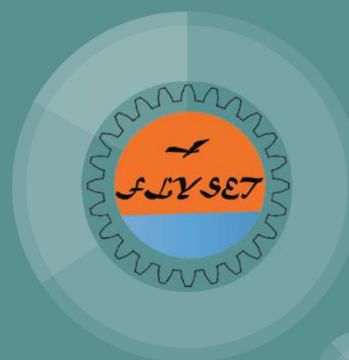


2018 FLYSET FTC Workshop - 6 Wheel Geared Drive (REV)

(9/3/2018)



Ray Chu

This is my 3rd year in the FIRST program, starting with FLL for two years and one year in FTC with team 12810 QuantumX. Last season, I was a programmer.



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Chassis Specification

Six Wheel Geared Drive (REV)



Base Weight: 8.2lbs

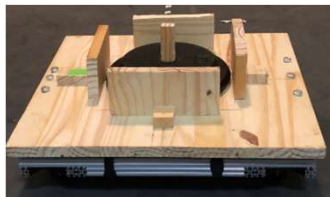


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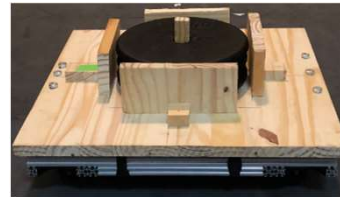
Six Wheel Geared Drive (REV)



13.2 lbs



28.2 lbs



43.2 lbs



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Six Wheel Geared Drive (REV)

- REV chassis based on REV FTC Starter Kit Gear Drive Train Guide
- Adapted for two HD Hex motors for chassis study
- Gear ratio from motor to wheel: **40:1** (equivalent to NeveRest 40)
- Consists of six 90-mm wheels (3.55 inches)
- Base chassis weight (including the weight support tray): 13.2 lbs
- A tray on top to contain the weights during the load tests



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6 Wheel Geared Drive (REV) Build Notes

- My robot tended to go right, but after adding weight, it started going left.
- I added more tape to the phone to prevent it from falling off.
- In order to adapt for HD HEX Motor, I added a second bar besides the original bar to shorten the distance for the shaft to reach the other end for supporting.
- My wheels aren't 4 inches like most of the other robots, they are only 3.55 inches.
- Only used two HD HEX Motors.





Test 1: Forward Speed Test

- My wheels are 3.55 inches.
- Observation
 - Heavy load actually made the robot turn left instead of right.

	No load	15 lb load	30 lb load
Distance traveled	3.6 m	3.44 m	3.25 m



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Test 2: 3 Second Turn Test

- My wheels are 3.55 inches.
- Observation
 - Less than 2 rotations.

	No load	15 lb load	30 lb load
Degree turned	664.27	540.98	362.93



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Test 3: Driving up/down a ramp

- My wheels are 3.55 inches.
- Observation
 - Easy access up and down

	No load	15 lb load	30 lb load
Up ramp	Yes	Yes	Yes
Down ramp	Yes	Yes	Yes



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Test 4: Balance Stone balancing ability

- My wheels are 3.55 inches.
- Observation
 - Easy access up and down

	No load	15 lb load	30 lb load
Go on the stone?	Yes	Yes	Yes
How long on the stone? (forever is settled on the stone)	Forever	Forever	Forever



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Test 5: Pull Strength Test

- My wheels are 3.55 inches.
- Observation
 - Adding more load doesn't increase the speed

	No load	15 lb load	30 lb load
10 lb pull weight	4.78 seconds	5.1 seconds	5.76 seconds
20 lb pull weight	5.62 seconds	6.37 seconds	7.51 seconds
30 lb pull weight	N/A	8.3 seconds	10.09 seconds



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Test 6: Autonomous Straight Line Drift Test (Optional)

- My wheels are 3.55 inches.
- Observation
 - Random Drift

	No load	15 lb load	30 lb load
Horizontal drift	3.33 cm	5.43 cm	4.4 cm



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Test 7: Autonomous 90/180 degree turn offset (Optional)

- My wheels are 3.55 inches.
- Observation
 - The Kp was tuned for the 15 pound load

	No load	15 lb load	30 lb load
90 degree turn drift	9.4	2	3.7
180 degree turn drift	0.87	0.9	11.67



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6 Wheel Geared Drive (REV) Summary

- As a typical build for 6 wheel chassis, the center drive wheels were lowered, which gives the chassis some rocking behaviour during driving and allowed it to get on the balancing stone with even a bit lower frame
- Was able to pull weights that other robots (including 4 motors) couldn't.
- One HEX motor encoder reading is not right. Per REV support, we can add a stock paper between magnets and motor (inside the black encoder cap)
- Flexible frame can be accurately built with 12 inch combo square



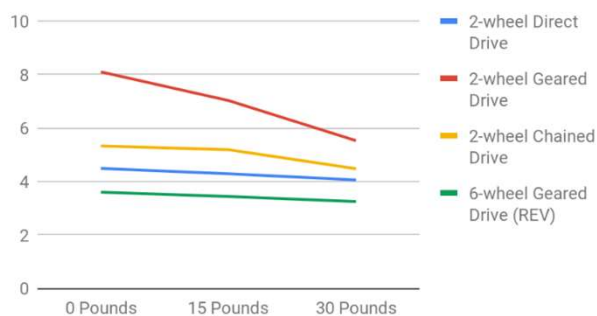
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Comparison with 2 Motor and 4 Motor Chassis

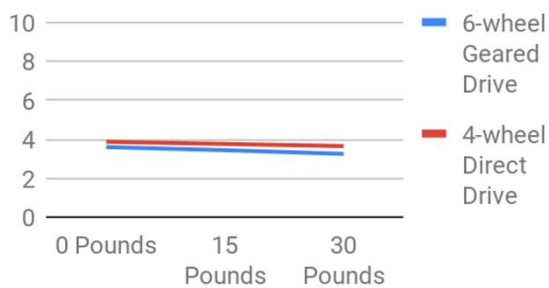
2-Motor Chassis

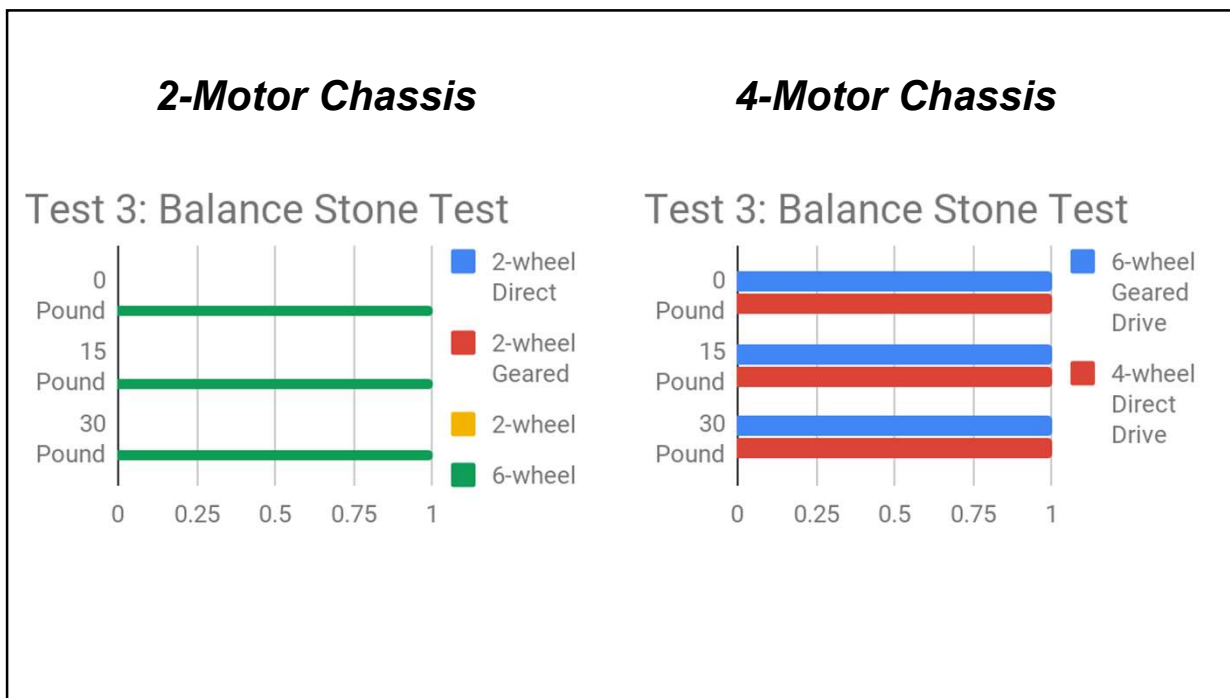
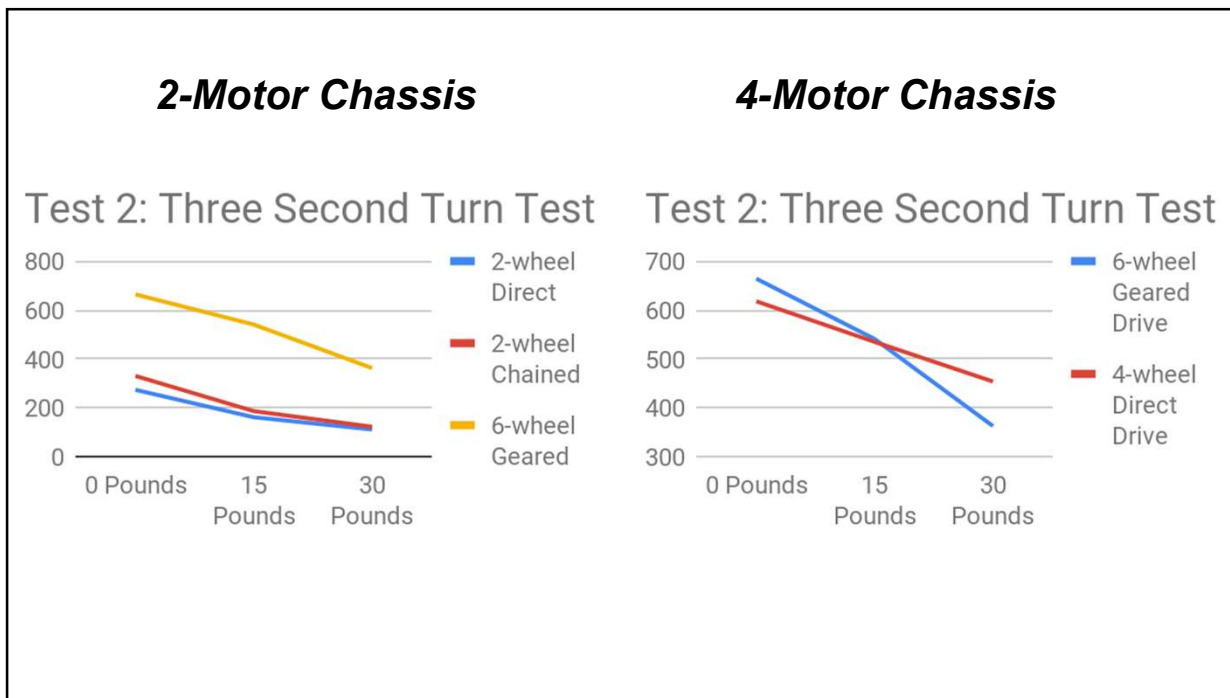
Test 1: Forward Speed Test

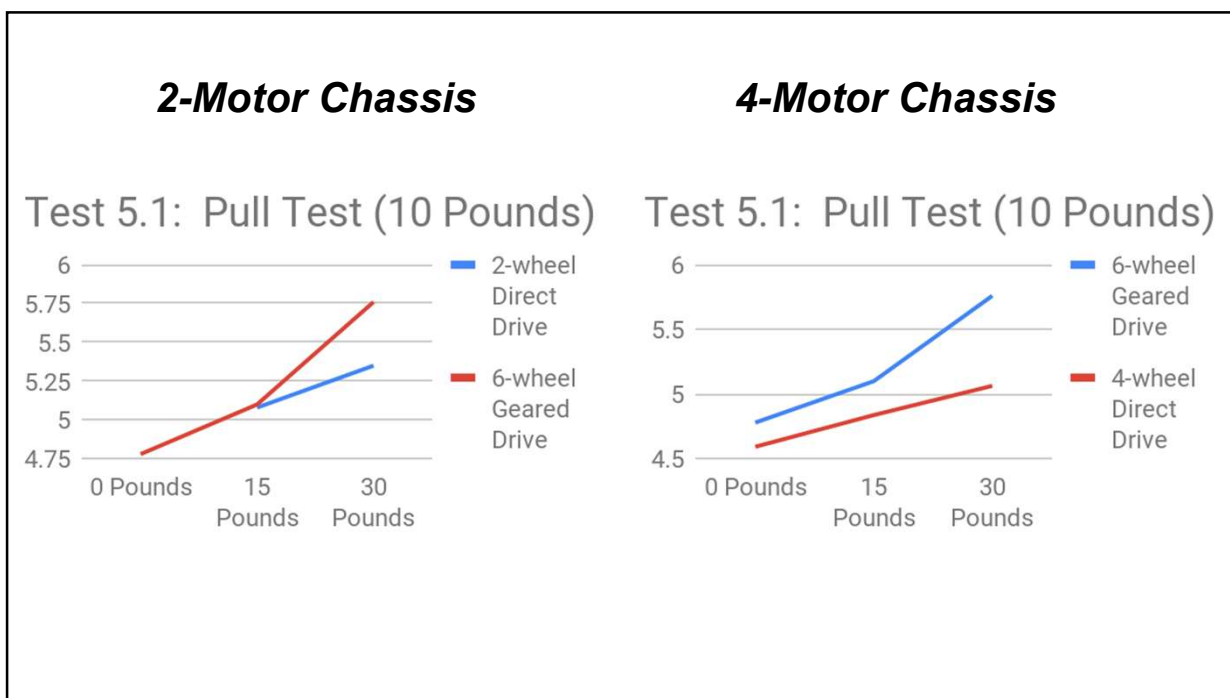
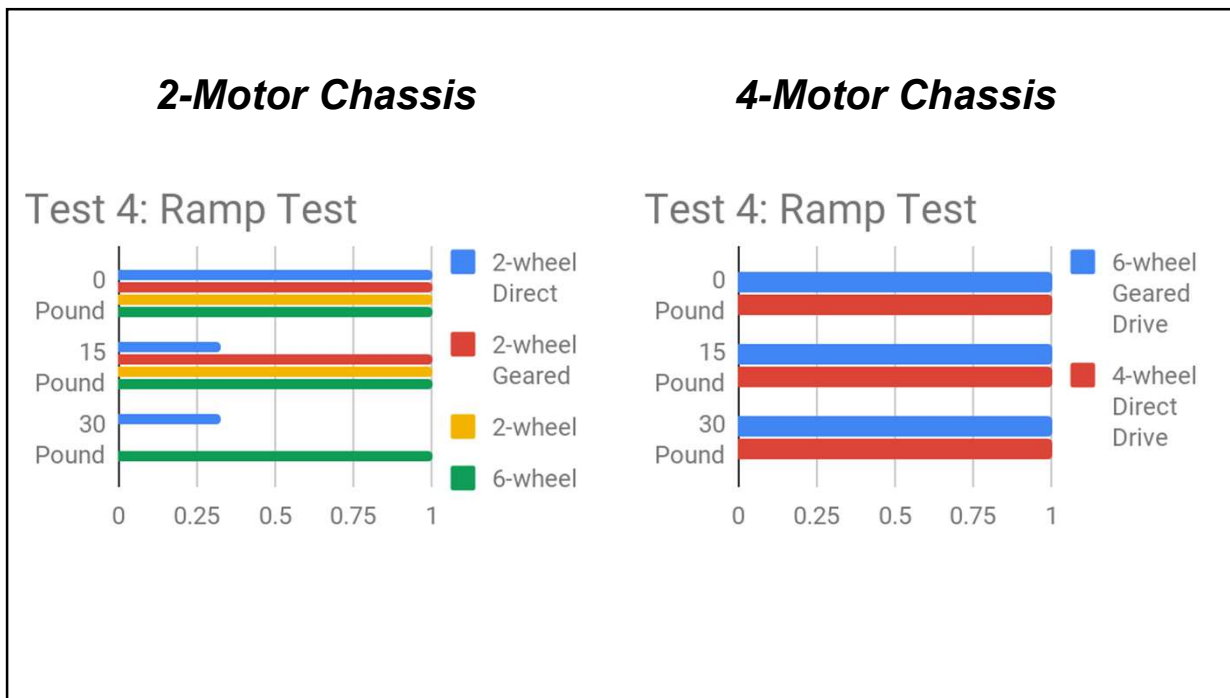


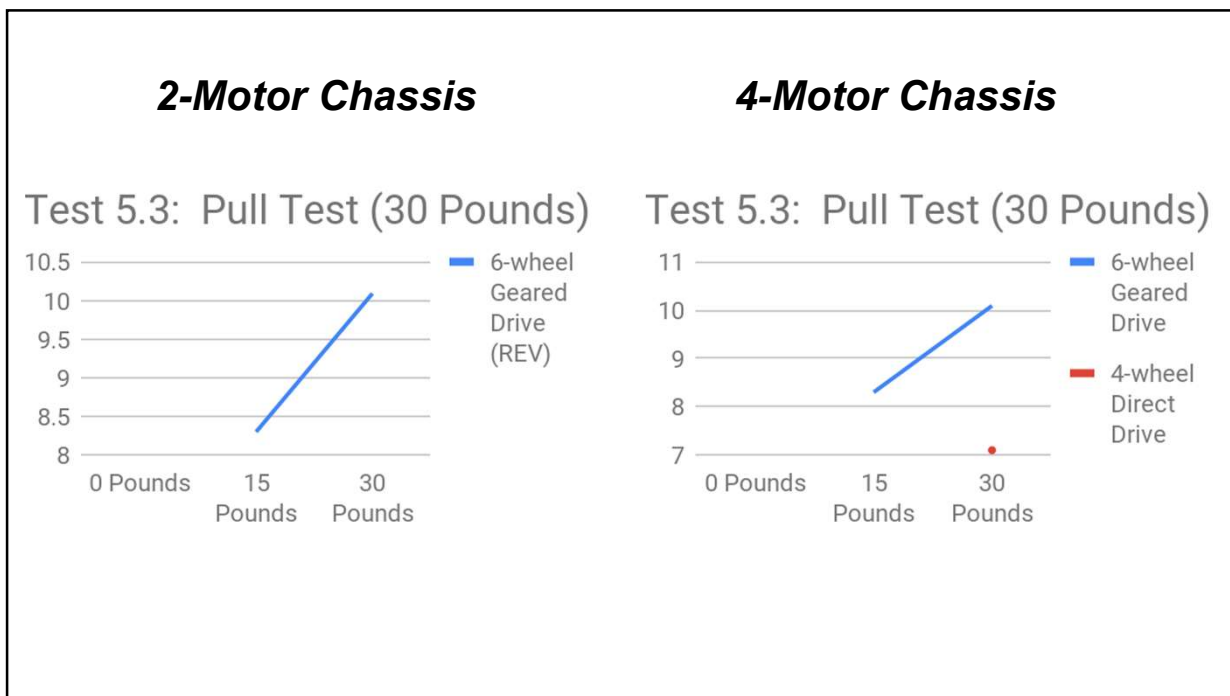
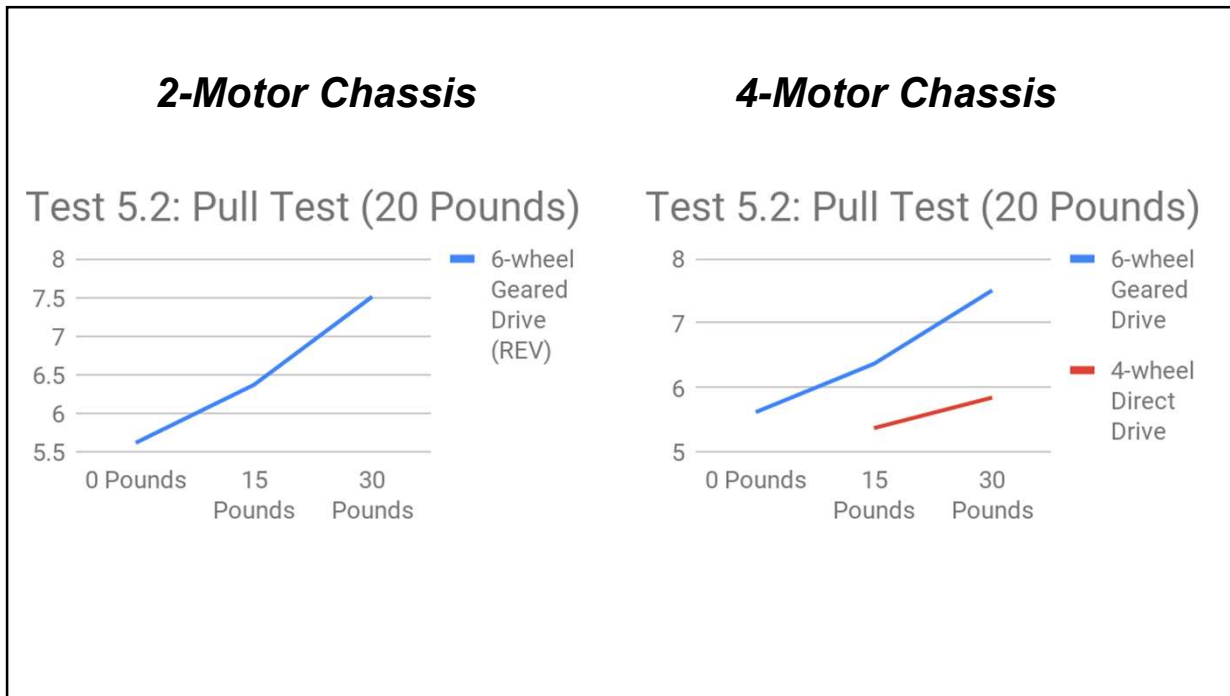
4-Motor Chassis

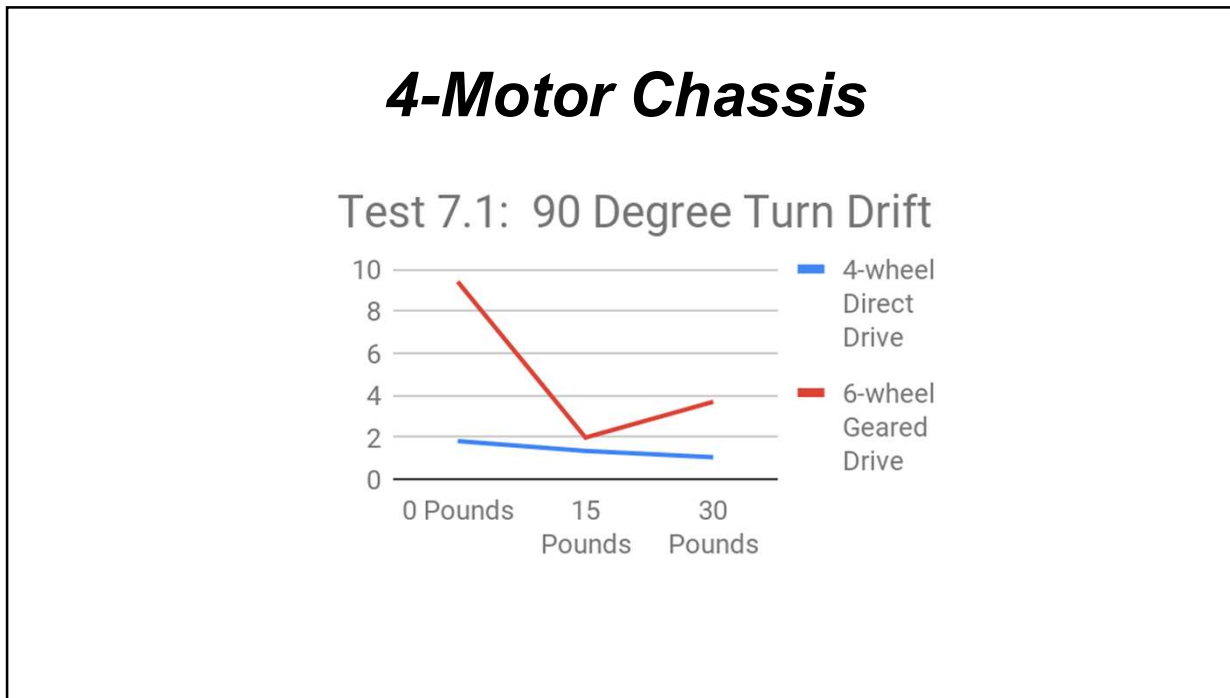
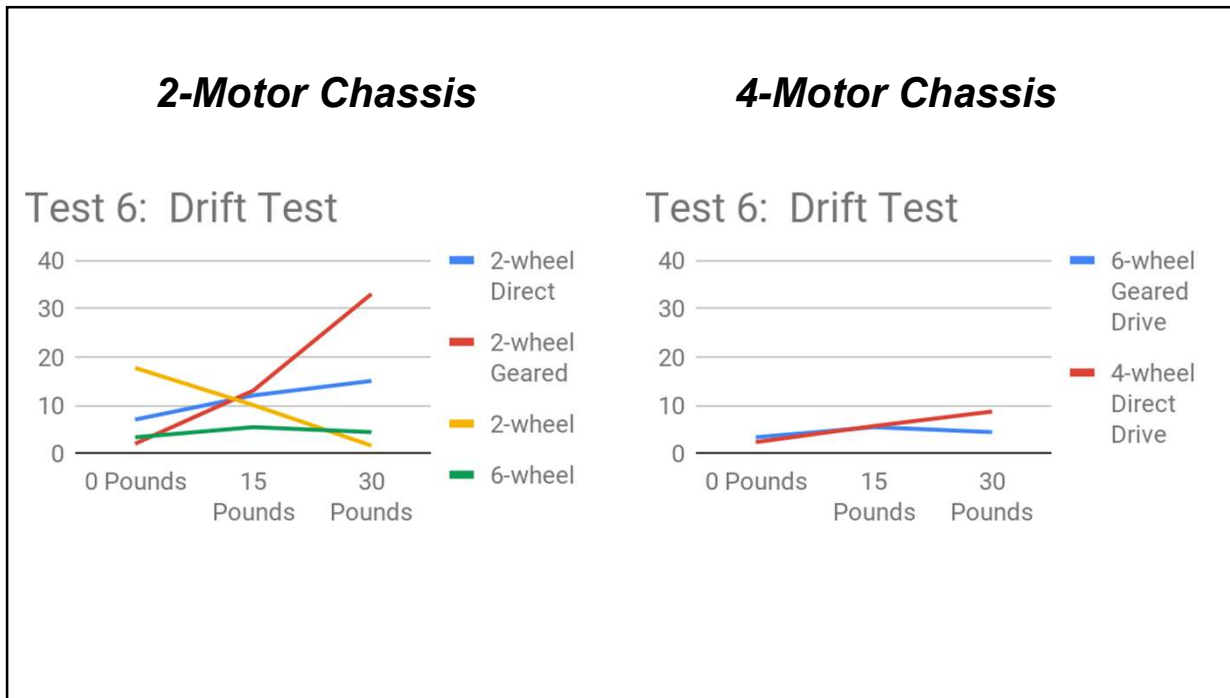
Test 1: Forward Speed Test











4-Motor Chassis

Test 7.2: 180 Degree Turn Drift...

