Spring 2021

(Personal Protective Equipment) PPE Design Prompt

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PPE Prompt

(Personal Protective Equipment) PPE Design Prompt

Option 1

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Background

As we continue to navigate the challenges surrounding the COVID-19 pandemic, we find that tools and equipment that functioned acceptably during normal circumstances are not fulfilling the extreme demands during this crisis situation. This project will explore more sustainable materials, construction, and a more user-centered design approach to solve problems of filtration, safety, comfort, and sustainability in personal protective equipment (PPE) as it becomes part of our everyday lifestyles.

Goals

1. Design a mask for long-term or specific user group use (ie runners, industrial workers, etc) If you had to wear a mask all day, what kinds of problems would you need to solve?

2. The mask design must include sustainable solutions that minimize waste.

3. Leverage generative design in Fusion 360 and the ecodesign strategy tools discussed in class and through readings to produce a sustainable design for a mask.

4. Evaluate your design solutions along the way using alternative tools and strategies to prototype such as AR and non-traditional mockup materials such as creating your own material from household ‘waste,’ sourcing industrial/production ‘waste,’ upcycling materials that would normally go into landfill, etc.. How can you be creative and expand the idea of sustainability to your entire design process? How can you leverage strategies such as circular design or cradle-to-cradle to reduce
environmental impact in your design process? For example, can your final design cannibalize material from prior design phases?

**Requirements**

- The mask must target N95 or better rating
- The mask must accommodate long-term use
- The new mask design must reduce environmental impact of a current N95 style masks by 50% or more
- The mask design must meet at least 1 or more of the UN's SDGs (United Nation's Sustainable Development Goals)
Considerations

- Present your final product ‘in a continuum’ sharing the historic past expression (and learning from it’s wisdom), current market competitor, and your future redesign that reduces the environmental footprint by 50%
- How can you design for inclusivity? How can you design for the variety of facial features across cultures?
- How can your design expand, reflect, or be inspired by current conversations around social justice?
- Can we design a mask to allow others to see our facial expressions?
- How can we incorporate better sound transfer from within the mask?
- How can we design for more comfortable wear?
- How can we design more sustainable mask production?
- How can we design for more reliable fit?
- Sterilization/cleaning/reuse

Market/Product/Design Reference

The race for R&D

There are many companies in the R&D phase of claiming new technologies and solving problems for everyday use. Here are some of the top we are tracking:

<table>
<thead>
<tr>
<th>1. CLIU</th>
<th>Claims:</th>
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<tbody>
<tr>
<td>![CLIU Image]</td>
<td>![CLIU Claims]</td>
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## Final Deliverables

### Final CAD Model and 1-page ‘Sell Sheet’
Design a poster 30”x40” that summarizing your approach to sustainability, the key features of your final design, your use of generative design, etc.

### Final SBOM (System Bill of Materials)
Calculate the environmental impact of each material and process (as possible) according to the Okala Impact Factor Points chart to visually quantify the environmental impact of your final design. The objective is to reduce from a comparable current target by at least 50%.

### Final Presentation
This final submission is your complete product presentation. Think of what is most important to communicate about your final design solution. How can your solution be evaluated for success? What problem(s) did you solve and what makes your design more successful than the predecessor product? Remember to include your History San Jose reference original product.

You will include:

<table>
<thead>
<tr>
<th>2. Leaf Mask</th>
<th>Claims:</th>
</tr>
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<tbody>
<tr>
<td><img src="image" alt="Leaf Mask" /></td>
<td>MOST FUNDED MASK</td>
</tr>
</tbody>
</table>
1) Final appearance model (including beauty shots and callouts of features and explanatory drawings)

2) Link to your Fusion model

3) Final LCA .pdf and a link to the original file

3) Final summary of where you reduced the environmental impact and carbon footprint of your product through design and by how much. Make sure this is clear and easy to read at a glance. Visual impact and organization of information and data is required here. Again, you should be focusing on how to translate the summary of both of your SBOM's here. They represent the full Life Cycle Analysis you have been working on all semester, for both your original product and your redesign. You can also use the Ecodesign Strategy Wheel to help get more detail on the major areas you reduced impact. Be sure to include the final numbers from the SBOM (Total Impact/Lifetime: Materials, Processes, Energy, End of Life, Transport; Impact/Hour) for both products, as well as how generative design was utilized in your design process.

4) The original product and its package (if applicable) and the original product SBOM that clearly communicates the final Impact #’s.