	Describe the risk briefly	*What is the effect on any or all of the project deliverables if the cause of this risk actually happens?*	*What is/are the possible cause(s) of this risk? (Be creative!)*	*1-->3*	*1-->3*	*L*S*	*What action(s) will you take, by when to prevent, reduce the impact of or transfer the risk of this cause occurring?*	*Who is responsible for following through on the mitigation?*
Category	**Risk Item**	**Effect**	**Cause**	**Likelihood**	**Severity**	**Importance**	**Action to Minimize Risk**	**Owner**
Design	Drive/Power train seizes	device doesn't work	sand/debris in the mechanism	0	3	0	enclose the mechanism, create drawing for B9 to manufacture case	Kyle
Design	Gears wear prematurely	Failure of gearbox	Gears may be made from thermoset plastics, grind plastic down	0	3	0	Will use Carbon Steel for gear	Kyle
Design	Crankset fails/pedals fail	no power provided to bulb unit	kids pedalling too fast or hard/general misuse of device and they come undone	3	3	9	Builld from structurally sound materials, use high factor of safety	
Design	Seat back collapses during use	User will have to support their body in order to pedal	Misuse or lack of proper analysis of range of loads	1	2	2		
Design	Seat collapses during use (bucket)	User will not be able to support their body in order to pedal	Misuse or lack of proper analysis of range of loads	2	3	6	brainstorm further to identify best seat solution	
Design	Shaft misalignment	"wobbling" of shaft	Higher RPM than is proper for shaft size	1	3	3	Ball bearings will allow for some shift but we will design around it.	
Design	Gears shift along shaft	gears will not mate	no collar	1	3	3	Use e clips with groove, also apply stepping	Jess, Kyle
Design	Components Break	device doesn't work/repairs have to be made	large forces on weak/brittle components	1	3	3	analyze forces on components and design for that; include repair instructions in manual	
Design	Durability	Wear/rust decreases stability, safety, ease-of-use	Device is made of highly corrosive parts	1	2	2	Use a lubricant to prevent rust and wear on carbon steel. Also encasing the gears will reduce wear caused by outside stuff.	
Design	Gearbox falls over during use	may break pedals or device	not stabilizing the gearbox and chain properly	1	2	2	Added pin to linear track, adding support at base if needed	
Design	Product Safety	Injuries to user and/or damages to device	Keeping costs down permits too many exposed parts	1	3	3	Encase (with plastic/acrylic material)	
Design	Gear Ratio too damn high	Gears hard to turn	excessive inertia to overcome	3	3	9	Analysis to confirm motor and gear selection sizes	Kyle and Jess
Design	Complexity and Size of Design	Device is difficult to set up	Number of Components not minimized	1	1	1	Provide an adequate straightforward instruction manual	
Electronics	Too much power blows bulb and/or pump	Destroy intended use product, cause needed repair	Over-pedaling and not properly sizing the circuit. Or the regulator circuit malfunctions	1	3	3	Test the regulator circuit w/ out bulb attached	Chris
Electronics	Voltage Regulator stops functioning.	System will have no maximum voltage. May provide too much power and may damage pump and bulb.	Several; physical damage, malfunctioning ICs, blown caps	1	3	3	Physically protect the circuit and find a dependable supplier for components.	Chris
Electronics	LED interface stops functioning.	User will not be told when they are generating enough Power.	LED blown, circuit has physical damage, etc.	2	1	2	Physically protect the circuit.	Chris
Electronics	All or 1 DC motor(s) stop functioning	Will not generate enough power to run Bulb or pump.	Physical damage, loose wiring, etc.	2	3	6	Protect the motors and operate them at a reasonable rpm such that they have a long life.	Chris

	Describe the risk briefly	*What is the effect on any or all of the project deliverables if the cause of this risk actually happens?*	*What is/are the possible cause(s) of this risk? (Be creative!)*	*1-->3*	*1-->3*	*L*S*	*What action(s) will you take, by when to prevent, reduce the impact of or transfer the risk of this cause occurring?*	*Who is responsible for following through on the mitigation?*
Category	**Risk Item**	**Effect**	**Cause**	**Likelihood**	**Severity**	**Importance**	**Action to Minimize Risk**	**Owner**
Electronics	wires come unsoldered	various; electronics don't work as they should	poor solder joints	1	3	3	Stabilize circuit board, minimize length and interference of wires	Chris
Electronics	Miscellanious wiring issues	Ranges from insignificant to critical depending where it takes place.	Either physical damage to the unit or bad manufacturing.	1	3	3	Physically protect all wiring.	Chris
Ergonomics	Uncomfortable/Non-ergonomic Seating	Using device places an unnecessary strain on users	Not being able to find a reliable source for an OTS seat	1	2	2	Explore all options for seating and choose most inexpensive and easily sourced and modify design as needed; prototype seating	Erika
Ergonomics	Adjustable Seat length(for intended users)	Adding flexibilty to accomodate user size increases costs	Range of users	0	1	0	Design for approximately 90% of women and 50% of children above the age of 6	
Ergonomics	Seat is too large/small for some users' comfort	End user discouraged from use	Not enough subjects tested device	1	1	1	test subjects of many ages, sizes, weight	
Ergonomics	Prototype doesn't accomodate intended users	Many end users dislike use	Not enough subjects tested device	1	1	1	Bring in sufficient range of subjects to test device	Jake, Erika, Liz
Ergonomics	Complexity of Design	New design requires more labor to construct	Number of Chains and Gears, Size of Motor	1	2	2	Provide an adequate straightforward instruction manual; pre-construct gear box.	Kyle, Liz, Jess
Ergonomics	Poor User-End Assembly	broken parts; no put-together device	too much user-end assembly; unclear/inadequate manuals	1	2	2	test user manuals on random people/children; pre-assemble major components before ship.	
Ergonomics	Ergonomic Fit	several people can't share workload	the device is too large/small	1	1	1	adjustable seating	
Project Planning	Materials Missing for Prototype	Cannot show customer a functional prototype	Parts did not arrive in time	2	2	4	Take into account long order lead times	Jess
Project Planning	Build Failure	No functional prototype	inadequate analysis	2	3	6	conduct appropriate analysis and source all necessary tools ahead of time	Chris, Kyle, Liz, Jess
Project Planning	Will not finish analysis on time	May cause problems with design funtionality	too many design review presentations; not spending enough time on project	3	3	9	Stay ahead of project plan by reveiwing action items	Jake
Shipping	Size of Device	Device is costly to ship due to size	Number of Chains and Gears, Size of Motor	2	2	4	some assembly required? collapsible?	All
Shipping	Difficult to Ship	increases end cost to user/broken components upon arrival	Big, heavy	1	2	2	minimize footprint, minimize weight, incorporate some user-end assembly; support unit for fragility	
						97		