

Progress Reports are graded on the (i) write-up of what has been accomplished and (ii) the amount of said progress on the overall project.

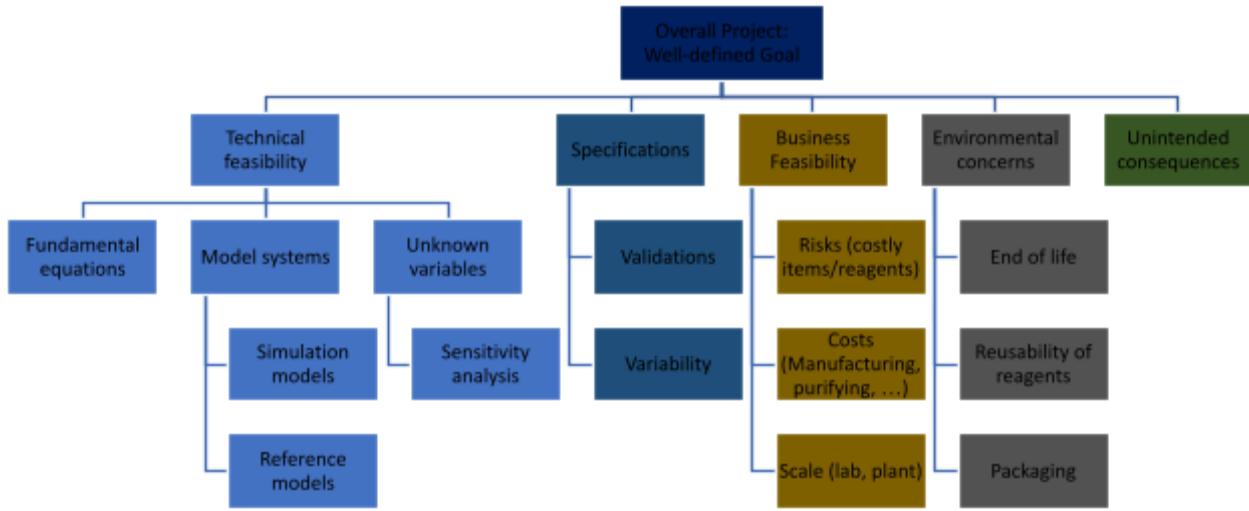
1. Group Number and Title: Group 11 – Sustainable Polymers

2. Week 9/16 and Date: 3/28/2025

Understand	Synthesize	Ideate	Prototype	Implement
Explore	Debrief	Brainstorm	Create	Support
Observe	Organize	Propose	Engage	Sustain
Empathize	Define	Plan	Evaluate	Evolve
Reflect	Interpret	Narrow Concepts	Iterate	Execute

3. Provide a brief list of activities that were done and their corresponding HCD space(s) and subspace(s) (add rows if necessary):

Activity	HCD space(s)	HCD subspace(s)
Continuing Degradation Tests	Prototype	Evaluate
Received and unpacked new materials (cotton candy machine, glue, exacto knives)	Ideate	Plan
Continuing DSC data collection	Prototype	Evaluate
Fiber forming trials (cotton candy machine)	Prototype	Create
Made fibers from varying PEG/PLA concentration	Prototype	Evaluate
Made new 20 wt% PEG + PLA stock samples	Prototype	Create
Made new 5 wt% and 35 wt% samples for rheology testing	Prototype	Create



4. What branches/blocks were work focused on this week?

Technical feasibility - model systems (reference models)

Specifications - validations and variability

Environmental concerns - end of life

Business feasibility - scale

5. What was accomplished? (4-5 bullet points, include data/charts if applicable)

- Tried using creep equipments for fiber pulling
- Tried using the cotton candy machine for PLA fiber fabrication
- Did more DSC on the sample to see if they are consistent with previous results and figure out the T_g
- Made more of all samples for future applications: rheology, DSC, fiber pulling

6. What challenges are still outstanding? (2-5 bullet points)

- Mechanical testing is still ongoing: we will need to troubleshoot if it doesn't work
- Creep testing equipment did not work to make fibers
- Cotton candy machine needs to be cleaned before more sample can be made

7. As you engaged in human-centered engineering design activities this week, do you think you became curious about any new content? If yes, how?

Yes, we have become curious as to how the morphology and processing of our samples affects the pulled fiber. This is because the method of squishing the cut up samples in the

melt indexer affects the air bubbles and inclusions in the fiber. Additionally, the polymer demonstrates thinning under pressure for the PLA/PEG 35% sample.

8. As you engaged in human-centered engineering design activities this week, do you think you made any new connections (e.g. connections between ideas, connections between people, etc.)? If yes, how?

Yes we made new connections between the percentage of PEG in the sample and the fiber pulling behavior. We have seen that increased PEG in the sample creates a more gummy, less functional sample.

9. As you engaged in human-centered engineering design activities this week, do you think you created any value (e.g. identified a way to work together more efficiently, found a way to improve your idea or design, etc.)? If yes, how?

We created value by testing a more high throughput method (the cotton candy machine) that is similar to how fibers might be created on an industrial scale. This gives us more information about how our material might or might not be scalable, which is what would make it relevant and valuable to the fast fashion industry.

10. What feedback did you obtain from the instructor or TA last week that you addressed in your work this week?

The feedback last week was similar to the week before; mainly that we need to figure out mechanical testing. We scheduled a meeting this week with the Sottos lab and have made our samples for the testing so it should be handled by next week.