What is STEM?: A Discussion with Local Education Leaders

**Rusty Clifford** (Superintendent, West Carrollton City Schools), **Sharon Goins** (Principal, Thurgood Marshall STEM High School, Dayton Public Schools), **Josh Jennings** (Director, Global Impact STEM Academy), **Denny Morrison** (Superintendent, Xenia Community Schools), **James Rowley** (Dayton Regional STEM Center), **Hope Strickland** (Principal, Dayton Regional STEM School), and **Krista Wagner** (Curriculum Director, Mad River Local Schools)

The importance of STEM education to the Dayton region’s competitive edge is hard to overstate, and STEM education has proliferated in recent years. Join DRSS Superintendent **Robin Fisher** as she facilitates a panel of local school leaders from across the Miami Valley in a discussion centered on the following question: “What is STEM?” Panelists will discuss what STEM education looks like in their own schools and districts.

**Student Engagement and Achievement Across STEM Education**

**Nimisha Patel and Suzanne Franco** (Wright State University)

This presentation will focus on the results of a study for which the researchers examined differences in engagement and achievement between 2695 high students enrolled in: 1) STEM schools, 2) traditional schools, and 3) STEM programs housed in traditional schools. The High School Survey of Student Engagement was utilized to measure three dimensions of student engagement, while grade point average (GPA) and standardized test scores were used to measure academic achievement. Students’ understandings and experiences related to student engagement were reflected in 5 themes: descriptors, effort and challenges, teachers’ facilitation of engagement, class assignments, and future use of learned content.
An Investigation of How and Why the Body Uses Food
Erin Poppaw (Dayton Regional STEM School)

Eighth grade science is in the beginning stages of taking an existing body systems unit that focuses on the driving question, "How and why does my body use food?" and turning it into a project-based learning unit. In this tuning protocol session, one of the science teachers involved in this project would like support identifying an authentic audience and product for this unit that will increase student motivation and engagement.

Including PBL Project Essentials: A Wellness/Language Arts Integrated Project
Jenn Reid and Heather Tash (Dayton Regional STEM School)

Learn how a Health and PE teacher and a Language Arts teacher collaborated to support tenth grade students to develop public service announcements (PSA). The PSAs were aimed at changing behaviors in a target audience to reduce their risk of cancer. Students created video PSAs and then worked to identify and contact organizations that could use the PSAs to promote cancer prevention. During this tuning protocol session, teachers will share their planning process and samples of student work in order to get feedback about the project’s development.

Archaeoastronomy
Brittnee Lydy and Kevin Lydy (Dayton Regional STEM School)

Archaeoastronomy is the study of how ancient people observed and understood the cycles of the moon, sun, and stars, and what roles these cycles had in their cultures. A history and a science teacher are teaming up to develop a 2-week immersion course for students in grades 7-9 emphasizing various ancient cultures from the Egyptians to the Mayans. The short course will ultimately focus on the ways Native Americans in Ohio utilized and depended upon astronomical phenomena. In this tuning protocol session, presenters are looking for feedback about partnerships, possible products, and how to focus the course’s content.

Streamlining PBL: A Coding Cadets Project
Megan Bennett (Mills Lawn Elementary)

A third grade teacher will share a new project called Coding Cadets that teaches basic PBL skills through coding. Working with a partner, students will be designing and presenting one of the following: a video game, animated video, or interactive quiz. They will also be promoting coding by helping their school participate in Hour of Code this year. Embedded in this project are reflection rubrics for self and a partner, critiques, assessments and community experts. In this tuning protocol session, participants will give feedback on this project’s development.

Hardly Soft Skills: How to Teach and Measure the Intangibles
Emerie Whitman-Allen (Dayton Regional STEM School)

"Soft Skills" are usually described as the social/emotional skills that are hardest to explicitly teach and measure. This presentation will explore how these skills (notably collaboration, respect, personal accountability, and self-reflection) can be taught, supported, and assessed in any regular classroom. Participants will learn strategies for instructing these skills directly, and will walk away with concrete tools to better measure them.
Scaling Game Characters

Stacy Slone and Amy Vazquez (Dayton Regional STEM School)

This seventh grade math project has been done in the past as an introduction to scaling 2-dimensional figures on a coordinate grid. (This entails designing and plotting points to create a character, then stretching, shrinking, and moving the character using (x,y) rules.) During this tuning protocol session, the teachers leading this project would like help involving more depth of content and possibly including a more authentic final product.

Session 3

11:00am - 12:20pm

Empowering Screen Recordings as Teaching Aids

Philip Bottelier, Jackie Harris, Kevin Lydy, and Nancy Schaefer (Dayton Regional STEM School)

From this workshop, participants will leave with the skills and understanding of how to employ free screen recording software to enhance and supplement their instruction. Participating teachers will plan, prepare for, record, and leave with a screen recording they can use as a classroom lesson, homework, or reinforcement activity for their students. Screen recordings are ideal for teaching technical skills when students are learning features of software (Excel, Word, PPT, CAD, and so much more). Although participants are encouraged to bring their own computers, netbooks will be supplied for those who need them.

De-Mystifying Community Partnerships: How to Connect (& Why It’s Worth It for Students)

Participants will hear from and engage with teachers and community partners who have successfully created collaborative partnerships with other organizations. Panel presentation will be followed by a Q&A session and time for networking. Panelists include: Brittnee Lydy (DRSS) explains how she utilizes local engineers to critique student work. Russ Nelson (DRSS) and Chris Hoffman (Montgomery County Solid Waste District) discuss how they collaborated to start DRSS’s Zero Waste Program. Philip Bottelier (DRSS) and Eric Johnson (Northrop-Grumman) discuss a collaboration between DRSS’s Advanced Engineering Course and Northrop-Grumman. Jenny Montgomery (DRSS) discusses the Living Lens Project, a collaboration between DRSS and the Newport Aquarium. Krista Gerhardt of WPAFB’s Office of Educational Outreach shares how they partner with Dayton-area schools. Kurtz Miller (DPS) discusses the sustainable model of internships he helped create between Thurgood Marshall and industry partners. AJ Ferguson of UpDayton discusses the ways in which Dayton-area young professionals want to get involved in schools.

Empowering All Students through Anti-Biased Behaviors

Christa Preston Agiro (Wright State University)

Research about human behavior in educational systems reveals that not all students have the same educational experience in relation to identity. This presentation will examine what research says about teachers’ treatment of students according to their identities, especially those related to race, class, gender, sexual orientation, religion, dialect, physical characteristics, and other socially-constructed categories. The aim of the presentation is to inform those who work with youth about ways to filter out the culturally-produced discriminatory smog found in every educational institution. Participants will explore the concept of cultural humility and look at immediately applicable ways to work to foster anti-biased treatments of students and ways to respond to student-on-student discrimination.
Transforming Classroom Culture from Rote to Meaningful: Supporting Middle School, High School, and College Student Engagement in Scientific Explanation & Argumentation

Lisa Kenyon and Jonathan Zemmer (Wright State University)

How do we engage students in meaningful learning? Scientific practices can play a central role in project-based investigations that embed core scientific goals in meaningful problems. In this workshop, participants will engage in the scientific practices of explanation and argumentation, working in small groups as they collect evidence from a biological database to investigate why finches from the Galapagos Islands are dying and why some are surviving. This investigation will provide activity structures that promote sense-making, evaluating, argumentation and consensus building while providing rich, meaningful content learning. This practice-based investigation will address educators at the middle school level, also illustrating how this plays out in a high school and college environment. Throughout the session we will model the meaningful integration of technology by utilizing student-focused apps while exploring the untethered classroom.

Session 4
1:00pm - 1:50pm

Inquiry-Based Learning in Math Class

Brian Polk and Brittany Shores (Dayton Regional STEM School)

Implementing Project-Based Learning is a daunting task in any classroom, but is especially challenging in the math class. In this workshop, presenters will focus on the benefits of using Inquiry-Based Learning (IBL) in the math class. Come experience two brief inquiry-based math lessons, one for a middle school math classroom and one for a high school geometry classroom, to get some ideas for how one can structure an inquiry-based math lesson at any level. Participants will have an opportunity to ask questions of teachers who use IBL every day, and will be supported in brainstorming some IBL lessons they can use in their own schools.

Modeling, Simulation and Programming Fundamentals: Resources for the Classroom

Jay Lane (Oakwood City Schools) and Jennifer Winner (Air Force Research Lab)

This presentation highlights collaboration between the Air Force Research Laboratory’s Gaming Research Integration for Learning Laboratory (GRILL) and Oakwood City Schools. The presentation will highlight recent collaborations between the GRILL and local districts. These collaborations have resulted in a variety of open-ended challenge problem content available to schools free-of-charge. Oakwood’s new Programming Fundamentals curriculum will be presented. This curriculum provides practical guidance materials that educators can use for a semester-long programming course. The programming language Python™ is used as the primary language to illustrate fundamental principles of programming design and coding that apply in any computing environment.

Food for Thought: An Interdisciplinary Project about Informed Food Choice

Desiree Nickell and Donna Haller (Yellow Springs High School)

The driving question for this 9th grade project is: How does food culture affect our lives, and how can we cultivate a healthier community through education about food choice? After researching various food issues, student groups are designing and creating a Food Expo Booth including an interactive presentation, informative display, a “tasting activity” or food sample, and a take-away item. The culminating event is a community-wide Food Expo scheduled for November 20th. Presenters in this session will share a wealth of resources in the areas of PBL planning and implementation, integrated projects, fundraising, community partners, and authentic teaching and learning.
Adventure Golf

Jack Hatert (McKinney Middle School)

This presentation will share a recent project in which 7th graders took on the task of constructing an 18-hole miniature golf course titled ‘Around the World in 18 Holes.’ This integrated project focused on the variety of biomes that exist around the world and the complex interactions that take place in them. The math portion of this project incorporated a video game/math cache structure to differentiate the learning needed to design and build the course. Measurement skills were put to use as students used power tools to bring their designs to life while the LA class read nonfictional texts, created signage, and wrote break-up letters to their partners in mutualistic relationships.

Strengthening the Vocab of Culturally & Linguistically Diverse Students

Christa Preston Agiro (Wright State University) and Claire Preston (Dayton Regional STEM School)

This presentation will impart practical strategies to help English language learners as well as students from a variety of cultural backgrounds to flourish in any class. Methods that teach academic and Tier II vocabulary in memorable ways will focus on increasing student output and linking vocabulary directly to concepts. These research-based strategies can be utilized in any classroom and are beneficial for all students.

Universal Design for Learning: What It Is, and What It Isn’t

Gregory Taylor (Thurgood Marshall)

Universal Design for Learning (UDL) is a buzzword in education and curricula, but what does it really mean? This presentation will give an overview of the UDL framework, address misconceptions, and show participants what implementing UDL in their curricula would look like. Students in these classrooms can enter with a variety of interests, abilities, and needs. UDL is an alternative to the one-size-fits-all problem that often leaves students behind. Providing multiple means of representation allows students to comprehend and perceive information in different ways. Incorporating multiple means of action and expression in your classroom will address the way in which students can express mastery. Learners also have different interests and motivation.

Session 5

2:00pm - 2:50pm

Digging Deeper into STEM: Making Cookie-Cutter Activities, Labs, and Projects Involve More Critical Thinking

Kurtz Miller (Dayton Public Schools)

This presentation will outline some essential concepts, ideas, and tools that can be used to assess the relevance and rigor of instructional materials (Bloom's Taxonomy, the inquiry continuum, the rigor/relevance framework, and Webb's Depth of Knowledge (DOK) framework).
Effective Discussions in the Math Classroom  
**Peggy Kelly** *(Wright State University)*

Students who work in inquiry-based classrooms have many things to discuss. How can you be sure that the small-group and whole-class discussions lead students to understanding concepts and procedures? In this presentation, attendees will look at how to implement practices for orchestrating effective discussions in the math classroom.

Embedded English: Quality vs. Quantity  
**Michael Payne** *(Global Impact STEM Academy)*

Having started a school year in which English has been embedded into social studies, science, math, and art, the presenter will share a current overview of the advantages and concerns regarding the embedding of English into other curricula. Are students losing out in not having a "standard" English classroom; or do students gain a deeper understanding of the skills and standards by applying them throughout their classes?

Who Cares? Inquiry in Social Sciences  
**Meghan Durkee** *(Dayton Regional STEM School)*

Many people think of history or social studies and think it's just facts about a bunch of things that already happened, what does it have to do with me? And that is what triggers inquiry! This presentation will explore strategies that Middle and High School Social Science teachers can incorporate in their classrooms to add the "who cares?" - or inquiry - in a social science classroom. Let's move beyond memorizing social studies into DOING social studies with inquiry!

Using GIS Technology in the Classroom  
**Nick Pant** *(Dayton Regional STEM School)*

The presentation will introduce Geographic Information Systems (GIS) technology and how aspects of it can be used to supplement the learning experience. An emphasis will be on Social Studies content and journaling, but the resources and strategies discussed can be applied to any content area. Attendees will see the main ways in which one teacher exposes students to content in an interactive way, and how GIS allows us to connect spatial information and written text with meaning. Those in attendance will experience the technology firsthand as they practice using it the way that they, and their students, will in the classroom.

Best Practices Coaching Session (Interdisciplinary)

Come brainstorm classroom ideas, develop an idea for a unit, or bring the beginning of a project plan you hope to implement in order to share and receive feedback. Coaches will include teachers from a wide range of content areas who have implemented PBL and other best practices in their classrooms. These sessions provide an opportunity to workshop your plans in any stage. Bring a new, unformed idea or fully developed concept you'd like to fine-tune. Multiple coaches representing a variety of content areas & grade levels will be available to discuss your ideas and help you move forward!