MSD Project Risk Assessment Template

ID	Risk Item	Effect	Cause	Likelihood	Severity	Importance	Action to Minimize Risk	Owner
	Describe the risk briefly	*What is the effect on any or all of the project deliverables if the cause actually happens?*	*What are the possible cause(s) of this risk?*			*L* S*	*What action(s) will you take (and by when) to prevent, reduce the impact of, or transfer the risk of this occurring?*	*Who is responsible for following through on mitigation?*
1	Not being able to find the parts we need for our print head	Project delay	Limited availability	1	2	2	Wide range of research regarding the parts we need, track availability in our BOM, contact SMEs about suppliers.	Entire team
2	Heat management	Printer head fails, plastic pellets melted too soon	High temperatures & poor insulation	3	3	9	Insulation research, multiple solutions, possible failsafe. Feedback process built into system.	Kylan
3	Improper research calculations	Coming in over budget/failed part	Buying/designing wrong parts	2	3	6	Thorough research and calculations. Peer and expert review/feedback. Track part costs in BOM.	Entire team

4	Inability to print for 10 hours	Failure to meet customer requirements	Clogging/heat management/lack of pellet supply/non-uniform flow rate	2	3	6	Proper insulation, constant pressure, constant pellet supply, interchangeable nozzles, feedback process built into system. Testing of equipment. Part inspection.	Entire team
5	Team Complications	Project delays	Miscommunication, disagreements, scheduling conflicts	3	2	6	Communicate, set up meetings prior, talk to team facilitator, meeting agendas/notes.	Entire team
6	Failure to provide adequate operation manual	Not meeting customer requirements	Improper documentation along the way	1	3	3	Adequate engineering notebook, thorough documentation, process testing, proper time management.	Alyssa
7	Safety	Inflicted injury/death	High temperatures, automated parts, shop environment	2	3	6	Paying attention, heat management, feedback systems, failsafe, abiding by lab safety rules.	Entire team
8	Delayed part delivery	Project delays	Unreliable suppliers	1	2	2	Purchase from reliable sources, backup suppliers, log order dates and expected delivery dates, maintain contact with Marylin.	Alyssa

9	Scope creep	Project delays	Trying to incorporate too much	2	2	4	Functionality first, stick to project plan, realistic goals, satisfy major engineering requirements.	Alyssa
10	Unavailable customer	Project delays, lack of communication	Busy	3	3	9	Clear communication, alternative resources, specific and direct questions/requests. Continually request feedback.	Alyssa
11	Ineffective pellet grinding	Clogging	Improper balance between pellet shape/consistency and grain size	2	2	4	Research on grinders, research on pellet sizes now, testing to see how small we can get the pellets, contact pellet manufacturers.	Ray
12	Printer head size/mass too big/too heavy	Project delays, printer head won't move, printer head wont' fit, printer head fails	Limited materials, limited cost, poor designs	2	3	6	Research on materials, research costs of materials, weigh everything and compare to previous print head, testing, benchmarking, add weight section to BOM	Jimmy
13	Test results that don't repeat	Project delay	Wired incorrectly, heat management, clogging in screw, heavy print head, too large of a print head	3	3	9	Research and analysis needs to be done correctly, need help from faculty for analysis, approved designs from customer prior to buying parts, get help with wiring properly, insulation research. Also, simulations or walkthrough can be performed to make note of what the expected outcomes are and be used as a baseline.	Ray

14	Parts getting lost	Project delay/coming in over budget	Miscommunication with where our purchases parts are going, misplacing things, not keeping track of our parts/materials	2	3	6	Set up a spreadsheet containing all of our materials (bill of materials) and a log to measure expected deliveries and actual deliveries.	Alyssa
15	Consistent flow management	Defective parts	Pressure and heat variability, pellet variability, screw degradation, drive method, motor performance variation	3	2	6	Extensive testing, flow feedback process, temp/pressure control, material specifications, motor selection research	Jimmy
16	Customer satisfaction	Poor project outcome and deliverable	Miscommunication, unsatisfactory deliverable, conservative research	2	3	6	Effectively communicate with customer, exceed expectations, strong design development, alternative solutions, team flexibility.	Alyssa
17	Overly Complex Designs	Delays and Scope Creep	Ambitious ideas rather than realistic and attainable solutions	2	2	4	Use of tools such as BOM, feasibility analysis, etc. to ensure our potential solutions are adequate	Ray
18	Overheating subsystems	Motor failure, power failure, etc	Poor heat insulation	1	3	3	Insulation, material selection, thermal feedback systems	Kylan/Jimmy

19	Insufficient drive power	Pellet jamming, no dispensing, backpressure	Weak motors driving the pellets, poor screw design	2	3	6	Adequate motor selection, screw design parameters, gear ratio	Jimmy
20	Inability to maintain operating temp	Over melting the pellets, solidifying within print head, print failure	insufficient heating elements, feedback system	2	3	6	Fail/safe sensor, insulation, thermal feedback system, heating zone control	Kylan
21	Inability to achieve operating temp	Inability to print ULTEM and meeting customer requirements	Poor insulation and heating elements	1	3	3	Research specs/capabilities of heating elements, heating element testing, research insulation specs	Kylan
22	Screw Deflection	Material fails, pellets jam	Inability to hold small tolerances with structural integrity	1	3	3	Proper screw design and material selection	Jimmy

Likelihood scale	**Severity scale**
1 - This cause is unlikely to happen	1 - The impact on the project is very minor. We will still meet deliverables on time and within budget, but it will cause extra work
2 - This cause could conceivably happen	2 - The impact on the project is noticeable. We will deliver reduced functionality, go over budget, or fail to meet some of our Engineering Specifications.

3 - This cause is very likely to happen	3 - The impact on the project is severe. We will not be able to deliver, or what we deliver will not meet the customer's needs.

"Importance Score" (Likelihood x Severity) – use this to guide your preference for a risk management strategy	
Prevent	Action will be taken to prevent the cause(s) from occurring in the first place.
Reduce	Action will be taken to reduce the likelihood of the cause and/or the severity of the effect on the project, should the cause occur
Transfer	Action will be taken to transfer the risk to something else. Insurance is an example of this. You purchase an insurance policy that contractually binds an insurance company to pay for your loss in the event of accident. This transfers the financial consequences of th accident to someone else. Your car is still a wreck, of course.
Accept	Low importance risks may not justify any action at all. If they happen, you simply accept the consequences.