Mandatory 3: Proposal Submission - Aaron Minard

What is the title of your STEM Professional development?	Problem Solving: A Design-Based Approach **I'm not sure if this is the most appropriate or engaging title. Very open to suggestions and comments.**
Why did you select the topic?	The engineering design process emphasizes an open-ended approach to problem solving where students get to create innovative solutions to real-world problems and challenges. Combining real-world application and hands-on problem solving experiences can lead to increased student engagement and support deeper learning of skills and concepts in any subject area.
How does your PD integrate NASA assets and/or content from the Endeavor courses?	My professional development training will integrate the "E" in STEM which is an essential element of science education. Engineering design activities can help educators to apply concepts and processes from within and across STEM domains. It also provides a way to create real-world connections so students can see how relevant engineering is to their daily lives.
Who is your proposed audience? Which teachers will you serve with your PD and activities? What grades, subjects, and how many students do they teach?	Since engineering can be integrated into a variety of content areas I will be offering my PD to my entire teaching staff. The science, math, language arts, social studies, and exploratory departments impact a total of 941 middle school students from grades 6th through 8th.
What STEM concepts or learning goals will you and your materials address which can potentially replace other classroom activities? List NGSS and CCSS or your state standards.	The overarching STEM concept here is the implementation of the Engineering Design Process as a hands-on learning alternative to help students identify and solve problems in any subject area in a fun and engaging way. **Next Generation Science Standards (NGSS):** **MS-ETS1-1** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. **MS-ETS1-2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **MS-ETS1-3** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

	MS-ETS1-4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. **Common Core State Standards (CCSS):** **Math.Practice.MP1** - Make sense of problems and persevere in solving them. **Math.Practice.MP2 -** Reason abstractly and quantitatively. **Math.Practice.MP4 -** Model with mathematics. **Math.Practice.MP5** - Use appropriate tools strategically. **Math.Practice.MP6** - Attend to precision. **Math.Practice.MP7** - Look for and make use of structure. **Math.Practice.MP8** - Look for and express regularity in repeated reasoning.
How long will the session be? How will you recruit your audience? Where will you advertise your PD session?	I am anticipating teaching both a morning and an afternoon session each lasting about one hour. I will advertise my training in our schools weekly bulletin, during our staff meetings, and through word of mouth.
To demonstrate that teachers have learned something new, you will generate a pre- and post-survey. What, in general, will your pre-survey and post-survey ask?	**Pre-Survey: (Likert Scale - Always / Very Often / Sometimes / Rarely / Never)** • How often do you incorporate the following in your classroom? 　• Problem Solving Strategies 　• Hands-on Learning Opportunities 　• Design-Based Activities • What do you know about the Engineering Design Process? **Post-Survey:** • What new ideas have you gained and how do you plan to implement these new ideas in your classroom? • What specific suggestions do you have to improve this activity? • Additional comments... • **I am open to additional ideas and suggestions for my pre- and post-surveys.**

What outcomes or expectations do you hope to see for your educators?	I am hoping that my colleagues will take an interdisciplinary approach and incorporate engineering practices and/or processes into topics they're already teaching as a way to make their lessons richer and more engaging.
How will you follow up with the teachers in attendance?	Following the post-survey responses, I intend to reach out to one or two teachers from each department (math, science, social studies, language arts, and explore) to get a feel for the impact of the training as it pertains to different subject areas.
What data collection methods (e.g. surveys, interviews) will you use to analyze the PD's success?	I will conduct a pre- and post- survey along with one or two interviews per department based on teacher attendance in the PD training.