

## **Leadership PD Proposal**

Elizabeth Newton Cooper  
9-12-20

### **Title: Integrating Robotics into your Curriculum**

I have been working with a robotics committee in China for 2 years now, and we have been providing training to teachers across China on how to start robotics teams and participate in competition. Each year we have had additional requests to talk about how to use robotics in the curriculum, going beyond after school activities.

### **NASA/Endeavor Integration:**

This PD will be using resources from the Coding, Robotics, and 1:1 Technology Endeavor Course.

### **Proposed Audience:**

This PD will be presented at the ACAMIS Technology Conference in October. The participants will be mostly teachers at international schools in China who are interested in starting robotics programs or maybe have after school programs and want to expand to their daily curriculum. It will be mainly upper elementary or middle school teachers, although there may be some high school or lower elementary teachers as well.

The teachers that attend this conference are mainly science, technology, STEM, or design teachers, although some do not have this background. There are also many technology directors that attend the conference, although I doubt they would be as interested in this workshop.

### **STEM concepts and standards:**

This workshop will cover how to use robotics in your daily curriculum. It would be tied to engineering concepts and the design cycle, but the specific standards will vary based on individual teachers. The goal is to help them discover how they can connect it to their individual standards.

Some standards that could be connected are:

- NGSS Engineering Standards (MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4)  
Robotics can be used to demonstrate all parts of the engineering design cycle, from planning, creating, and testing a design to identifying criteria and constraints of a design problem.
- NGSS Middle School Life Science (MS-LS1-3)  
Robotics can be used as a metaphor for how cells and organ systems in the human body work together in a system to function. Students can compare parts of their robot to parts of a cell or the human body, then explain how they all work together to function. (Ex: light sensor is like eyes, but cannot function without the brick/brain).
- [CCSS.MATH.CONTENT.7.G.B.4](#)

Use the robot to measure how many wheel rotations it takes to travel a set distance. Then from this, calculate the circumference of the wheel. Finally, explore how the circumference and radius are connected.

- [CCSS.MATH.CONTENT.7.G.A.1](#)

Use the robot to travel 10 cm and calculate how many rotations it takes to get there. From this information, create a scale and an equation to predict how many wheel rotations it will take to go 143 cm. Program the robot and test out the calculation.

After sharing a few resources and examples, teachers will be encouraged to sit with others that teach similar subjects. They will brainstorm together how robotics could fit into their curriculum, based on their own standards.

### **Length of Session:**

The session will be 60 minutes.

The goal for the session would be 10 minutes of introduction and pre-survey, 20 minutes of presentation of examples, resources, and tips for successful implementation, 15 minutes for collaboration and development of units, and 15 minutes to share ideas and fill out the post-survey.

### **Advertisement and Recruitment:**

Email advertisements will be sent out about the conference. In addition, I will send out an email to all robotics coaches in the Southern region that may be able to attend. Lastly, I will send out a WeChat message to our robotics groupchat.

### **Survey:**

My presurvey will ask teachers to introduce themselves, in terms of what grade levels and subjects they teach, what their experience with robotics is, what robots they have available in their classroom, and if they have tried to integrate into their curriculum before.

The postsurvey will ask teachers to evaluate their confidence in implementation, if they gained new ideas, and to share one way that they plan to use robotics in their classroom. Lastly, it will ask if they have any additional questions about robotics or curriculum.

### **Expected Outcomes:**

It is my hope that teachers walk away feeling confident about using robotics in their classroom. I want the teachers to have time to explore resources and plan a unit where they can use robotics. I also want them to have the opportunity to share and get ideas from their peers, to give them more confidence in their own ideas. We will add to a Padlet throughout the session, so hopefully at the end teachers have a resource board where they can see each others' ideas. I would love for teachers to walk away with a planned, peer-reviewed unit that they are ready to implement immediately.

**Follow-Up:**

I will keep a record of all participants, and follow up by email. I will check in to see if they have successfully implemented their unit and if they have additional questions about implementation. Lastly, I will see if they are willing to share their unit to create a shared file of curriculum to spread to all participants.

**Analyzing Success:**

Success will be measuring by both the survey at the end, based on both their measure of confidence and if feel they have gained new ideas, and the follow-up emails. If teachers successfully implement their units, this will definitely be considered a success.