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.

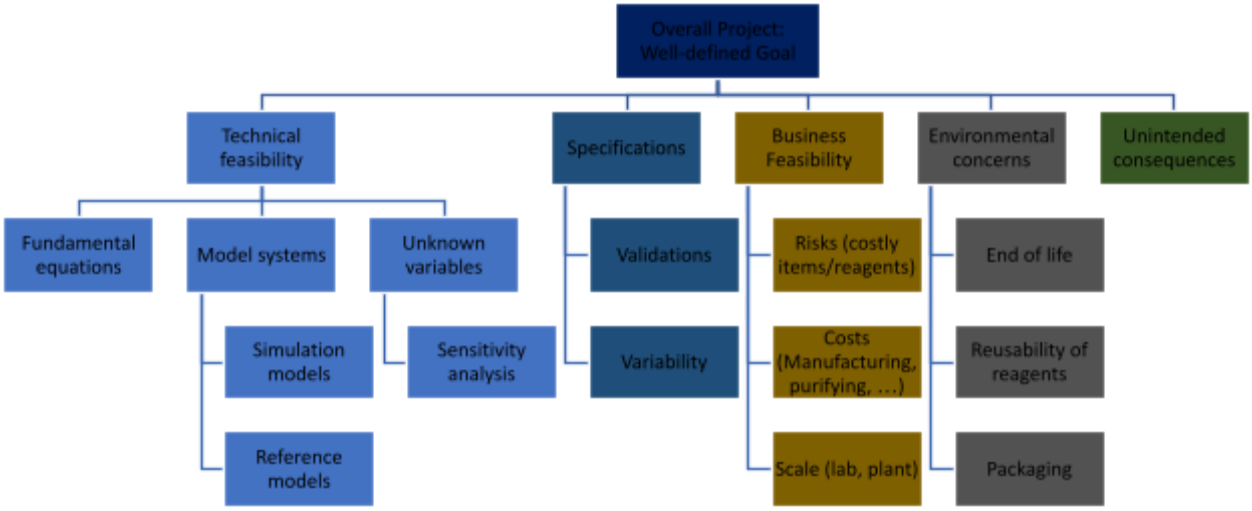
1. Group Number and Title: Group 11 – Sustainable Polymers

2. Week 8/16 and Date: 3/14/2025

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
Finished Midterm Presentation and gave the presentation	Understand and Synthesize	Explore and Organize/Define
Continuing DSC data collection	Prototype	Evaluate
Updated budget to account for new mechanical testing plan and requested new materials for purchase	Ideate	Propose
Looking for methods to hot pull fibers more consistently (got trained on the creep testing equipment)	Plan	Brainstorm
Experimented with different temperatures for hot pulling with PLA/PEG samples	Prototype	Create
Conducted measurements on optical microscopy images	Prototype	Evaluate
Decided to prioritize polymer blends over composites	Ideate	Narrow Concepts
Trained on the Rheometer	Ideate	Plan



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)

- Finished and presented the Midterm Presentation
- Sent updated budget with purchase request so that we can begin mechanical testing after break
- Measured fibers in optical microscopy images
- Tested pulling sample fibers at 3 different temperatures
- Got trained on the rheometer

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

- Still need to find a more controlled manner to pull fibers and determine if it makes consistent sizes.
- Had to terminate the cotton and 5 wt% PEG + PLA tests because the samples were too broken to ensure successful recovery
- Difficult to consistently pull PLA/PEG fibers in melt indexer
- DSC data is not completely clear to extract Tg

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?

   We became curious about what we can use our remaining budget for (~$200), and threw around some ideas. For example, using a cotton candy machine to melt spin PLA fibers (because the melting temperature of PLA is similar to sugar). Also, we looked into the materials necessary for conducting mechanical testing according to the ASTM standard we found previously.

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 have determined what variables affect the quality of the pulled fiber. We have made connections between the geometry of the initial polymer to how it is extruded through the melt indexer.

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 have created value by being trained on the rheometer which helps us characterize our samples. Having a better understanding of the properties of our samples creates value as we are better able to compare our sample to our model.

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

    We have removed cotton from our degradation testing as recommended by our TA as the sample was degraded beyond salvation.