

Heather Niebauer

1 Hour Session at [PETE&C](#): Pennsylvania Educational Technology Expo and Conference

Session Title: Build a Bot, Learn a Lot with Hummingbird

Session Description: Learn to teach with the LEDs, motors, and sensors of the Hummingbird Robotics Kit using block-based coding! The Hummingbird is an easy, creative robotics tool which can be used to develop engineering and computer science skills from 4-12 grade using art and design. Integrate robotics into any subject. Appropriate for teachers of any skill level.

I was asked by Kelsey Derringer, the Professional Development Coordinator at Birdbrain Technologies, to submit a proposal to present at PETE&C. Kelsey and I met at a workshop hosted by Google, Pittsburgh and after some conversation and collaboration, we eventually co-presented last year at TRET (Three Rivers Ed Tech Conference in Pittsburgh, PA). So, essentially, I selected the topic because I was asked; however I was asked because, after the “Coding, Robotics, and 1:1” course, where Birdbrain Technologies’ products were featured, I have used and promoted the use of the Hummingbird Bit. Full disclosure: I am not being compensated by Birdbrain Technologies, though they are providing stickers and copies of the assessment resources for participants and intend to promote the session to help encourage conference attendees to participate. They’ve also allowed me to use their presentation background and colors for my slides. I agreed to present at PETE&C because I want to push myself out of my comfort zone, network with amazing educators (there is no shortage of incredible people in attendance at EdTech conferences), and because I have watched the educators in my district transform their teaching as a result of implementing the PD I’ve provided to my district in the past. I love so many features of the Hummingbird Bit. It has a low floor and a high ceiling, which allows for easy differentiation. Projects using the Hummingbird can be authentically interdisciplinary and are engaging and student-centered. Birdbrain Technologies has developed a user-friendly website that contains video tutorials and materials that support and empower teachers of all levels of technological expertise. Perhaps my favorite support materials are the assessment resources. These guides were featured in the “Coding” course I took through Endeavor and they have changed the game for me. I use them when designing almost every lesson. Another resource from the “Coding” course that has had an impact on my teaching and that I intend to share with participants is the SAMR model framework. Finally, I plan to share NASA’s robotics resources, specifically, the lesson plans. I’ll allow my participant to choose, but I’ll try to guide them toward one of the lessons involving a Mars rover. We will look at the lesson plan and determine how the Hummingbird Bit could be integrated into the lesson to bring computer science and more engineering into the lesson.

The session will begin with a brief survey using [Mentimeter](#) (or paper for those without devices), which will allow results to be projected and give me an idea of how to tailor the session to meet the needs of the participants. The survey will ask for years of teaching experience, level of technological expertise, grade levels and disciplines taught, and goals for this session. I plan to have something for everyone, as this PD is open to all interested educators K-12, any discipline, and any level of technological expertise, but the survey will give me an idea of which grade

levels and disciplines on which to focus.

Next, I will share my presentation goals:

1. Demonstrate how projects using the Hummingbird Bit can be interdisciplinary by sharing my experiences
2. Introduce participants to NASA Robotics resources
3. Brainstorm ideas that integrate the Hummingbird Bit
4. Encourage participants' next steps

Participants will learn how the Hummingbird Robotics kit can be used in a variety of classes and disciplines to create interdisciplinary, project-based learning opportunities for students. In the session, teachers will be given a brief overview of the Hummingbird Bit, a guide to the Hummingbird site and tools for educators, and copies of the Engineering Design and Computational Thinking [Assessment Guides](#). I will share some of the projects I've implemented in my own experience: workshops with grades 3-5 and projects in classrooms in grades 6-12. Though I've not used Hummingbirds with students in K-2, I have conducted various coding workshops using apps like [Tynker](#), and will share those, as well, if my participants indicate a need in the opening survey. Next, I will conduct an overview of [NASA's robotics resource page](#). After participants have had a few minutes to look over the page, together we will investigate the lesson, [Rover Races](#). In this lesson students experience the engineering of a communication protocol. After a summary of the lesson is provided, I will suggest a way to follow this 45 minute activity with one using Hummingbird robots. We will then take a few moments to brainstorm some ideas, possibly using the NASA and Hummingbird sites for inspiration. The session will conclude with the sharing of those brainstormed ideas and a post-session survey, again using Mentimeter or a paper survey for those without devices. This survey will ask if the session goals were achieved, whether participants have additional questions, any highlights they wish to share, and what could be done to improve the session. Additionally, participants will receive a hyperdoc that will include links to all resources covered in the session, as well as my contact information, should they need on-going support.

Because I have provided similar PD to educators from the district in which I teach, I can use the follow-up support I have provided and continue to provide with them in the event that no participants from PETE&C reach out.

Though many other standards can be covered and incorporated, those I will focus on primarily will be the ones I used in the example lesson I will be sharing with participants:

Pennsylvania Core Standards for English Language Arts:

CC.1.3.11–12.A

Determine and analyze the relationship between two or more themes or central ideas of a text, including the development and interaction of the themes; provide an objective summary of the text.

CC.1.3.11–12.B

Cite strong and thorough textual evidence to support analysis of what the text says explicitly, as

well as inferences and conclusions based on and related to an author's implicit and explicit assumptions and beliefs.

CC.1.4.9–10.S

Draw evidence from literary or informational texts to support analysis, reflection, and research, applying grade-level reading standards for literature and literary nonfiction.

CC.1.4.9–10.T

Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

CC.1.5.9–10.A

Initiate and participate effectively in a range of collaborative discussions on grade-level topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CC.1.5.9–10.D

Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning; ensure that the presentation is appropriate to purpose, audience, and task.

Pennsylvania Standards for Science and Technology:

3.4.10.C1. Apply the components of the technological design process.

3.4.10.C2. Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments.