

Duck Dolly 2.0



Phase 1 Presentation

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Project Statement

- Cargo Bike Storage attachment for bike users in urban areas
- Focus on use for commuting, errands, and delivery services
- Existing solutions are expensive, not easily maneuverable, lack storage, or are not modular
- Goal to maintain functionality of bike while attachment is in use
- Challenges:
 - Size - Does it meet the customers' demand?
 - Compactivity - Can it be easily stored?
 - Functionality - Where does it attach to the bicycle?

State of the Art Review



Trenux Trailer



Travoy Trailer



Rear Folding Basket



ZiZZO Trailer

Target Customers / Customer Needs

Potential Customers

- Bicycle commuters going to work or school
- Anyone using bicycles to run errands
- Restaurant delivery riders
- Focus on users in urban locations

Customer Needs

- Affordable price
- Convenient
- Collapsible/expandable
- Protects cargo (weather, jolts)
- Traverses different terrain and obstacles
- Durability and long useful life

Target Needs and Metrics

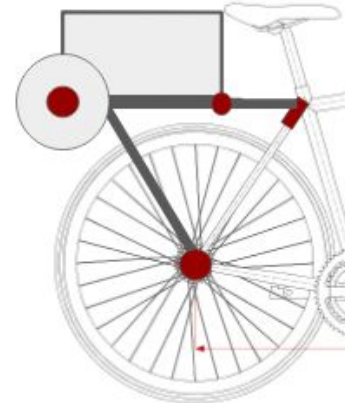
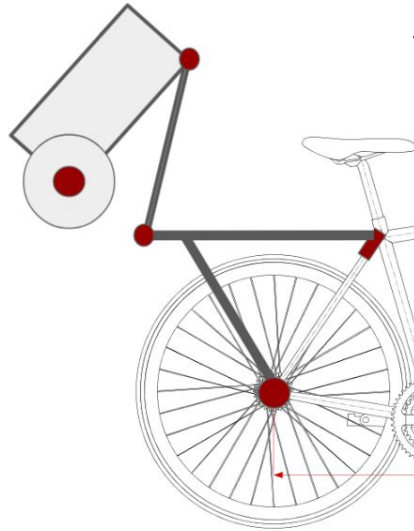
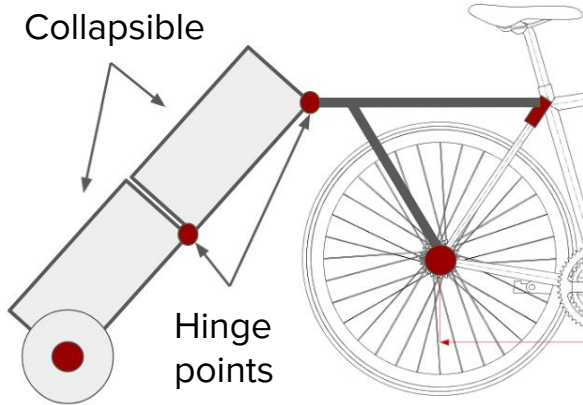
Metric	Target Value	Limit Value	Weight
Weight of dolly	<10 lbs	<20 lbs	2
Initial Install Time	<5 min	<10 min	4
Storage Load Capacity	>50 lbs	>25 lbs	3
Folded width	<12 in	<18 in	4
Collapsed height	<4 in	<7 in	2
Lockable	> Grade 2	> Grade 1	3
Storage Volume	>3 paper bags	>2 paper bags	3
Cost	<150 \$	<300 \$	5
Max Traversable obstacle	>8 in	>6 in	4
Expanded width	<20in	<30 in	4
Expanded height	<16 in	<19 in	3
Weather rating	>66 IP Rating	>64 IP Rating	3
Total Lifetime	>3 yrs	>2 yrs	2
Attachment/Detachment time	<5 s	<10 s	2
Compatibility to bikes	90% of bikes	75% of bikes	3

Concept 1

Top basket collapses, bottom
folds up behind seat

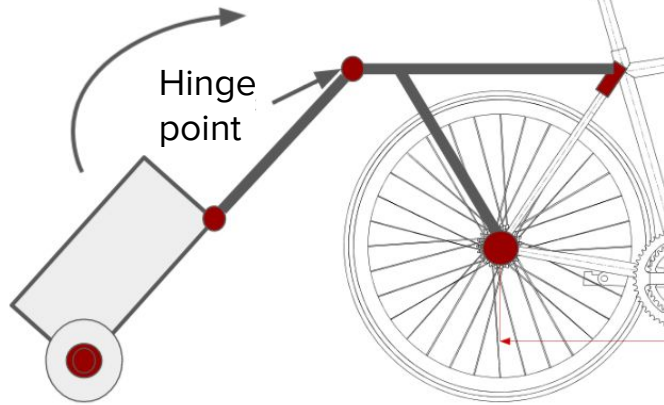
Bottom basket can be used
while folded behind seat

Bottom basket can
also collapse flat

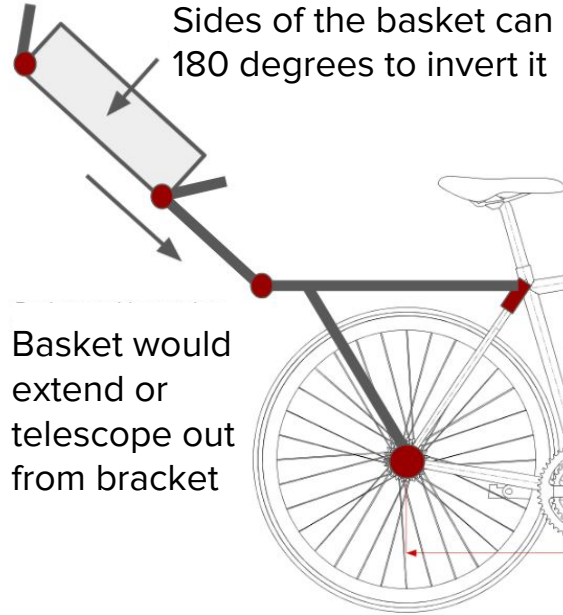


Concept 2

Basket trails behind the bike,
but can flip up behind the seat

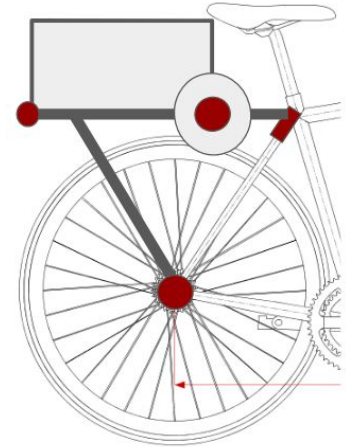


Sides of the basket can flip
180 degrees to invert it

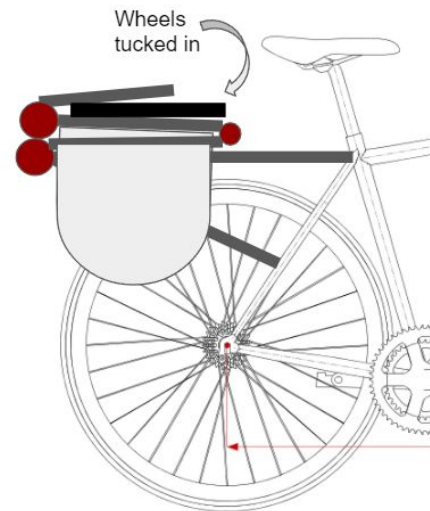
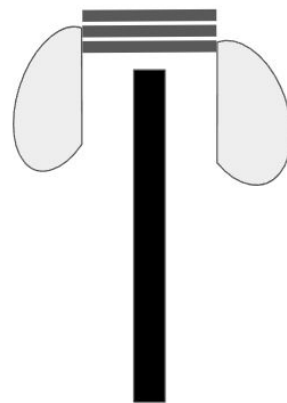
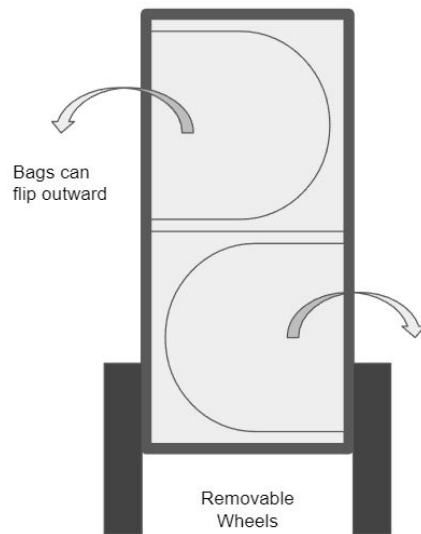
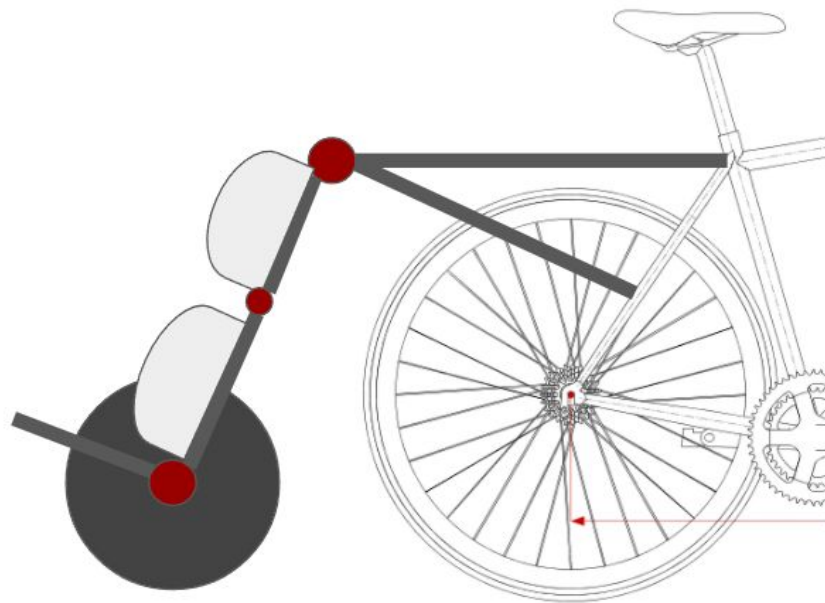


Basket would
extend or
telescope out
from bracket

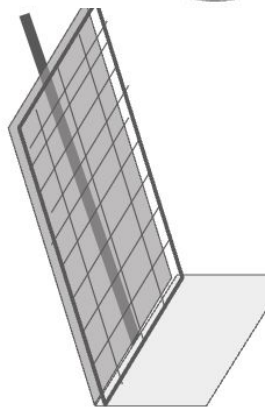
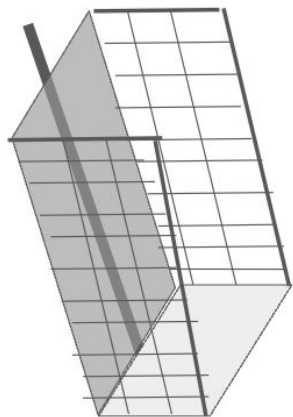
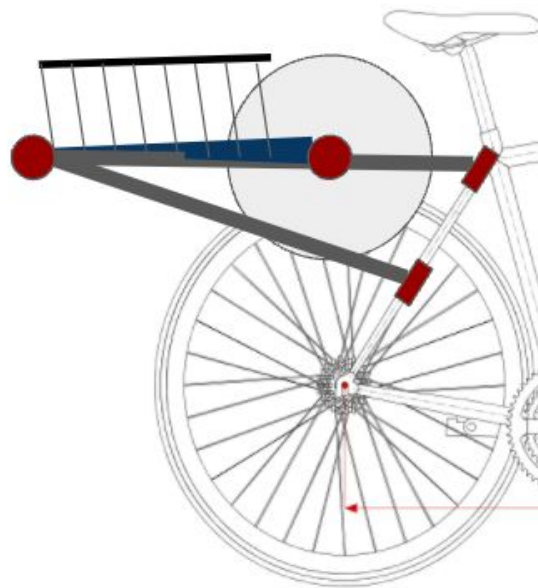
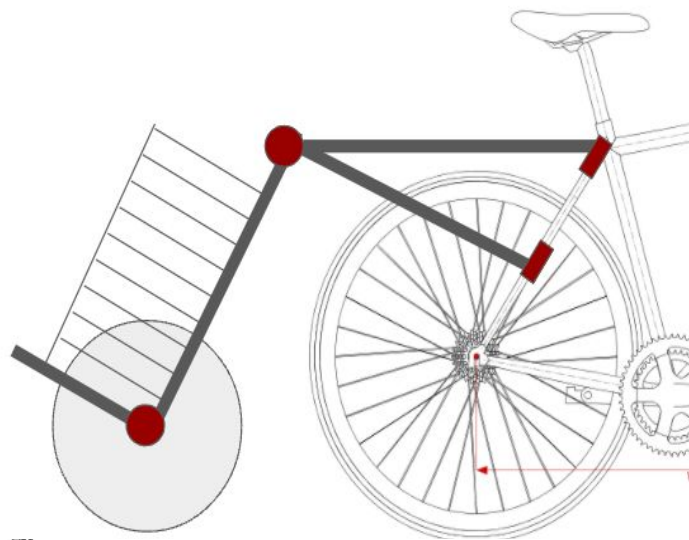
With basket telescoped in
and inverted, it would
provide storage on the
back behind the seat



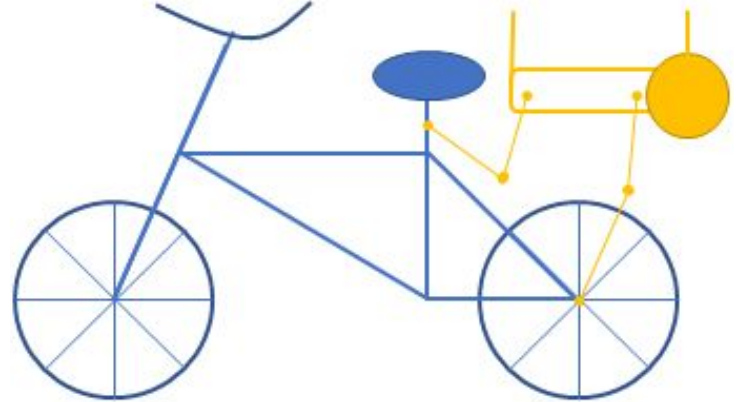
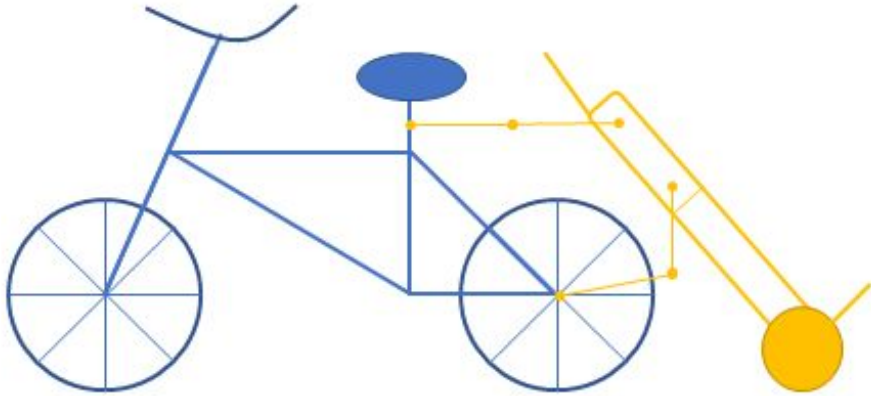
Concept 3



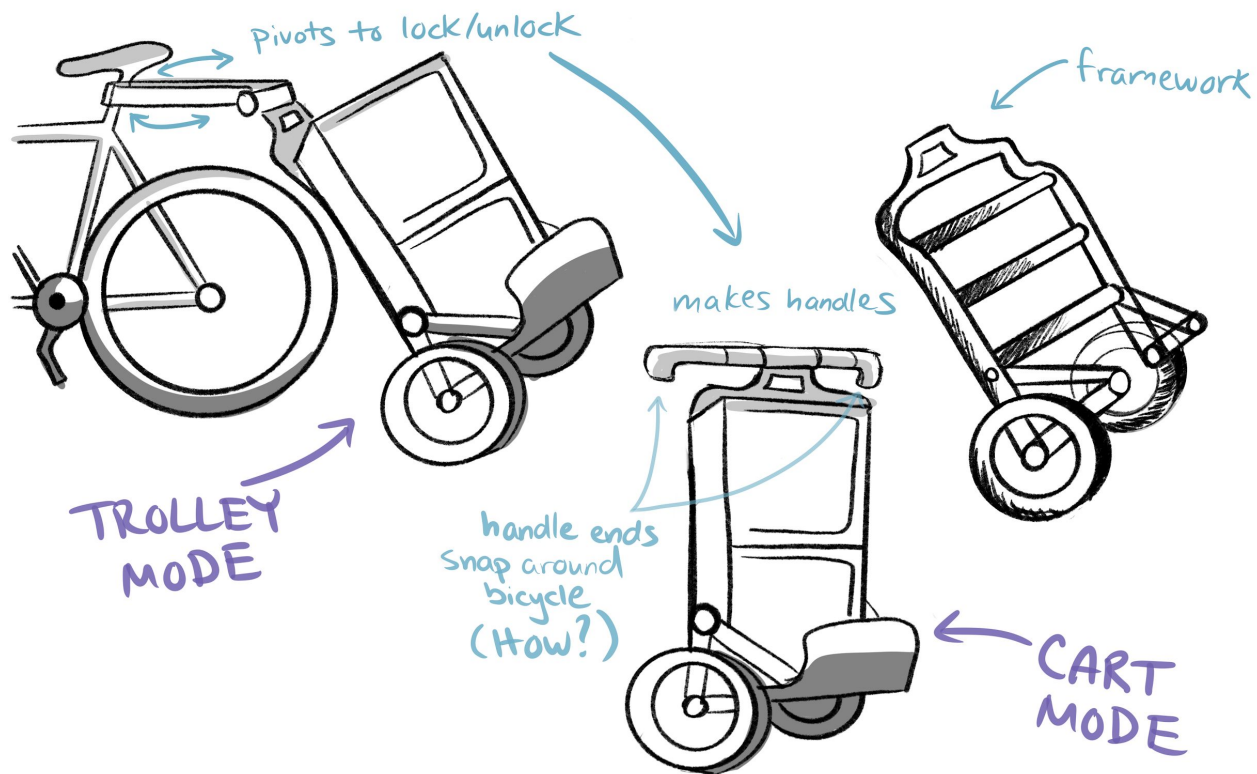
Concept 4



Concept 5



Concept 6

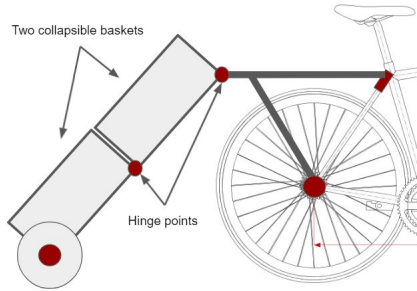


Concept Selection

Scale: 1 to 5	1 = Worst	Reference		Concept 1		Concept 2		Concept 3		Concept 5	
	5 = Best	Trenux Trailer		E: Folding Boxes		E: Telescope		R: Saddle Bag		S:Linkage	
Selection Criteria	Weight	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score
Weight of dolly	5.0%	3	0.15	4	0.2	4	0.2	4	0.2	3	0.45
Install Time	5.0%	3	0.15	3	0.15	3	0.15	3	0.15	2	0.1
Storage Load Capacity	10.0%	3	0.3	2	0.2	3	0.3	3	0.3	3	0.3
Folded width	10.0%	3	0.3	4	0.4	3	0.3	3	0.3	2	0.2
Collapsed height	5.0%	3	0.15	5	0.25	3	0.15	3	0.15	4	0.2
Lockable	5.0%	3	0.15	3	0.15	3	0.15	3	0.15	3	0.15
Storage Volume	10.0%	3	0.3	5	0.5	3	0.3	4	0.4	4	0.4
Cost	15.0%	3	0.45	4	0.6	5	0.75	4	0.6	5	0.75
Max Traversable obstacle	15.0%	3	0.45	4	0.6	3	0.45	4	0.6	3	0.45
Expanded width	10.0%	3	0.3	4	0.4	4	0.4	4	0.4	4	0.4
Expanded height	5.0%	3	0.15	3	0.15	3	0.15	3	0.15	3	0.15
Storage Capacity (collapsed)	5.0%	3	0.15	4	0.2	4	0.2	5	0.25	4	0.2
sum	100.00%										
	Total Score	3		3.8		3.5		3.65		3.75	
	Rank			First		Fourth		Third		Second	
	Continue?	No		Yes		No		Yes		Yes	

Top Designs

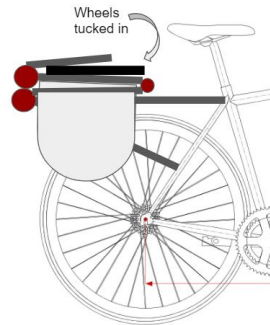
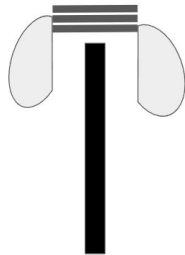
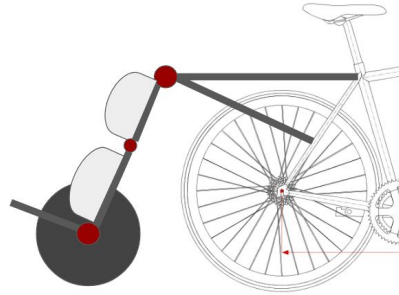
Concept 1



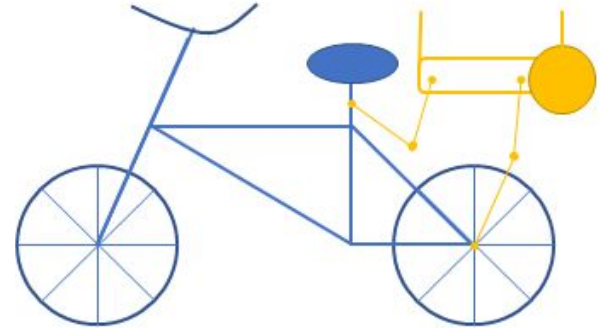
Bottom basket can also be folded flat



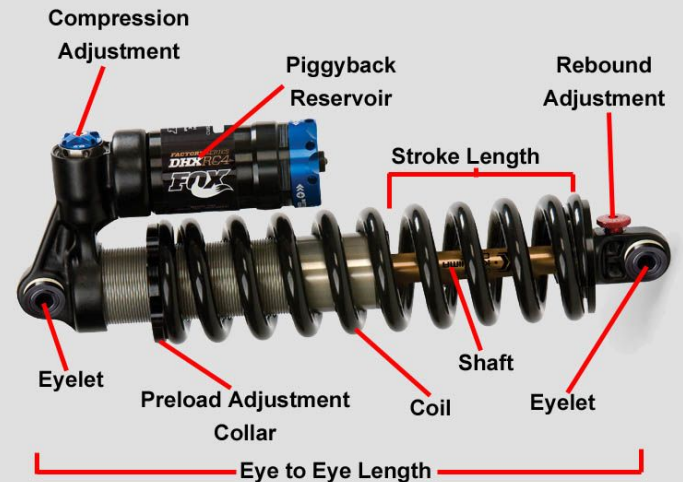
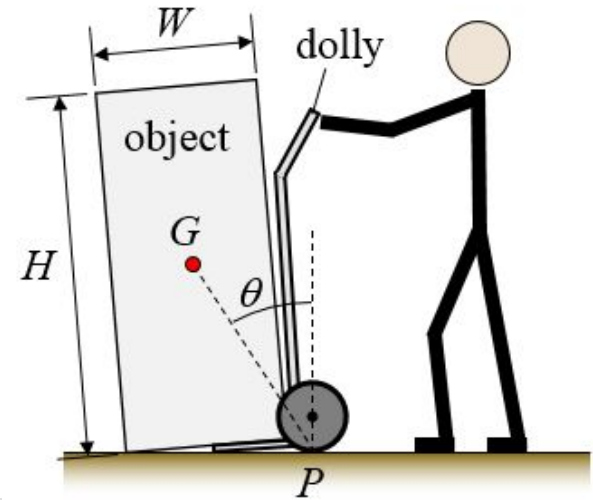
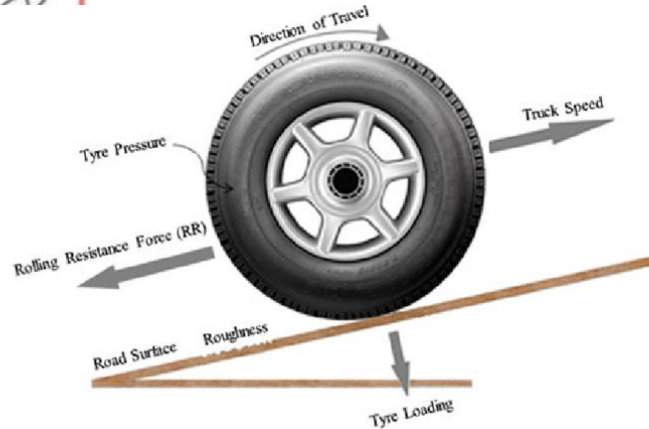
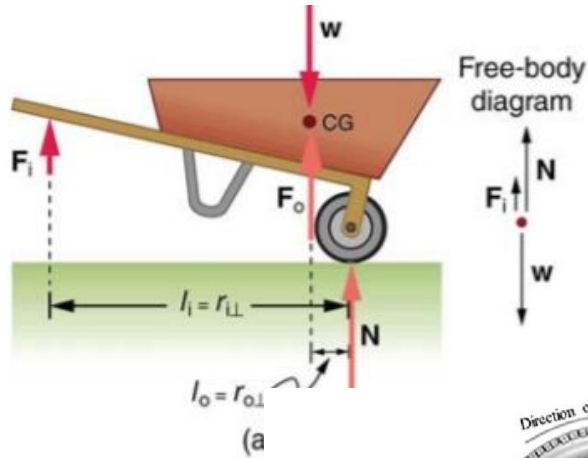
Concept 3



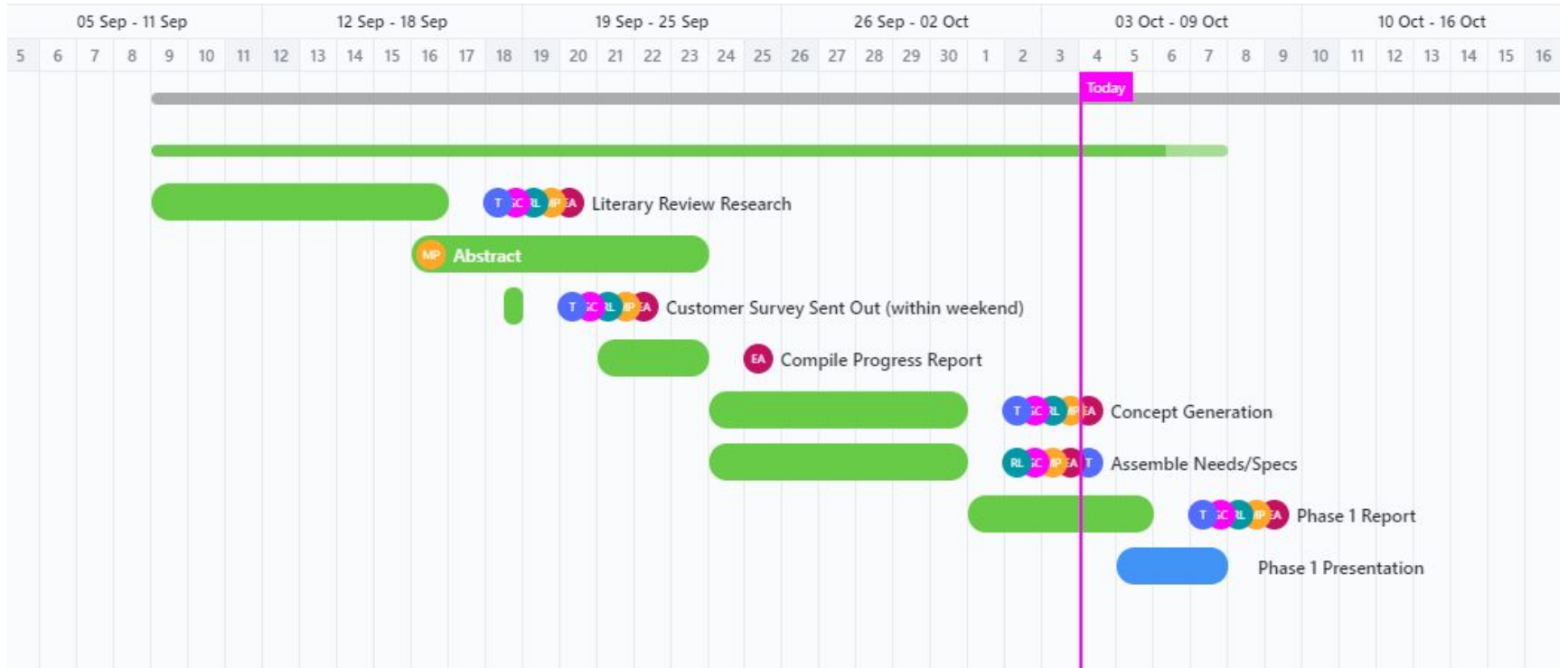
Concept 5



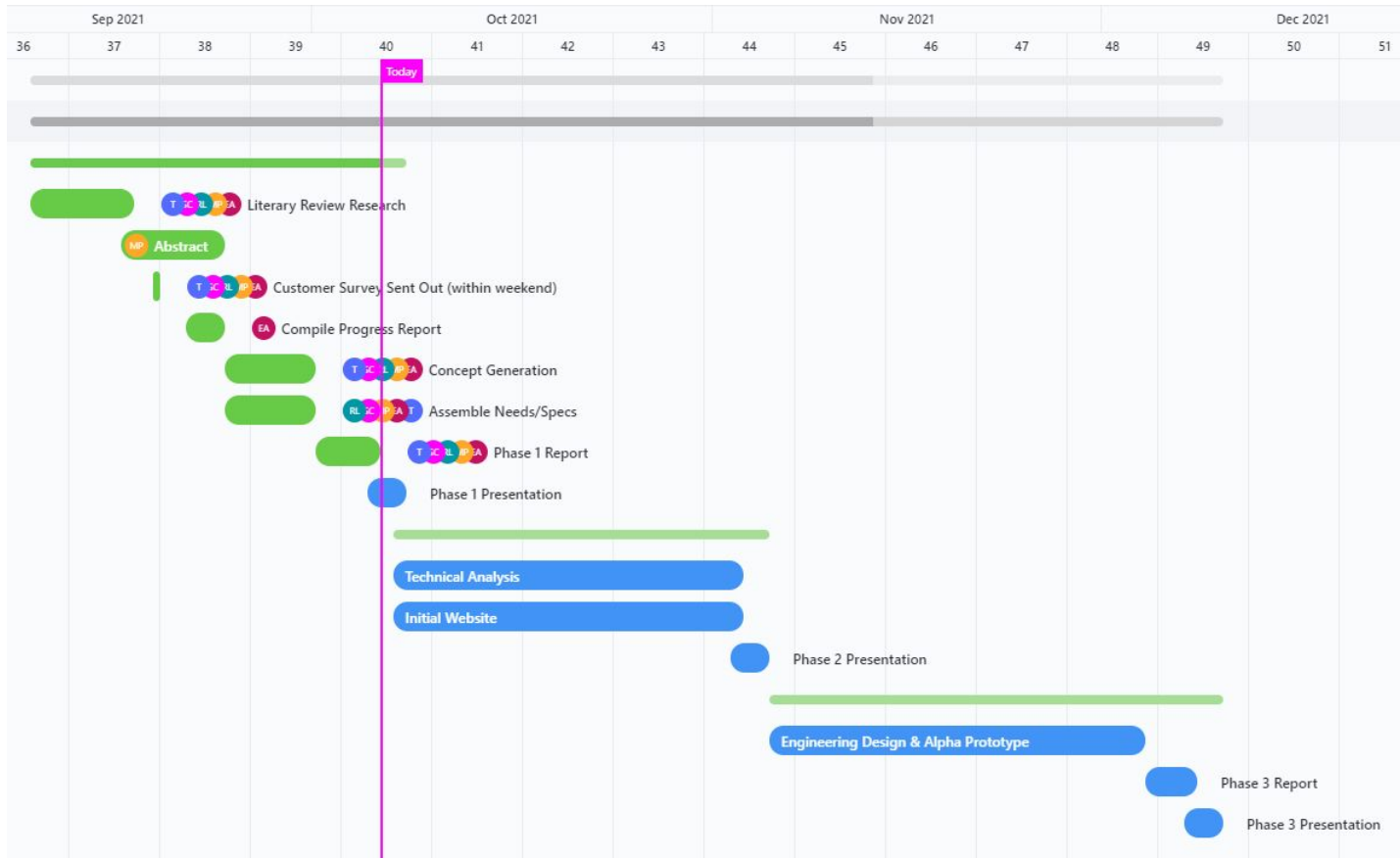
Technical Analysis



Project Plan



Project Plan



Budget

Components:

- 2x 6''- 8'' wheels (~\$30-\$50)
- Aluminum Structural Pipe (~\$80-\$110)
- Collapsible Boxes (~\$40)

Cost Estimate: \$150-\$200

Additional Components:

- Weatherproof Material (~\$30)
- 2x Large Bags (~\$50-\$100)

Cost Estimate: \$230-\$330

*Prices are overestimates

What's next?

- Technical Analysis of top concepts
- Finalize Concept Selection
- Initial Cad Modeling
- Budget and parts order update
- Project Website

Thank You

Questions?

References

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