

# 1 Weighted Decision Matrix

Evaluation Criteria	Concept 4- Puff Motorized gearbox with potentiometer detection				Concept 2- Get Hitched Dual motor 4 wheel drive with simple gears				Concept 3- Pump Chump Belt drive with servo brakes and light sensor				Concept 5- Simplicity Simple belt-drive design			
	Weighting (%)	Rating (/10)	Rating Justification	Score	Rating (/10)	Rating Justification	Score	Rating (/10)	Rating Justification	Score	Rating (/10)	Rating Justification	Score	Rating (/10)	Rating Justification	Score
Competition Cost	20%	9	The calculated cost for this design was determined to be approximately \$80	1.8	9	This design was calculated to be approximately \$90 in price.	1.8	9	The calculated cost for this design was \$85	1.8	9	The calculated cost for this design was determined to be approximately \$80	1.8	9	The calculated cost for this design was determined to be approximately \$80	1.8
Energy	20%	4	This design would require the same amount of energy as the other designs to pull up the same amount of weight.	0.8	3	This design is slightly heavier due to its extra motor and therefore would require slightly more energy to move the car.	0.6	4	This design would require the same amount of energy as the other designs to pull up the same amount of weight.	0.8	4	This design would require the same amount of energy as the other designs to pull up the same amount of weight.	0.8	4	This design would require the same amount of energy as the other designs to pull up the same amount of weight.	0.8
Derailment Stability	25%	8	This design uses conical wheels, which derailed 2 times out of 9 trials. It has a low center of gravity.	2	8	This design uses conical wheels, which derailed 2 times out of 9 trials. It has a low center of gravity.	2	5	This design uses conical wheels, which derailed 2 times out of 9 trials. However it has a high centre of gravity, which derailed 9 times.	1.25	5	This design uses cylindrical wheels, which derailed 5 times with a low centre of gravity.	1.25	5	This design uses cylindrical wheels, which derailed 5 times with a low centre of gravity.	1.25
Cargo Transfer Ability	10%	4	This design was able to exert 32mN·m of force before stalling  In this design, our team will need to create a gearbox and figure out how to make potentiometer detection work properly. Therefore, this design is manageable, but will require lots of time to complete.	0.4	8	This design is expected to perform twice as well as a similar design with only one motor  The light sensor is likely easier to program, and the motors may be more difficult to set up in sync. However, even if the motors are out of sync, this design will be able to compete.	0.8	1	The belt drive could not transport cargo without overheating or slipping	0.1	1	The belt drive could not transport cargo without overheating or slipping	0.1	1	The belt drive could not transport cargo without overheating or slipping	0.1
Risk	25%	3		0.75	5		1.25	1	The belt drive wore down extremely quickly (~2min), and reduced the diameter of our pulleys to the point where there was a visible difference.	0.25	1	The belt drive wore down extremely quickly (~2min), and reduced the diameter of our pulleys to the point where there was a visible difference.	0.25	1	The belt drive wore down extremely quickly (~2min), and reduced the diameter of our pulleys to the point where there was a visible difference.	0.25
Net Score	100%			5.75			6.45			4.2			4.2			4.2
Rank				2			1			3			3			3

Table 1: Weighted Decision Matrix