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Sensor Tests:
Minimum range: started reading at .181m or 18.1cm
Maximum range: 6.548m

Cart measurements
start = 20cm
final position = 100cm
displacement = 80cm = .80m

Measured from sensor: 1.014 - .224 = .79m

Pre questions:

1.1: 15cm to 6m with a resolution of 1mm
1.2: 0.05 seconds between measurements
1.3: Round trip = 12m, time it takes = .03499seconds
1.4: Linear with a slope of 1.5m/s
1.5: y = 1.5x + 0.5

Post Questions:

1.1: Vernier claims the resolution is 1mm, and it seems correct as that is what it is measuring accurately to. Any variations are likely human error. The claimed ranges for the sensor are minimum of 15cm or .150m and maximum is 6m. The measured minimum is less than our measured minimum at 18.1cm meaning we might need another sensor despite the advertising of 15cm accuracy. However we measured accuracy up to 6.458m which is greater than the advertised accuracy.

1.2: We would recommend on having range as a priority as it would allow more people to use their toy successfully.