



NGSS Short Courses

PIMSER has many short courses to help you implement the NGSS in your classroom. These have been some of our most successful trainings!

- Designed to strengthen content understanding and/or understanding of science and engineering practices and cross cutting concepts at the designated grade band
- Addresses multiple aspects of the Framework for Teaching
- Examine misconceptions and naïve conceptions that might hinder practice and concept development, and learn how to design experiences to help students change these misconceptions
- Experience activities as a learner that promote concept and practice understanding, and discuss implications for best practice and highly effective teaching with other professionals

Teachers will leave each session with examples, resources, and a deepened understanding of how to implement the NGSS.

1-Day NGSS Short Courses

Course	Grades
Using the Practices to Develop Understanding - Asking Questions and Defining Problems, Planning and Carrying Out Investigations, and Analyzing and Interpreting Data <ul style="list-style-type: none"> • Develop a deeper understanding of Practices 1, 2, and 3, and how students can use these practices to make sense of phenomena. • Learn how to help students ask testable questions, develop their own investigations, collaboratively (K-2 and 3-5), and in small groups or individually (3-5), and analyze data with specific tools and strategies. 	K-5
Using the Practices to Develop Understanding – Developing and Using Models, Constructing Explanations, and Engaging in Argument from Evidence <ul style="list-style-type: none"> • Develop a deeper understanding of Practices 4, 5, and 6, and how students can use these practices to make sense of phenomena. • Learn how to help student develop and use models, constructing explanations from data, and engage in argument from evidence with specific tools and strategies. 	K-5
Engineering Process and Design <ul style="list-style-type: none"> • Develop an understanding of the engineering process and how to develop and implement engineering tasks with elementary students to evaluate their understanding of science concepts. • Understand implications of including engineering in the science standards, and how to use engineering tasks as both formative and summative assessment. 	K-5
Primary Science: Investigations, Engineering, and Integrating ELA <ul style="list-style-type: none"> • Identify and plan for three dimensional instructional experiences that will enable students to be successful using the Science and Engineering Practices and Cross Cutting Concepts in the classroom to make sense of phenomena • Integrate investigations and engineering experiences into the sense-making process • Use literature, writing in science, science talk and vocabulary development to boost students' conceptual understanding in science 	K-2
Physical Science - Forces and Interactions <ul style="list-style-type: none"> • Develop a deeper conceptual understanding of forces and interactions by observing, describing, measuring and analyzing motion. • Learn how to develop student understanding of forces in lessons where the Science and Engineering Practices are embedded in instruction, following the vision of the NGSS. 	K & 3
Physical Science - Waves <ul style="list-style-type: none"> • Understand key ideas underlying the concepts of waves and information transfer; become familiar with the connections between sound, light and waves. • Learn how to develop student understanding of waves in lessons where the Science and Engineering 	1 & 4

Practices are embedded in instruction, following the vision of the NGSS.	
Physical Science - Properties of Matter <ul style="list-style-type: none"> • Develop a deeper conceptual understanding of the structure and properties of matter by observing and describing matter, observing changes and interactions, and analyzing how phenomena inform us about the particulate nature of matter. • Learn how to develop student understanding of matter in lessons where the Science and Engineering Practices are embedded in instruction, following the vision of the NGSS 	2 & 5
Earth and Space Science - Weather and Climate <ul style="list-style-type: none"> • Develop a deeper conceptual understanding of weather and climate by asking questions and defining problems, planning and carrying out investigations, analyzing and interpreting data, engaging in argument from evidence, constructing explanation and designing solutions, and obtaining, evaluating, and communicating information. • Learn how to develop student understanding on weather and climate in lessons where the Science and Engineering Practices are embedded in instruction as envisioned in the NGSS. • Participants will leave with outlined units for K and 3rd Weather and Climate, including driving and focus questions, possible phenomena, learning outcomes, formative assessments, and lesson ideas/resources. 	K & 3
Earth and Space Science - Space Systems: Patterns and Cycles <ul style="list-style-type: none"> • Develop a deeper conceptual understanding of space systems and related patterns and cycles by planning and carrying out investigations, analyzing and interpreting data, and engaging in argument from evidence. • Learn how to develop student understanding about space systems in lessons where the Science and Engineering Practices are embedded in instruction as envisioned in the NGSS. • Participants will leave with outlined units for 1st and 5th Space Systems, including driving and focus questions, possible phenomena, learning outcomes, formative assessments, and lesson ideas/resources. 	1 & 5
Earth and Space Science – Earth Systems: Processes that Shape the Earth <ul style="list-style-type: none"> • Develop a deeper conceptual understanding of processes that shape the earth by observing, measuring, identifying patterns, analyzing and interpreting data, and generating and comparing solutions to earth changes. Fifth grade teachers will look closely at the roles on water on earth, and human impact on earth systems. • Learn how to develop student understanding of earth processes and interactions in lessons where the Science and Engineering Practices are embedded in instruction as envisioned in the NGSS. • Participants will leave with outlined units for 2nd and 4th grade Earth Systems, including driving and focus questions, possible phenomena, learning outcomes, formative assessments, and lesson ideas/resources. 	2 & 4
Life Science – Interdependent Relationships in Ecosystems <ul style="list-style-type: none"> • Develop a deeper conceptual understanding of interdependence in ecosystems as you develop and use models, plan and carry out investigations, analyze and interpret data, obtain, evaluate and communicate information, and engage in argument from evidence. • Learn how to develop student understanding of interdependence in ecosystems in lessons where the Science and Engineering Practices and Cross Cutting Concepts are embedded in instruction as envisioned in the NGSS. • Participants will leave with unit outlines for both K and 2 Interdependence in Ecosystems, which includes driving and focus questions, learning outcomes, formative assessments, and lesson ideas/resources. 	K & 2
Life Science – Structure, Function, and Information Processing <ul style="list-style-type: none"> • Develop a deeper conceptual understanding of structure and function of living things by observing and determining similarities and patterns, developing and using models, designing solutions, and constructing arguments based on evidence. • Learn how to develop student understanding of structures, functions and information processing in lessons where the Science and Engineering Practices are embedded in instruction as envisioned in the NGSS. • Participants will leave with unit outlines for both 1st and 4th Structure, Function, and Information Processing, including driving and focus questions, possible phenomena, learning outcomes, formative assessments, and lesson ideas/resources. 	1 & 4

<p>Life Science - Interdependent Relationships in Ecosystems and Inheritance and Variation of Traits: Life Cycles and Traits</p> <ul style="list-style-type: none"> • Develop a deeper conceptual understanding of interdependent relationships in ecosystems and life cycles and traits as you develop and use models, plan and carry out investigations, analyze and interpret data, obtain, evaluate and communicate information and engage in argument from evidence. • Learn how to develop student understanding of interdependence in ecosystems, and life cycles and traits in lessons where the Science and Engineering Practices and Cross Cutting Concepts are embedded in instruction as envisioned in the NGSS. • Participants will leave with an outlined unit for 3rd Grade Interdependence in Ecosystems, and Life Cycles and Traits including driving and focus questions, possible phenomena, learning outcomes, formative assessments, and lesson ideas/resources. 	3*
<p>Life Science – Matter and Energy in Organisms and Ecosystems</p> <ul style="list-style-type: none"> • Develop a deeper conceptual understanding of interdependent relationships in ecosystems (with a focus on photosynthesis and decomposition) as you develop and use models, plan and carry out investigations, analyze and interpret data, obtain, evaluate and communicate information and engage in argument from evidence. • Learn how to develop student understanding of interdependence in ecosystems in lessons where the Science and Engineering Practices and Cross Cutting Concepts are embedded in instruction as envisioned in the NGSS. • Participants will leave with an outlined unit for 5th Grade Interdependence in Ecosystems, including driving and focus questions, learning outcomes, formative assessments, and lesson ideas/resources. 	5*
<p>Constructing Explanations and Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> • Learn how to design and deliver instruction as envisioned by the KAS for students in grades 4-8 through the Science and Engineering Practices and Cross-cutting Concepts. • Understand complexity continuum and implications for instruction. • Examine connections to informational and argumentative reading and writing as required by the CCSS for Science and Technical Subjects. • Participants will leave with processes and strategies for helping students construct explanations and argue from evidence: support materials, ready to implement lessons, sample assessment items, strong and weak models, and instructional strategies and scaffolds. 	4-8
<p>Developing and Using Models</p> <ul style="list-style-type: none"> • Engage students using scientific modeling - a prevalent Practice they can use to demonstrate their understanding of scientific phenomena as part of the KY Science Assessment System. • Develop a deeper understanding of modeling and its relationship to the other Science and Engineering Practices. • Use models to understand and explain phenomenon by generating questions, making predictions, testing hypothetical explanations and communicate their thinking • Gain strategies for engaging students in the iterative cycle of development, engagement, evaluation, and revision of models 	6-8
<p>Waves and Electromagnetic Radiation</p> <ul style="list-style-type: none"> • Understand key ideas underlying the concepts of waves, electromagnetic radiation and information transfer • Learn how to develop student understanding of waves in lessons where the Science and Engineering Practices and Cross Cutting Concepts are embedded in instruction as envisioned in the NGSS. • Participants will leave with a storyline for the targeted performance expectations, several lesson ideas ready for use in the classroom, and strategies for supporting students’ development and use of models • Materials and resources participants will receive: Unit storyline for middle school Physical Science standards on waves, support materials, ready to implement lessons, math and literacy integration, notebooking strategies, and sample assessment items. 	7
<p>Developing and Using Models including Data Analysis and Mathematic and Computational Thinking</p> <ul style="list-style-type: none"> • Develop understanding of Practices 2, 4, and 5 – modeling, data analysis, and using mathematics and computational thinking. • Understand complexity continuum and implications for instruction. • Examine connections to CCSS in mathematics. 	9-12

2-Day NGSS Learn & Apply Sessions

Course	Grades
<p>Developing Units Aligned to the NGSS</p> <p>Three-dimensional teaching and learning, as envisioned by the NGSS, requires a different approach to designing instruction. We have developed a process that has proven to be effective for any grade level or science discipline. You will leave this short course with a unit outline that is aligned to the NGSS, grounded in phenomena of interest to students, and includes a summative task and embedded assessments, a unit storyline, focus questions, investigations, and learning targets. Tools, processes, resources, and samples will be provided.</p>	K-12
<p>Developing Classroom Assessments Aligned to the NGSS</p> <p>A statewide science assessment system is currently being developed (watch this KDE video!). Knowing how to design NGSS-aligned, effective classroom assessments is more important than ever!</p> <p>Because of the 3-dimensional nature of the NGSS, classroom assessments will need to provide multiple and varied opportunities to demonstrate blended learning, have multiple component tasks for a given NGSS performance expectation, focus on a smaller set of important gatekeeper concepts, provide scaffolding to help students generate valuable information about their blended knowledge, and be scored so that they provide valuable feedback on DCI's, practices, and cross-cutting concepts. Participants will:</p> <ul style="list-style-type: none">• Determine characteristics of NGSS-aligned tasks• Utilize evidence-centered design, construct monitoring, and support materials• Generate grade-level specific classroom assessment tasks and rubrics	K-12