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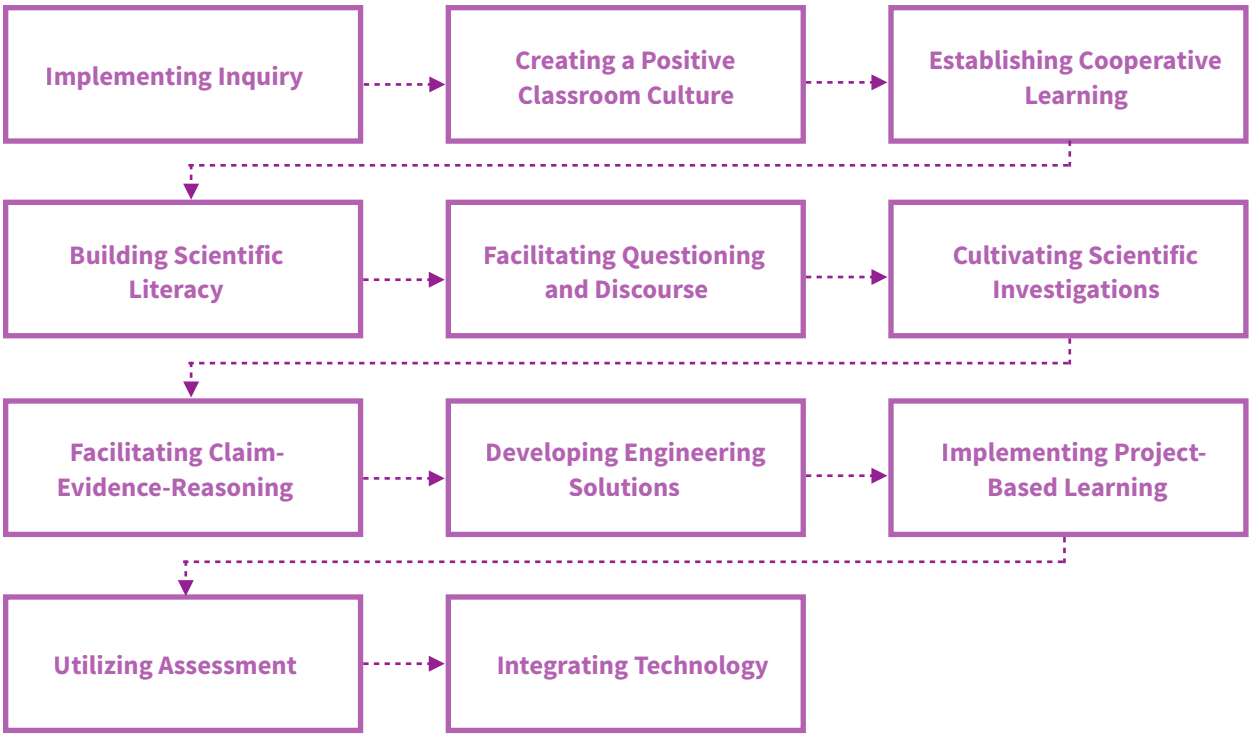
Recommended PD Progression

The following flow of the SIPs is recommended when districts want many (or all) of our SIPs over the course of a year or several years.



Creating an Environment for Learning

Creating a Positive Classroom Culture

The classroom-–learning environment must be a safe space for the students so they feel comfortable taking risks and engaging in their learning environment. This three-– hour session models many strategies and varied techniques to develop strong relationships with students so they are willing to take risks, involving family and community in school life, empowering student independence and managing the physical space of the classroom to enhance learning and promote a positive classroom culture.

Establishing Cooperative Learning

Within the science classrooms of today and the workplace of tomorrow, the skills of working collaboratively and through building consensus are non-–negotiable for student success. Come learn with us as we model and investigate the ways to build these 21st Century Skills into your science lessons. This three-–hour session provides many strategies that will increase student engagement and productive communication while decreasing off-–task behaviors. This session models examples of cooperative learning protocols as well as ways to implement these into a framework for building the 21st Century Skills that are valued by the workforce for college and career readiness.

Integrating Technology

Technology is a tool that extends our abilities and is vital to college and career readiness in the 21st century. Although technology should never replace hands-on, minds-on science, it can and should be used to extend the learning in authentic ways, modeling the technology use of scientist and engineers. This three-hour session models seamless technology integration in the STEM classroom by using the SAMR model to encourage reflective practice. We will learn how to harness the tool of technology for authentic STEM lessons, simulations, and assessment.

Building Scientific Understanding

Implementing Inquiry

Research has shown that “the actual doing of science or engineering will pique students’ curiosity, capture their interest, and motivate their continued study.” Inquiry investigations involve a great deal of student inquisitiveness, critical

thinking, and independence. This three-hour session will define what inquiry truly is and show how to convert teacher-directed, highly structured lessons to more open-ended inquiry experiences that allow for student input, wonder, and individual exploration. These subtle shifts can be a simple solution to building student-centered, engaging instruction into your science classroom.

Facilitating Questioning and Discourse

An essential aspect of facilitating student understanding is insight into student thinking. Observing how students are able to communicate their understanding best provides this insight. Scientific argumentations and discourse allows students to express their thoughts in a manner that requires knowledge and appropriate evidence to support their claims and show the teacher the depth of their understanding of a concept. This 3 hour hands-on session models how to engage students and adults in questioning, argumentation and discourse that encourage rebuttal. Teachers will leave with questioning and discussion strategies ready for use in their STEM classroom.

Building Scientific Literacy

Literacy strategies, such as analyzing, discussing, and summarizing, can be utilized while reading science-–based articles, authentic science research, journals, and textbooks. Utilizing graphic organizers, vocabulary strategies and note booking will bring student ownership and deep understanding of science content. Reading and writing skills reinforce science background knowledge. This three-–hour session models strategies that are highly engaging, easy to implement, and effective in integrating literacy, writing, and discourse into the science classroom.

Utilizing Assessment

Assessment should inform and inspire students and teachers for continuous improvement and growth that can transform learning and teaching. In this three-hour session we will model and explore how to implement meaningful, varied, authentic assessments for learning. Discussion strategies will be modeled for making thinking visible so that student misconceptions and prior knowledge are revealed for formative assessment. Meaningful, authentic summative assessments such as performance tasks, engineering solutions, design portfolios and evidence-based writing will also be considered as we examine utilizing the power of assessments.

Engaging Students in Scientific and Engineering Practices

Developing Engineering Solutions

Engineers solve problems by using a systematic process called the Engineering Design Process (EDP) that includes identifying the problem, identifying the

constraints and criteria, generating ideas, and testing possible solutions. Through a reiterative process of testing and adjusting, they are able to design a solution to the problem. Join us for a three-–hour session that uses scale to design and solve the solution to an interesting science problem. This session will model a hands-–on, engaging, and interactive engineering problem to learn how to plan, conduct, and evaluate student learning. This session also addresses the 21st Century Skills of collaboration, communication, and critical thinking in designing the solution to the problem.

Implementing Project-–Based Learning

Project-–based learning (PBL) is the process of involving students in an inquiry-–based approach to solving an authentic, real-–world problem. PBL is age appropriate and tied to curriculum standards. It affords students the ability to choose the way they select and develop a solution to a problem. When students are given the autonomy to solve problems that are of interest to them, high levels of engagement lead to high levels of learning. Join us for a three-–hour session that models several powerful PBLs as a means to learn how to plan, conduct, and evaluate student learning.

Cultivating Scientific Investigations

Planning and carrying out scientific investigations is a science and engineering practice and is the work of authentic scientists. Scientists use investigations to answer a question, describe a phenomenon, or test a hypothesis in an attempt to explain how things work in the natural world. Join us for a three-– hour session that models several hands-–on, engaging, and interactive investigations to learn the differences in descriptive, comparative, and experimental investigation designs. Teachers leave with the means to run organized, standards-–based labs to determine students' depth of knowledge gained during an investigation as well as the means to guide students in the use of scientific explanations in their conclusions.

Facilitating Claim–Evidence–Reasoning

Claim–Evidence–Reasoning is a way for students to scientifically describe what they have observed and learned through an investigation, experience, or research. By making claims based on evidence, students are able to connect their science knowledge to the events and observations of the real world. Join us for a three-–hour engaging, interactive, and hands-–on opportunity to learn how to implement this highly effective strategy to increase rigor in your science classroom.