



## COMMUNICATION

**The Big Idea:**

“Conversation is the slowest form of human communication.” The three main parts of communication are sending, receiving, and interpreting a message. Communication can occur in many forms for many purposes.

**The Big Idea (Synopsis):**

The Communication Capstone is designed to give students an authentic engineering team work experience in which the strengths of each member of the group is utilized for the good of the common product. The groups will be composed of four students that will have specific roles. The groups will work over a 10 week period to complete three major construction components to a sound system. First the groups will design and construct an amplifier. Next, students will create a housing unit that will hold the amplifier and a speaker. Lastly, students will use software to write an original piece of music and may also incorporate instruments and live vocals if they so choose. Students will also be creating a light display that will be a visual interpretation of the music they have created. The groups will give a “performance” using their constructed sound system in which they play their original piece of music through the speaker and amplifier, showcase the light display and marketing components.

**Essential Questions:**

- Why is communication important?
- How are you going voice your ideas to the world?
- If Mr. Smith is stuck in a locker, and nobody hears him call for help, does he really make a sound?

**Benchmarks:**

<p><b>Math</b> PROC 8-10F, G</p>	<p><b>English</b> ENG LTRY 8-10 E, ENG LTRY 8-10 F, ENG WRTA 11-12 C</p>	<p><b>Science</b> PHYS 9-10 F PHYS 9-10 G PHYS 9-10 G INQR 9-10 A KNWG 9-10 B KNWG 11-12 A</p>	<p><b>Engineering</b> EGR 11.1 EGR 2.13 EGR 1.5</p>	<p><b>Social Studies</b> SS SKLS 9-10 A SS PEPL 9-10 C</p>	<p><b>Art</b> History 9-12A History 9-12D ANYL 9-12 A APPL-9-12 B AEST 9-12 C</p>
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**Mastery Learning Goals:**

Mastery Column of Rubric

<p><b>Math</b></p>	<p>1. Student can accurately explain in writing how a mathematics is used to construct all components of sound system. Student can also write clearly and coherently about how mathematics plays a role in sound.</p>
<p><b>English</b></p>	<p>1. Poetry is exceptionally written in approved size and style font. Student uses Figurative language, sound devices and literary techniques. Writer makes no errors in grammar or spelling that distract the reader from the content.</p> <p>2. All required elements are present and answered in a factual, meaningful manner. Conclusion includes whether the findings supported the hypothesis, possible sources of error, and what was learned from the experiment. The writer seems to be writing from knowledge or experience.</p>
<p><b>Science</b></p>	<p>1. Student can create an extension of the parabolic transceiver that transforms the energy in the system into another energy form</p> <p>2. Student can develop an original demonstration of wave behavior</p> <p>3. Student can create and tune an instrument to produce a specific range of frequencies</p> <p>4. Student can create a procedure specific to creating and tuning an instrument</p>
<p><b>Engineering</b></p>	<p>1. Student can use at least two circuit elements not required in light box project to further control either the audio or visual parts of the light box</p>
<p><b>Social Studies</b></p>	<p>1. Students will create a marketing campaign, specific to a 1940s American audience, that is truthful in expressing what their product does.</p>



**Art**

2. Students will complete a manual that include a glossary of terms that accurately communicates technical terminology and jargon, including references to modern culture and historical context. Historical research is well thought out and evident
1. Student can explain the ramifications of cultural responsibility, demonstrating citizen's social initiative in contributing historically or politically as to how things are made.
2. Student will explain the era of propaganda, marketing a culture that contributes historically or politically as to how things are made.
3. Student can provide in-depth analysis about how things are made, but also assemble the works of art.
4. Student can create an original work of art, using art concepts as described by the parameters of the project
5. Judge the merit of selected artworks and provide the aesthetic basis for their position (aesthetics/art analysis)

**Rubric:**

<http://spreadsheets.google.com/ccc?key=0Au3jVEOyZ1PVdDdyeGdBMIFjTI9xUEprR0t0UDR6TXc&hl=en>

**Learning Activities:**

See Process Sheets

Project Manager (PM)	Electrical Engineer (EE)	Acoustics Engineer (AE)	Creative Design Engineer (CDE):	
<ul style="list-style-type: none"> <li>• Organizes information from other team members</li> <li>• Teachers others how to use fab lab tools</li> <li>• Fab lab safety certification</li> <li>• Fab Lab machine operation certification</li> <li>• Maintains an accountability flow chart</li> <li>• Contributes to the lyrics and sound recording</li> </ul>	<ul style="list-style-type: none"> <li>• Schematics for amplifier</li> <li>• Design</li> <li>• Diagram</li> <li>• Oversees Construction</li> </ul>	<ul style="list-style-type: none"> <li>• Schematics for housing unit</li> <li>• Design</li> <li>• Diagram</li> <li>• Oversees Construction</li> </ul>	<ul style="list-style-type: none"> <li>• Schematics for light display</li> <li>• Create marketing tools (business cards/logo/mission statement)</li> <li>• Creative design for light display</li> <li>• Creative design group performance attire</li> </ul>	

**Formative Assessments:**

Date	Task	Assessment	When
1. 01/05/10	Students have registered their group, students have selected roles.	All teachers will approve, amend, or reject groups.	Morning meeting, 01/06/10
2. 01/07/10	Students have created a flow chart that lists all of the tasks group members are responsible for	Flow chart rubric created. All teachers grade.	Thursday meeting, 01/07/10.
3. 01/08/10	Friday Individual Assessment	Teachers assess individual students in their room during project time.	During project time, 01/08/10
4. 01/14/10	Student is trained on FAB LAB tools and tested on skills and safety protocol.	Students assess each other by adding to flow chart. Mr. Bucur will give and grade written exam.	During project time, 01/14/10
5. 01/15/10	Friday Individual Assessment	Groups meet with professional	Project time
6. 01/22/10	Friday Individual Assessment		
7. 01/29/10	Friday Individual Assessment	Groups meet with professional	Project time
8. 02/05/10	Friday Individual Assessment		



9.	02/19/10	Friday Individual Assessment	OGT TEST-Still meet with professionals	Project time
10.	02/26/10	Friday Individual Assessment		
11.	03/05/10	Friday Individual Assessment	Groups meet with professional	Project time
12.	03/19/10	Friday Individual Assessment	Groups meet with professionals	Project time
13.	03/26/10	Performance Rubric	Project Rubric Used	PDI week

Friday Individual Assessment

- Easy rubric will be made during Thursday meetings.
- Each teacher will be responsible for roughly 15 students.
- During Friday project time, teacher will do a status check with students.
- Students will meet with their groups, discuss everyone's status, and create a plan for next week's tasks.
- Students will submit plan at the end of project time.
- Students will update flow chart based on task completion and new tasks added.

Professionals Assessments

We will secure five professionals and assign them to groups. These professionals will meet with their groups either in person or via skype to review the groups progress with a guided assessment sheet. See the Formative Assessment schedule above for dates. The professional will ideally need to be able to commit to 1 hour five times over the course of the project. Also ideally the professional will be able to meet with the kids between the hours of 9:20-11:20.

Rigor/Relevance

Students will be subjected to rigorous content expectations. Students will be covering topics in Pre-Calculus, as well as advanced topics in Physics and Engineering. NASA employees will be working closely with the physics teacher on communication demonstrations and small projects on antennae. The relevance will be provided by allowing students to create their own music and building a system on which to play it.

Final Products

*Group final products that will be assessed with the rubric*

1. Construction of the amplifier, light display, and housing unit
2. Technical manual-manual will be a how to writing that will include every machine in the fab lab, and how to construct every piece of the project
3. Lyrics
4. Marketing Components (logo, business cards, T-shirt)

Non Assessed final group pieces

1. Performance
2. Music composition

*Individual Final Products that will be assessed with the rubric*

1. Each student needs to hand in a Final Communications Report, see provided example template at <http://docs.google.com/Doc?docid=0AUcZXZyE8GGBZGR0eDRwNGtfMThmcW11NXZjZw&hl=en>