

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.

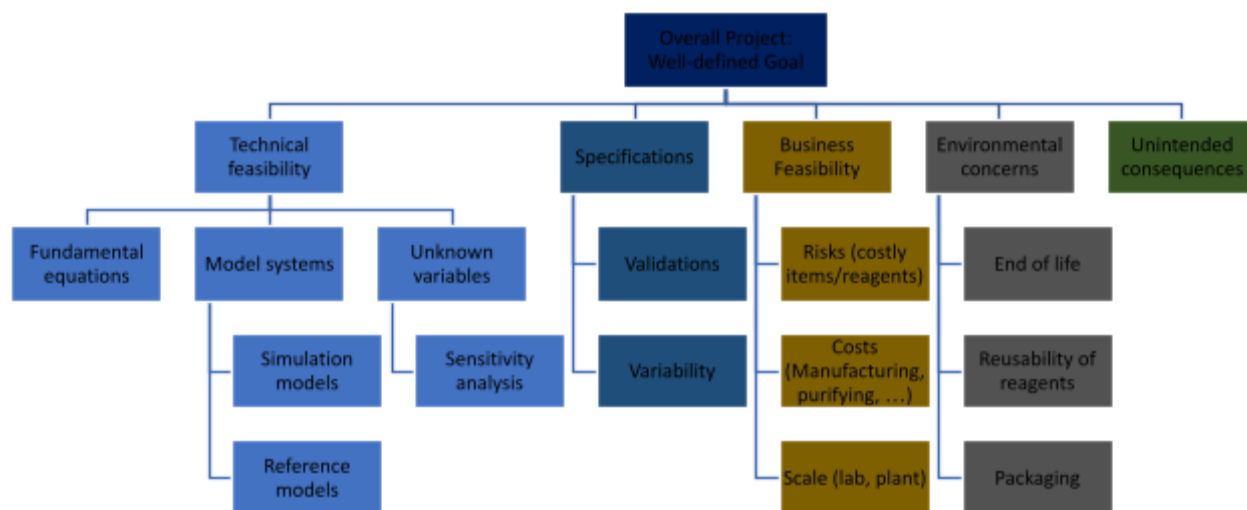
1. Group Number and Title: Group 11 – Sustainable Polymers

2. Week 4/16 and Date: 2/14/2025

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)
Synthesized first PLA-PEG sample	Prototype	Create
Started degradation testing	Prototype	Evaluate
Assigned schedule for degradation testing	Ideate	Plan
Synthesized new PLA-PEG samples with different PEG concentrations	Prototype	Create
Got trained on SEM	Ideate	Plan
Continued printing 3D extrusion part	Prototype	Iterate
Tested Melt Indexer for PLA & PLA-Fiber Blends	Prototype	Evaluate
Assigned tasks for characterization and scheduled times	Ideate	Plan
Reviewed degradation tests in literature to figure out how to document moisture content	Understand/ Synthesize	Explore, Interpret



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

- Technical feasibility - model systems
- Environmental concerns - end of life

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

- The first polymer PLA-PEG blend sample with 20 wt% PEG was synthesized successfully.
- Started the degradation test with the 20 wt% PEG, PET, and cotton samples.
- Schedules for maintaining the degradation environment and testing of samples was made. Assignments were done until the end of the semester.
- Group members were trained in the SEM and now have room access to the equipment.
- Found that the melt indexer was capable of producing of very thin strands of polymer

6. What challenges occurred that were overcome? (3-5 bullet points)

- Using parafilm to enclose polymer solution was unsuccessful as the solvent vapor dissolves parafilm. This was addressed by using aluminum foil to cover the polymer solution.
- The first synthesized PLA-PEG blend has a lot of bubbles trapped within. This was addressed by using more solvent and aluminum foil cover to better prevent solvent evaporation, lowering the solution viscosity so bubbles can escape.
- The printed 3D part was still closed due to low printing resolution. A PCB drill was used to clear out the hole, but the material broke the smallest drill bit (0.1 mm). To address this, a larger drill bit will be used.

- The challenge of producing thin fibers was overcome as the melt indexer is able to make them free hand

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

- The polymer sample under the SEM charges up and shows up as a bright spot. Could potentially be addressed through sputtering.
- The moisture meter purchased uses an arbitrary scale. This could be calibrated by correlating to moisture content by weight using an experiment.
- The 3D printed extrusion piece is still not done, but we have plans for it to be done soon.
- MRL still has not replied about electrospinner training.
- Must clean the melt indexer to remove stuck fibers
- Determining how reliable melt indexer is when making fibers and how thin a fiber is possible

8. What feedback did you obtain from the instructor or TA last week?

The TA gave us the advice to think about what content should be put on the poster and plan to take images, document progress, and pace ourselves so that we have content by the midterm presentation. Additionally, we were advised that with 10 weeks left in the semester, we need to delegate enough time for characterization later in the semester.

9. How have you addressed said feedback in your work this week?

We took several pictures of the sample synthesis process to demonstrate our procedures and show progress for our midterm presentation. We created and filled out a schedule to make sure we were staying on track. We also started the process of characterization this week with training so that we can have some data by the midterm presentation.