBL activities as a teacher, as a learner, and as a PBL teacher of math and science
- Produce a skeleton of a PBL project for their course that includes a coherent content storyline and a disciplinary practice pathway
- Leave with a plan for implementing their project, including tools and resources to guide planning and instruction
- Possess the tools and skills necessary to develop and implement PBL lessons

Associated workshops

Project Based Learning Basics

Project Planning Pyramid Framework

Engaging Students in Engineering Design

SNHU Course Code: EDTS 503KF

Overview:

Are you excited to help students explore real-world connections between math, science, and engineering, but worried that you already have too much content to cover? Engineering doesn't need to be an "extra" in STEM -- instead it can be embedded into your current content teaching to promote relevance, engagement, and 21st century skills. Learn how to plan and facilitate engineering design challenges that inspire your students to learn and apply math and science concepts as they solve real-world problems. Participants will engage as learners in engineering design challenges that span STEM subject areas, and will develop skills for teaching engineering in your classroom. Using tools for developing your own design challenges, participants will build an NGSS-aligned framework for using the engineering design process in your classroom.

Course Highlights

- Learn the hallmarks of the Engineering Design Process and strategies for cultivating engineering practices and mindsets in your students
- Explore multiple options for leveraging the Engineering Design Process in your classes, including content introduction, exploration, labs, and other parts of your current curriculum
- Unpack differences and overlap between engineering design and traditional math and science instruction and develop skills and confidence to integrate engineering in your classes

Associated workshops

Engineer-ize Your Science Labs

Designing Engineering Projects for Student Agency

Empowering Students & Communities with Engineering Design

SNHU Course Code: EDSC 504KF

Overview:

Investigating community issues in math and science classes can promote equitable teaching practices and culturally relevant learning. But do students walk away feeling *overwhelmed* by realities? Or *empowered* to work for solutions? Learn how the engineering design process can support students to deepen their understanding of challenges in their communities AND feel empowered to design and advocate for just solutions to those challenges. Participants will engage in rich engineering projects, unpack associated community issues and their implications, and explore how practices of science, math, and engineering can help learners develop and optimize solutions to these issues. The course highlights community empowerment through lines of the engineering design process: uncovering values, students as agents of change, and stakeholders and encouraging voices. Led by instructors who are experienced in integrating engineering into math and science classes, this course will support participants in identifying entry points in their own curriculum for integrating engineering and community issues.

Highlights

- Explore how various engineering design challenges provide students with opportunities for equitable learning, engagement in community issues, and agency in exploring and solving problems in their world
- Develop facilitation skills for using the engineering design process in your classroom
- Identify opportunities in your own curriculum to integrate empowered engineering projects

Associated workshops

Engineering to Empower

Physics for the Next Generation: The Patterns Approach

SNHU Course Code: EDSC 501KF

Overview:

High school physics often presents challenges, particularly in fostering mathematical connections and scientific practices, which can hinder student engagement and understanding of the subject. This course equips educators with an innovative approach to teaching physics, integrating storylines, project-based learning, modeling, and spreadsheet coding. Centered around the question, "How do we find and utilize patterns in nature to predict the future, make data-informed decisions, and understand the past?," the curriculum focuses on utilizing science's big ideas to explain phenomena and solve problems. Participants will explore design principles and curricular examples that guide students to embody the roles of both scientists and engineers, emphasizing the use of mathematical and phenomenological patterns to predict and understand, in alignment with the Next Generation Science Standards (NGSS). Participants will learn strategies to authentically engage students in math and science practices, fostering mathematical reasoning and problem-solving skills, ultimately enhancing their understanding of physics and science overall.

Highlights

- Learn to incorporate real-world problems and storylines into physics courses
- Explore strategies that guide students in identifying and making sense of the common mathematical and graphical patterns in nature
- Contrast low-evidence predictions (wild guesses) with data-informed predictions to help students learn the value of evidence-based reasoning
- Learn strategies for using technology, student talk, and claim-evidence-reasoning style arguments (CERs) to support engagement and success of every student in physics

Associated Workshops

Exploring the Science Practice of Mathematical Thinking to Deepen Physics Understanding

Coaching for Teacher Development

SNHU Course Code: EDSC 502KF

Overview:

Are you ready to transform your skills and knowledge in instructional coaching? Discover how our dynamic course can help you build a strong foundation in coaching techniques, empowering you to support teachers' professional growth and elevate their teaching practices. Our course supports administrators and teacher leaders in developing their instructional coaching skills through problem-solving, self-reflection, and meaning-making. Participants will learn about three coaching stances: Cognitive, Collaborative, and Consulting, which will serve as a framework for participants to develop specific coaching plans tailored to teachers at various experience levels and contexts. Participants will leave ready to implement specific coaching plans that cater to the diverse needs of teachers at all experience levels and contexts, ultimately fostering a culture of continuous professional growth within their schools. Whether you have plans to be a coach, or already a coach, join us and become a catalyst for positive change in education!

Highlights

- Understand the three different coaching stances: Cognitive, Collaborative and Consulting
- Recognize the three phases of the coaching process: Initiate, Implement, and Reflect
- Identify and collect data to support reflection and progress toward goals
- Practice and gain experience as an instructional coach
- Anticipate obstacles and resistance; formulate strategies to overcome
- Develop a way to transfer coaching skills to your setting

Workshops

Knowles Academy Workshops are engaging 90-minute online sessions designed to offer a concise, impactful experience drawn from our comprehensive courses. These workshops provide participants with an active, engaging learning environment, allowing them to explore a key concept or skill from the full course. Attendees will leave each workshop equipped with a practical tool or strategy that can be immediately implemented to enhance their math and science teaching.

Exploring a Life Science Phenomenon through the Practices of Science

In this workshop, teachers will explore a life science phenomenon to develop an understanding of how the practices of questioning, modeling, and data analysis support students in building content knowledge. Together teachers will consider places in their curriculum where phenomena and science practices can support students in building content knowledge.

Associated Course

Promote Sensemaking with Science & Math Practices

Exploring a Physical Science Phenomenon through the Practices of Science

In this workshop, teachers will explore a physical science phenomenon to develop an understanding of how the practices of questioning, modeling, and data analysis support students in building content knowledge. Together teachers will consider places in their curriculum where phenomena and science practices can support students in building content knowledge.

Associated Course

Promote Sensemaking with Science & Math Practices

Promote Engagement in Science through Lesson Design

In this workshop, teachers will learn how high cognitive demand tasks increase opportunities for students to access learning. Teachers will explore ways of modifying tasks to increase students' abilities to engage in sensemaking. This workshop will assist teachers in gaining the knowledge and confidence needed to design and modify tasks for their math classrooms to engage more learners.

Associated Course

Designing & Implementing Engaging Lessons

Promote Engagement in Math through Lesson Design

In this workshop, teachers will learn how high cognitive demand tasks increase opportunities for students to access learning. Teachers will explore ways of modifying tasks to increase students' abilities to engage in sensemaking. This workshop will assist teachers in gaining the knowledge and confidence needed to design and modify tasks for their science classrooms.

Associated Course

Increasing Participation in Groupwork

What was groupwork like for you when you were a student? Do you want it to look similar or different? Are you enthusiastic about the idea of your students working in groups? In this workshop, teachers will learn how to leverage groupwork to provide students with more learning opportunities. Teachers will gain insights into productive groupwork while reflecting on their current groupwork practices. Facilitated by experienced teachers, participants will leave with small, practical changes that can be implemented to make groupwork structures more productive for all students.

Associated Course

Increase Participation: Strategies for Effective Groupwork

Actionable Norms for Effective Groupwork

How can students learn to integrate their content knowledge with effective communication skills to solve meaningful and complex problems in a collaborative setting? In this workshop, teachers will learn strategies and principles for establishing a classroom culture of effective and meaningful student collaboration through the clear and intentional setting of actionable norms—working persistently, communicating productively, and taking risks. Leave this workshop with strategies that leverage the use of the actionable norms to encourage more students to effectively participate in groupwork activities.

Associated Course

Increase Participation: Strategies for Effective Groupwork

Project-Based Learning Basics

Understanding math and science enables citizens to make critical, informed decisions that support individual wellbeing and civic participation. We see project-based learning (PBL) as a highly effective way to address these challenges. In order to harness the potential of these courses to improve the lives of all students, teachers need specialized support in leveraging PBL in math and science. Come learn with us about some of the basics of PBL, such as entry events, end products, checkpoints, and other core components. Walk away with the next steps to begin implementing PBL in your class.

Associated Courses

Planning for Discipline-Rich Project Based Learning

Project Planning Pyramid Framework

Project-based learning (PBL) can be utilized to engage students, but most importantly should be a powerful lever to provide rigorous mathematical and scientific experiences for students. Come learn with us about the Project Planning Pyramid Framework, a tool developed to strengthen the disciplinary content and practices present in projects, in order to help support all students in accessing rigorous math and science through your PBL courses. Walk away with key takeaways for your next project.

Associated Course

Planning for Discipline-Rich Project Based Learning

Designing Engineering Projects for Student Agency

Find more ways to offer students choice in your engineering design projects. We'll look at several examples of engineering-integrated science and math lessons on a continuum of student-centricity and complexity. Together we'll use the Knowles Project Complexity Rubric to consider ways to modify these examples and your own lessons. You'll leave with a powerful tool and lots of engineering-design instruction ideas for use in your math and science classes.

Associated courses

Engaging Students in Engineering Design

Engineer-ize your Science Labs

Let your existing science labs take center stage in engineering design challenges! Together we will unpack the engineering design process and map science practices and common classroom activities onto that process, and we'll identify multiple points where your well-tested science labs can facilitate student-centered engineering design. You'll leave with student-facing tools and a fuller sense of how to integrate engineering into your science classes.

Associated courses

Engaging Students in Engineering Design

Engineering to Empower

How can we integrate engineering into math and science classes to help students develop a more meaningful understanding of real-world issues? We'll use a Four-Level Empowered Engineering framework to explore how engineering integration in science and math offers students a range of opportunities for learning, engagement in community issues, and agency for solving problems in their world. Teachers will identify entry points in their curriculum to integrate engineering and social justice.

Associated Course

Engineering for Student and Community Empowerment

Mathematical Thinking to Deepen Physics Understanding

Exploring the Science Practice of Mathematical Thinking to Deepen Physics Understanding Anchored in a foundational "Patterns & Inquiry" unit, the Patterns Approach to physics engages students in the work of scientists, including generating research questions, designing experiments, collecting data, identifying patterns, and using those patterns to successfully predict future data points. In this workshop, teachers will gain an overview of the Patterns Approach to physics, experience a Patterns-type lesson, and discuss how the Patterns Approach could be implemented in their classroom.

Associated Course

Physics for the Next Generation: The Patterns Approach