

**Makerspaces for Grades 6-8  
2017 Science P.L.U.S. Institute  
Roper Mountain Science Center**

**Academic Course Description:**

This course uses the design thinking process as an extension of science process skills to engage students in creative problem-solving for an authentic audience. Course topics are designed to enhance the middle school science teacher's comfort with collaboration and facilitate the shift from instructor to facilitator in the classroom. Activities are aimed at developing awareness in students of the connected nature of our world, and allowing for growth in critical thinking skills, communication skills, interpersonal skills, and global perspective. Participants receive a significant quantity of science materials for performing the activities in their classrooms.

**Outline of Course Content:**

**Main standard # (S.1.B.1)** Construct devices or design solutions using scientific knowledge to solve specific problems or needs: (1) ask questions to identify problems or needs, (2) ask questions about the criteria and constraints of the device or solutions, (3) generate and communicate ideas for possible devices or solutions, (4) build and test devices or solutions, (5) determine if the devices or solutions solved the problem and refine the design if needed, and (6) communicate the results. **This course will be focusing on integrating the Science and Engineering Practices standards. Various indicators from content standards will be addressed according to which content the participating teachers choose to use in the challenges.**

	Topics	Activities or Assignments	Correlation to SC Science Academic Standards
M o n d a y	Design Thinking  Science and Engineering Practices	-Intro to Design Thinking -LittleBits Challenge 1	6.S.1, 7.S.1, 8.S.1: A.1 – Ask Questions A.2 – Develop and Use Models A.3 – Plan and Carry Out Investigations A.4 – Analyze and Interpret Data A.5- Use Mathematics and Computational Thinking A.6- Construct Explanations A.7 – Engage in Scientific Argument from Evidence A.8 – Obtain, Evaluate and Communicate Information B.1 – Construct Devices or Design Solutions  Content standards as integrated by teachers
T u e s d a y	Science and Engineering Practices	Group Challenge: Solar Oven Rotate through station challenges in small groups, participating in challenge as well as presenting your work and giving/getting feedback: -Sphero Challenge -GoPro Challenge	6.S.1, 7.S.1, 8.S.1: A.1 – Ask Questions A.2 – Develop and Use Models A.3 – Plan and Carry Out Investigations A.4 – Analyze and Interpret Data A.5- Use Mathematics and Computational Thinking A.6- Construct Explanations A.7 – Engage in Scientific Argument from Evidence

		-Start Teacher Collaboration	<p>A.8 – Obtain, Evaluate and Communicate Information</p> <p>B.1 – Construct Devices or Design Solutions</p> <p>Content standards as integrated by teachers</p>
W e d n e s d a y	Science and Engineering Practices	<p>Rotate through station challenges in small groups, participating in challenge as well as presenting your work and giving/getting feedback:</p> <p>-Makey Makey/Paper Circuit Challenge</p> <p>-Scratch (Coding) Challenge</p> <p>-LittleBits Challenge 2</p> <p>-Continue teacher collaboration</p>	<p>6.S.1, 7.S.1, 8.S.1:</p> <p>A.1 – Ask Questions</p> <p>A.2 – Develop and Use Models</p> <p>A.3 – Plan and Carry Out Investigations</p> <p>A.4 – Analyze and Interpret Data</p> <p>A.5- Use Mathematics and Computational Thinking</p> <p>A.6- Construct Explanations</p> <p>A.7 – Engage in Scientific Argument from Evidence</p> <p>A.8 – Obtain, Evaluate and Communicate Information</p> <p>B.1 – Construct Devices or Design Solutions</p> <p>Content standards as integrated by teachers</p>
T h u r s d a y	Science and Engineering Practices	<p>-Teachers collaborate in groups to design lessons, prototype a student sample</p> <p>-Teach the lesson and get feedback</p>	<p>6.S.1, 7.S.1, 8.S.1:</p> <p>A.1 – Ask Questions</p> <p>A.2 – Develop and Use Models</p> <p>A.3 – Plan and Carry Out Investigations</p> <p>A.4 – Analyze and Interpret Data</p> <p>A.5- Use Mathematics and Computational Thinking</p> <p>A.6- Construct Explanations</p> <p>A.7 – Engage in Scientific Argument from Evidence</p> <p>A.8 – Obtain, Evaluate and Communicate Information</p> <p>B.1 – Construct Devices or Design Solutions</p> <p>Content standards as integrated by teachers</p>
F r i d a y	Science and Engineering Practices	-Teach the lesson and get feedback	<p>6.S.1, 7.S.1, 8.S.1:</p> <p>A.1 – Ask Questions</p> <p>A.2 – Develop and Use Models</p> <p>A.3 – Plan and Carry Out Investigations</p> <p>A.4 – Analyze and Interpret Data</p> <p>A.5- Use Mathematics and Computational Thinking</p> <p>A.6- Construct Explanations</p> <p>A.7 – Engage in Scientific Argument from Evidence</p>

			A.8 – Obtain, Evaluate and Communicate Information B.1 – Construct Devices or Design Solutions Content standards as integrated by teachers
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Daily Activities:

- Notebooks/Journals: data collection, analysis, reflections, feedback – will be assessed
- Discussion of Design Thinking model and practices as applicable to challenges and lessons being developed