

Team #505: Pop-Up Classroom

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Team Members



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Sponsors and Advisors



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Academic Advisor
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Academic Advisor
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*Electrical & Computer
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Objective

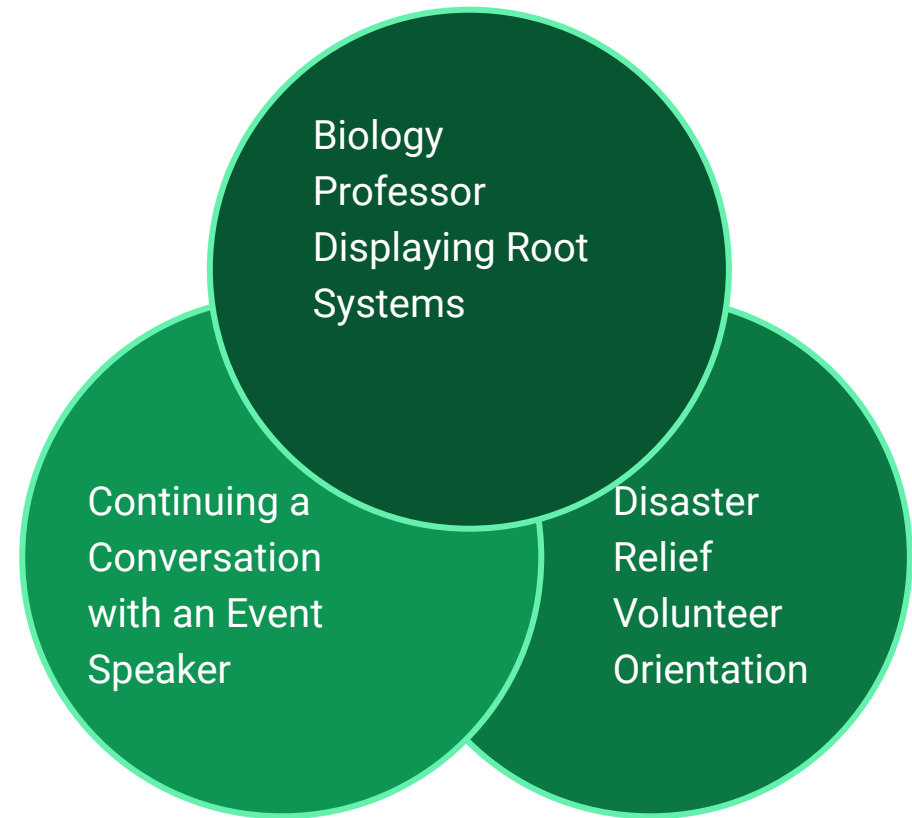
Campus Reimagined (CRI) seeks to create a new campus experience through the pop-up classroom. This device will provide a space for meetings, lectures, and similar events that is nomadic and can be ordered online.

Valeria Bernal



Product Application

Understanding the range of applications is fundamental to recognizing the scope



Valeria Bernal

Project Background

Project Scope

Providing an opportunity for learning in any environment.

Key Goals:

Nomadic, Promotes
Collaboration, Accommodates
10-15 People



Customer Needs

Mobility, accessibility, and access to common media devices were found to be most important to the customer.



Functional Decomposition

Main functional systems defined to be mobility (items involving motion) and connectivity (human interaction and technological connections).

Valeria Bernal



Defining Success

Targets and Metrics

- Braking Mechanism Present
- Device Base Can Handle the Weight of the Components
- Design is Intuitive

Testing Techniques

- Utilization of CAD Simulations with Various Weights Applied
- User Experience Survey
- Physical Testing of Components

Valeria Bernal



Redirection

Recently, we adjusted our scope in order to feasibly complete the project

Original

Gazebo built onto a trailer, allowing 10 members to be inside and chairs for others to sit in the surrounding area

Autonomous capabilities were not attempted

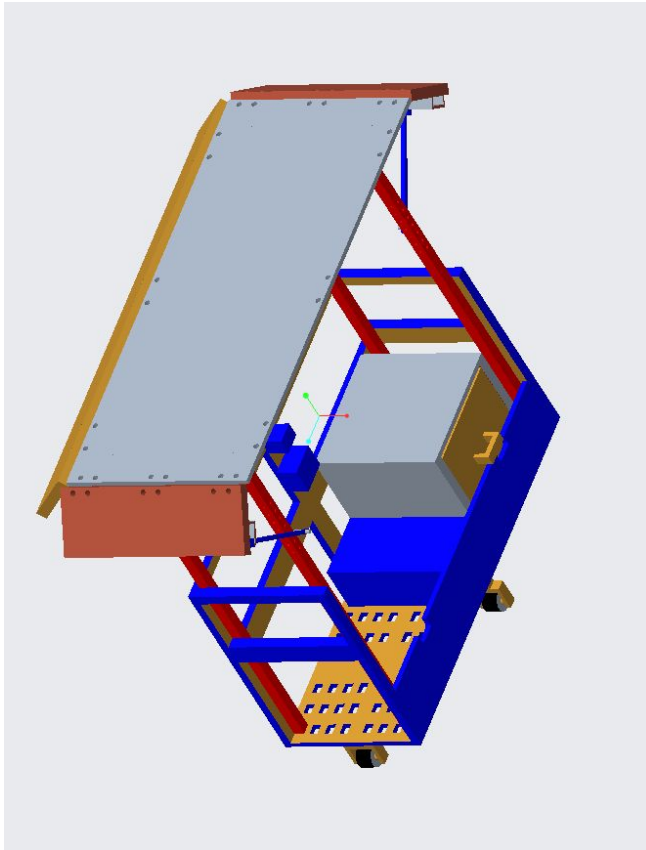
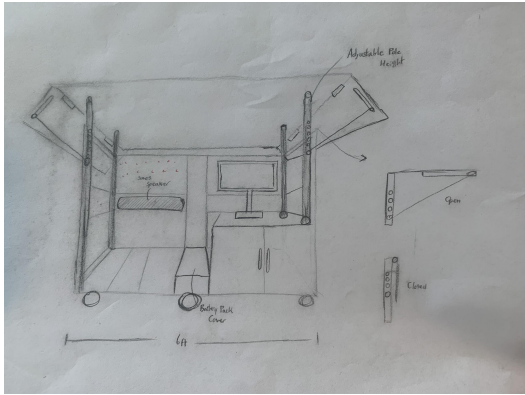
Redefined

Repurposing an autonomous vehicle from a previous year, outfitting the device with display options and collaboration tools

Members are not standing on the device, only the facilitator

Daziyah Sullivan

New Concept



- Roofing component is created out of poles and tin shading, extended by a notch system
- Incorporates a smart TV to provide casting capabilities from the facilitator's device
- Utilizes a remote controller from a bluetooth device for directions

Daziyah Sullivan

Testing

Motor and
Battery
Capabilities

Basic
Locomotion
from External
Source

Stability: Of
Cart and
Components

User
Experience

Daziyah Sullivan



Budget Update

Pricing for the Repurposed
Robotic Trash Cart:

Total: ~\$1570

Components to Replace:

Battery: \$130

Microcontroller: Raspberry Pi
given, Arduino nano 33 \$20

Additional Components:

Rods, Tin Roofing, Smart TV,
White Boards, Sensors,
Speakers

Projected Total: ~\$1300

Kyle Jackey

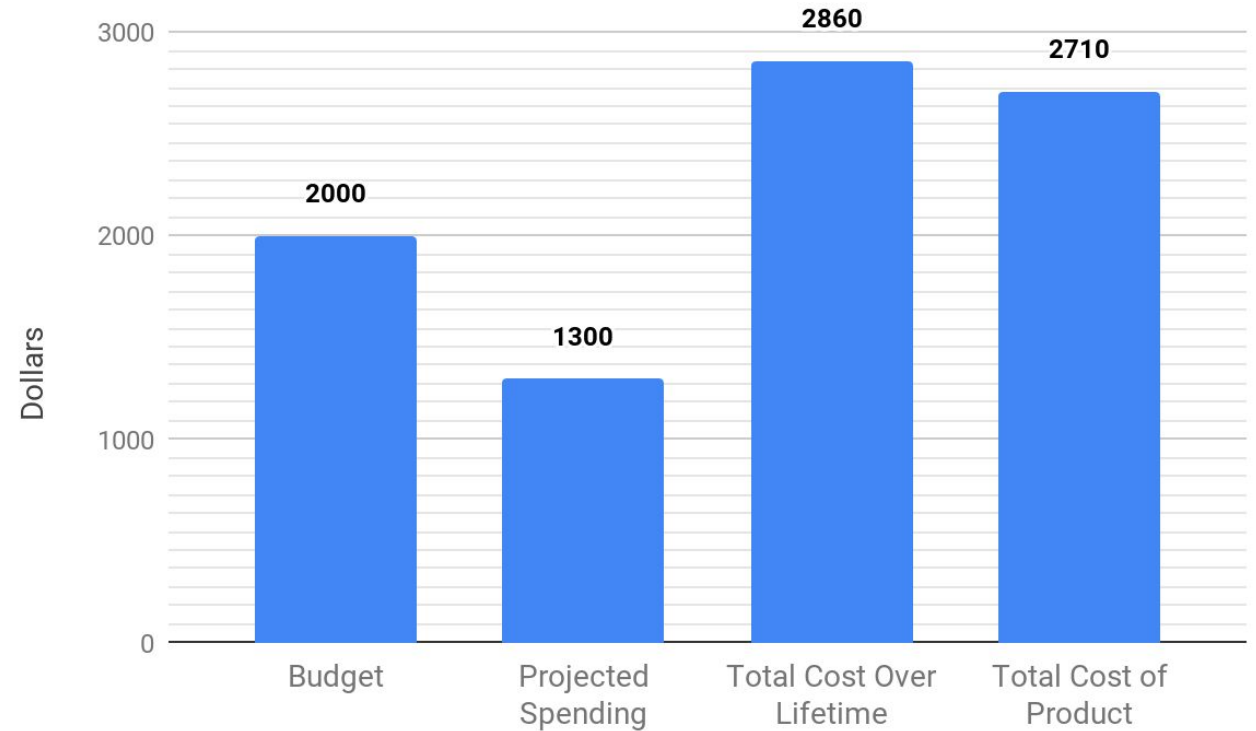
Budget Update continued

Total Budget:
\$2000

Projected Spending:
\$1300

Total Cost (Lifespan):
\$2860

Total Cost (Component Wise):
\$2710



Kyle Jackey

Key Takeaways

1. This project's main focus is to create a nomadic, collaborative environment.
2. The autonomous aspect of the project is being included once more.
3. Our redesign incorporates a former senior design project, bringing down total cost significantly.
4. We are currently ordering components.
5. Building should be completed by the last week of March, and testing will begin afterwards.

Kyle Jackey



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Questions?



Backup Slides



Customer Needs Backup



New Budget



<u>Item</u>	<u>Cost</u>
White Boards	
Sensor	18
Arduino Nano 33	20
Motor Battery	130
Smart TV	150
TV Mount	40
Microphone	16
Wifi Repeater	28
Speakers	400
DC-AC Inverter	400
Metal Rods	80

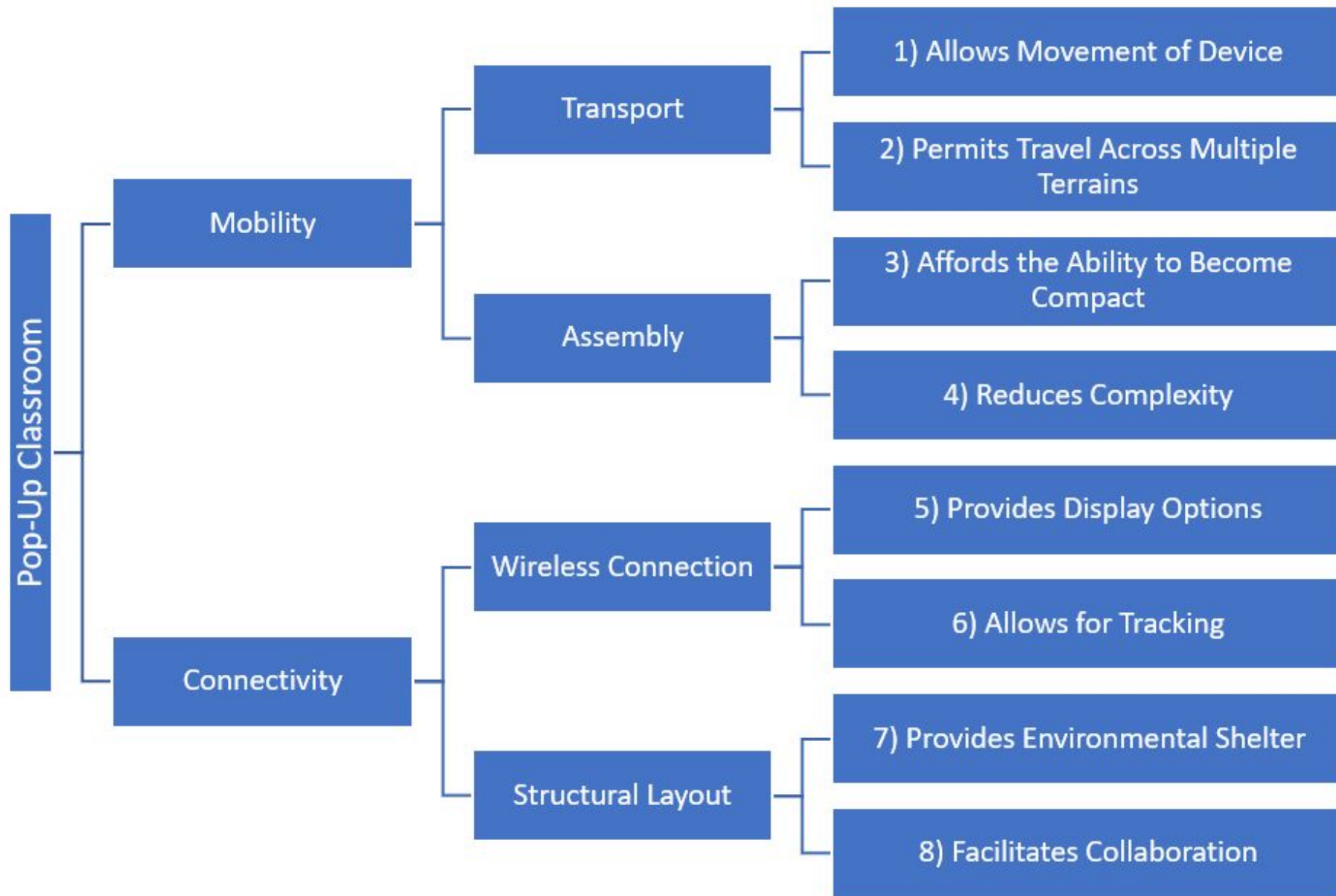
Question/Prompt	Customer Statement	Interpreted Need
Questions to the Sponsor		
As Stated in Project Brief	The popup classroom should provide a collaborative environment that is nomadic and has the capability of being ordered online	1. The layout provides the ability for collaborative input
		2. The product is mobile
		3. The product is integrated with an online platform
What is the required terrain?	Surfaces around campus or in parks	4. The device can maneuver common university terrain
What was the need that prompted this project?	Enabling conversations and valid discussions whenever it is wanted	5. The device is easily accessible to the customers
What is your opinion of the standard classroom setting?	The standard classroom setting is not conducive for critical thinking and creative learning.	6. The device promotes creativity and interactive learning
How many people will be using the device at one time?	From the size of small project groups to the size of group studies or tutoring	7. The device accommodates 10 to 15 people comfortably
What level of mobility is being asked for?	It should be nomadic with off-road preferred, can be driven or pulled initially with autonomous capabilities not being present in the first iteration	8. The device's motion can be manual, with powered or autonomous motion being implemented in later versions
		9. The device can be packed to reduce the hassle of moving across campuses

Questions to General Customers

What are the necessary components of a classroom?	Chairs, writing surfaces, some sort of projector that is connected to a computer, whiteboards, easily accessible electrical outlets, Wifi	10. The device includes media displays and seating/tabling options
		11. The device includes connectivity options such as internet access
What would you bring with you to an outdoors, educational experience?	Notebook and writing utensils, iPad, class materials, umbrella for shading or rain	12. The device allows users to set up their personal desk space similar to within a typical classroom setting
		13. The device provides shelter from the elements
Describe your ideal study or meeting space	In an area the size of a typical office space; a larger area that allows for personal space; a large table area to spread out	14. The device at normal capacity provides the ability to stretch out
What is your preferred shape for the educational experience?	U-shape, circling the speaker, modified U-shape, attendees in a circle with the speaker outside of it	15. The device's seating arrangement provides the participants the ability to view each other and requires the speaker to rotate to address them all
What does collaboration mean to you?	Cooperation of individuals that reach a common goal or mutual benefit	16. The device is structured to make it easy to interact with the other members
What tools do you find yourself using the most?	iPad, tablets, computers, smartboard, dry erase board	17. The device provides power for technological devices
		18. The device incorporates typical visual display options

Functional Decomp Backup





Concept Selection Backup



		Engineering Characteristics						
Improvement Direction			↑	↑			↑	↑
Units			lbs	#			m ³	kWh
Customer Requirements	Importance Weight Factor	Wheels and brakes are present	Device weight tolerance	Movable components stay in place	The design is intuitive	There is an admin portion to online platform	Provide enough room for 10-15 people	Adequate battery performance
Weight	5	1	3	3			3	3
Mobility	7	9	9	9	3	1	1	
Power Consumption	7				9	1	3	9
Area	2	3	3	9			9	3
Aesthetics	1	3	1	9	9	1	3	1
Weather Resistance	3		1	1	1			3
User Interface	5			9	9	9	1	
Raw Score (155)		16	17	40	31	12	20	19
Relative Weight %		10.3	11.0	25.8	20.0	7.70	12.9	12.3
Rank Order		6	5	1	2	7	3	4



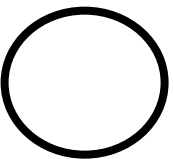
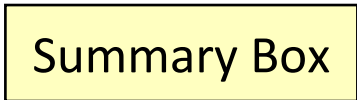
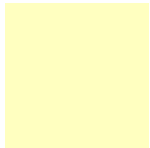
Detailed Math Backup



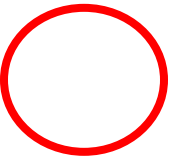




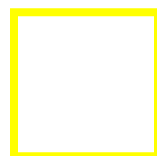
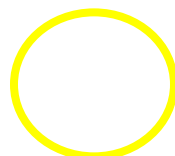
Standard Shapes



Text box
1



Outlined Text Box



Approved Logos



FAMU-FSU
College of
Engineering



FAMU-FSU
Engineering



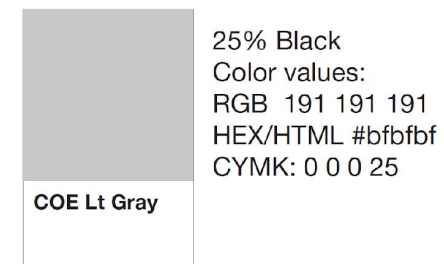
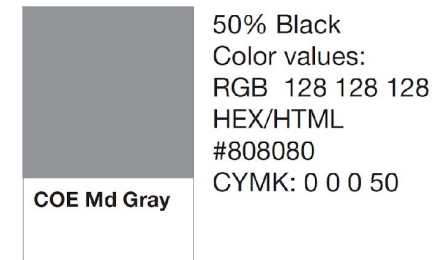
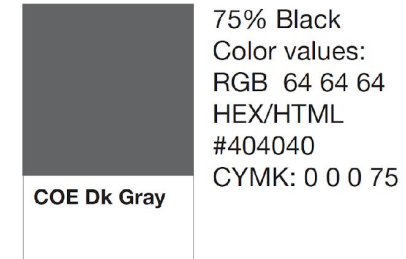
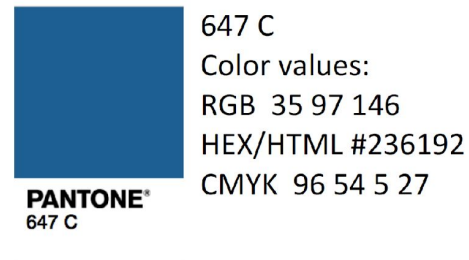
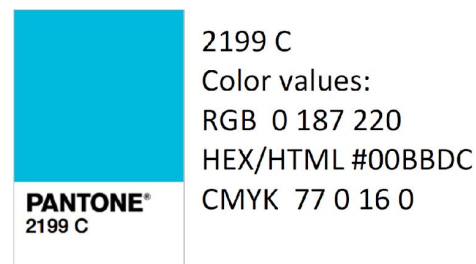
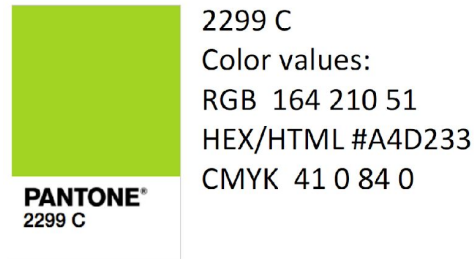
FAMU-FSU
Engineering



FAMU-FSU
College of Engineering



Color Palette



APA Tables

Category 1	Category 2	Category 3	Category 4	Category 5
Item 1				
Item 2				
Item 3				
Item 4				

	Category 2			Category 3	
Category 1	subcategory 1	subcategory 2		subcategory 1	subcategory 2
Item 1					
Item 2					
Item 3					
Item 4					