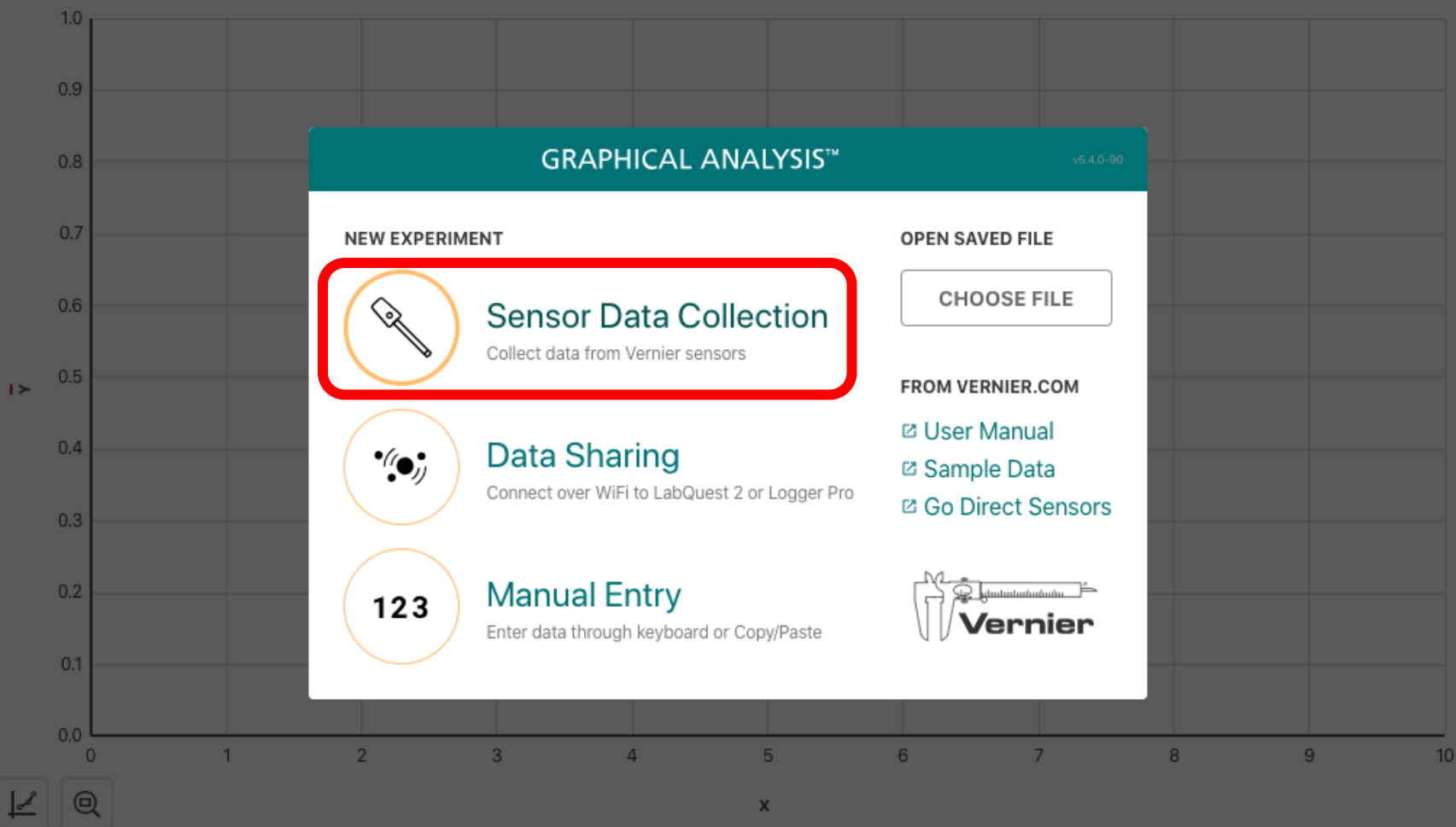


# Accelerometer DIY

- Goal: gain a better understanding of inertia, force, etc. and also how an accelerometer works.
- If successful, data recorded by the force sensor is used to calculate the acceleration of the unit and it will closely match the data from the built-in “commercial” accelerometer.

Untitled



Untitled



## Sensors

**No Devices Connected**

Connect to a wireless device below or connect via USB.

**Discovered Wireless Devices**

PROXIMITY CONNECT

Filter Device List

e.g., 007 or TMP



GDX-FOR 072051Z7

Connect

DONE

Untitled



## Sensors



## Connected Devices

\* GDX-FOR 072051Z7 ⓘ

Disconnect

## ▼ SENSOR CHANNELS Force, X-axis acceleration

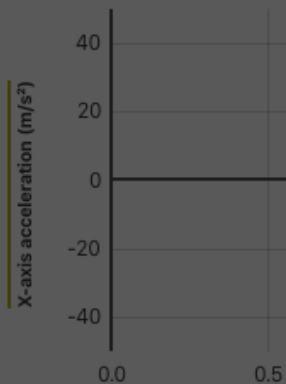
- Force
- X-axis acceleration
- Y-axis acceleration
- Z-axis acceleration
- X-axis gyro
- Y-axis gyro
- Z-axis gyro

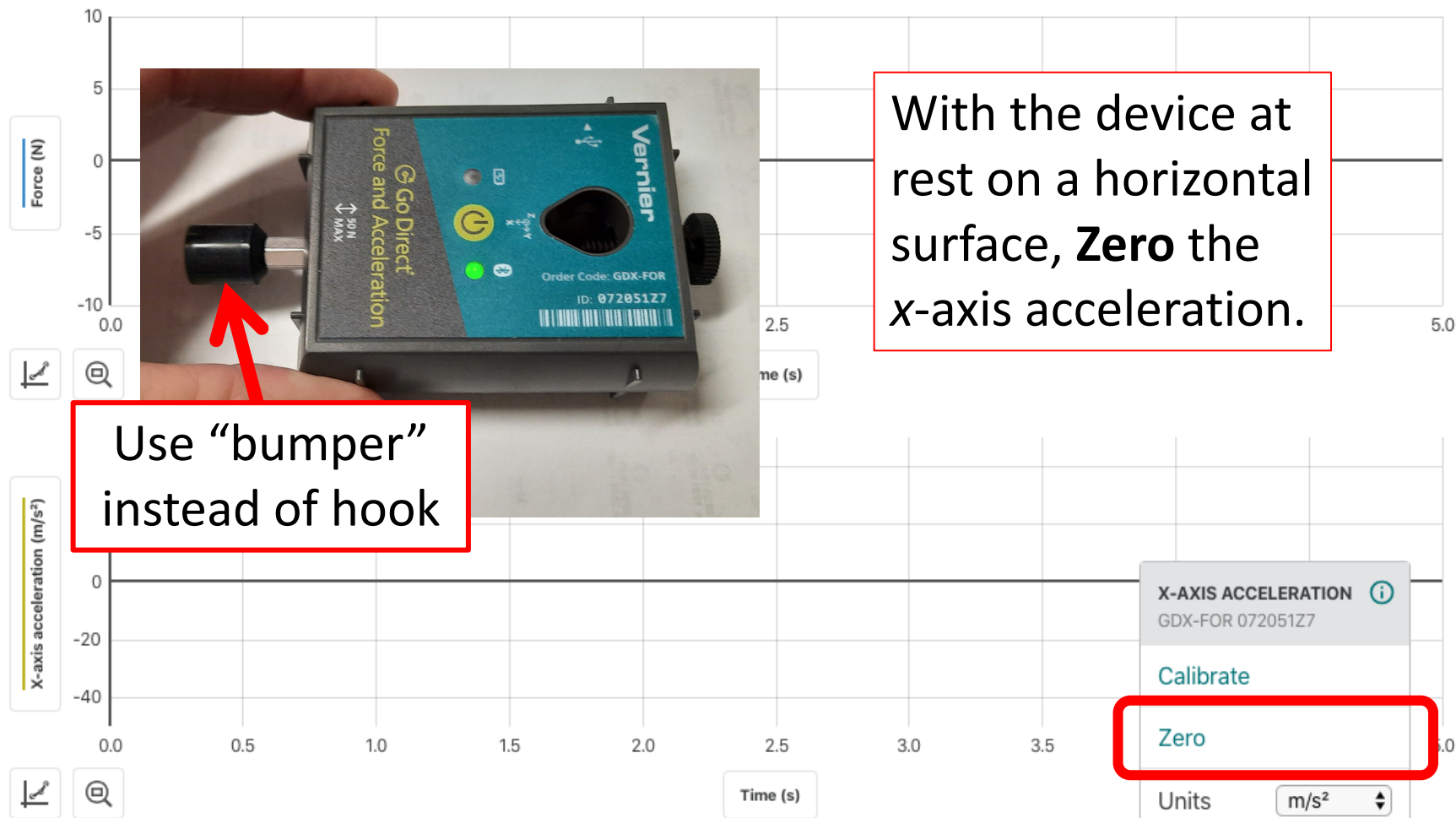
## Discovered Wireless Devices

 PROXIMITY CONNECT

Searching for devices...

DONE



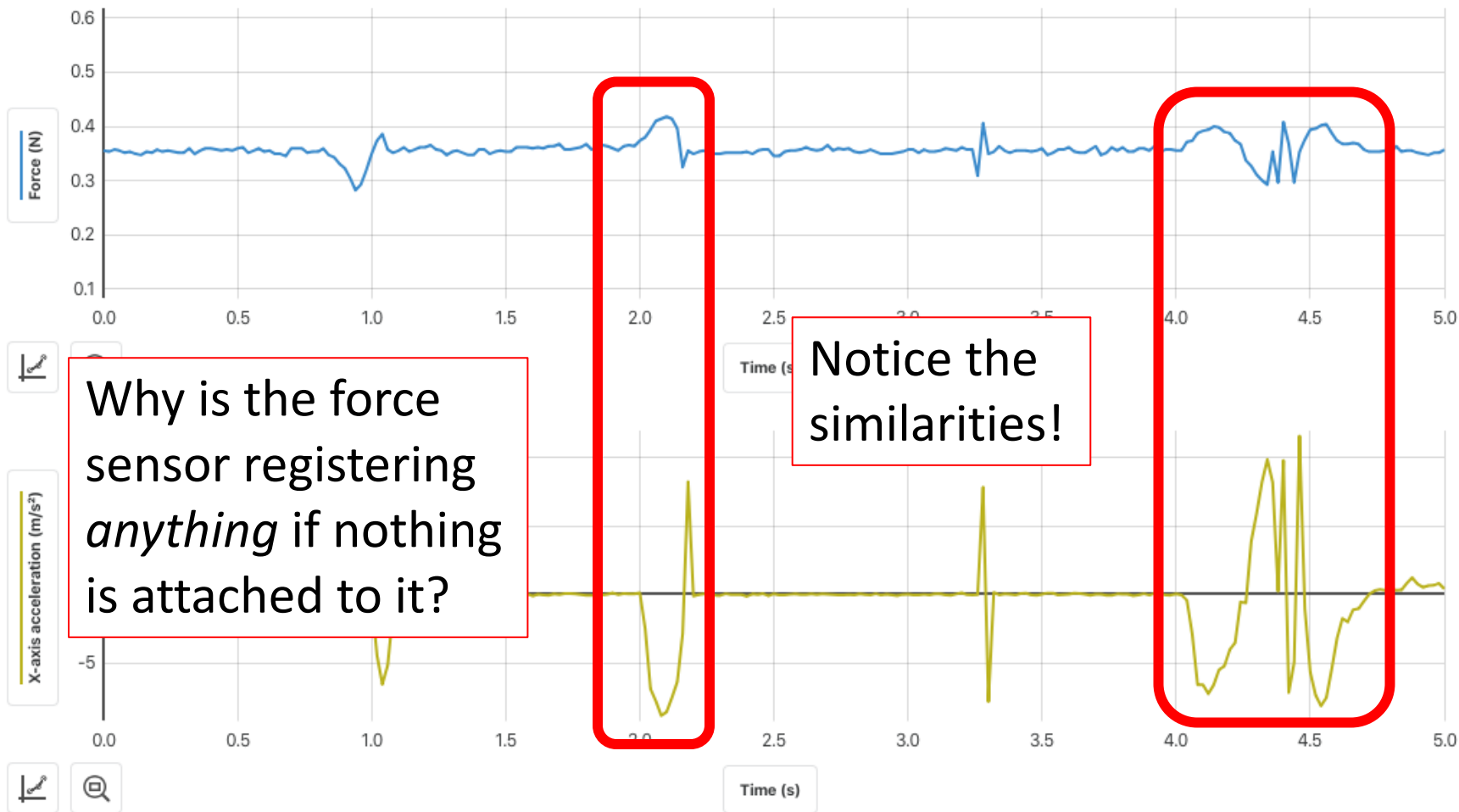


With the device at rest on a horizontal surface, **Zero** the x-axis acceleration.

Use "bumper" instead of hook

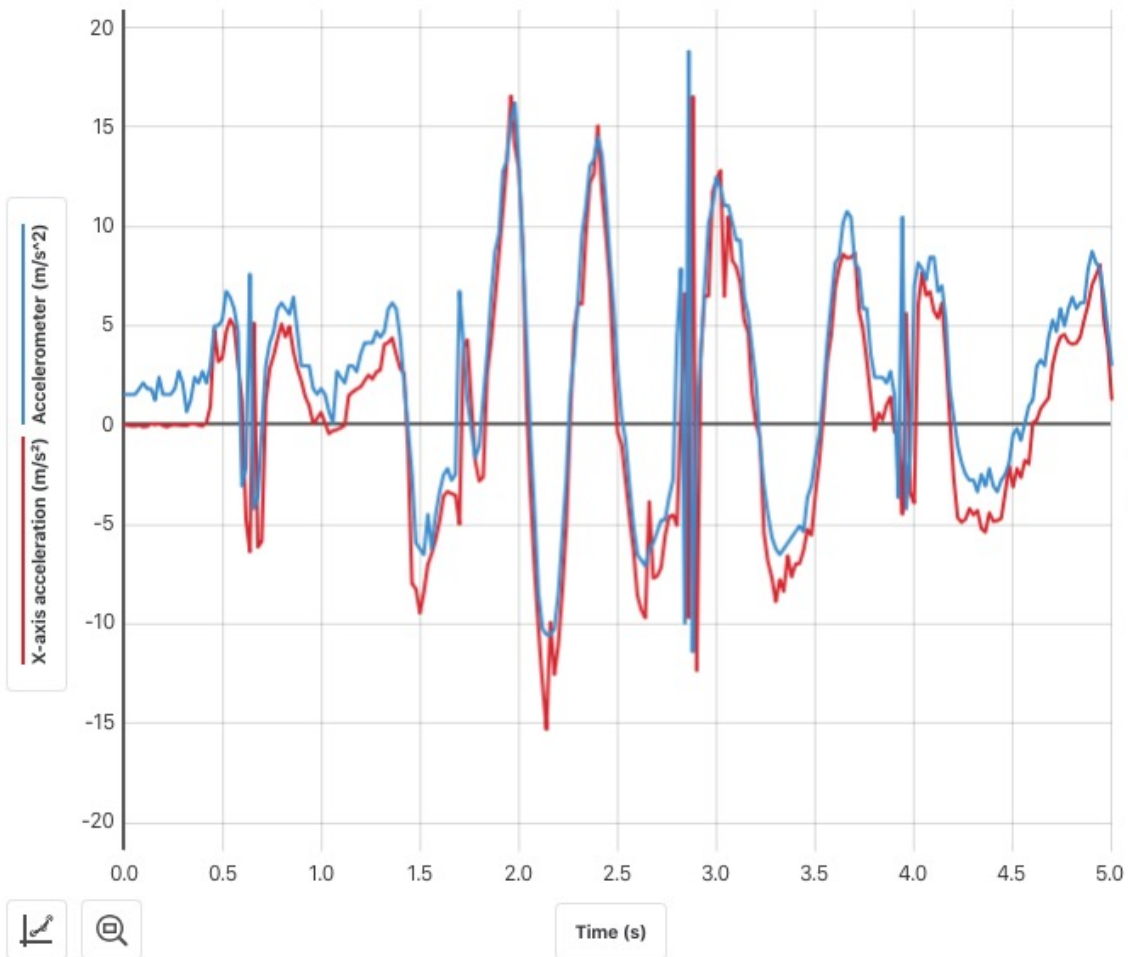
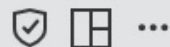


Without touching the force sensor, Collect data while rapidly sliding the device back and forth in the x-axis direction.



Untitled

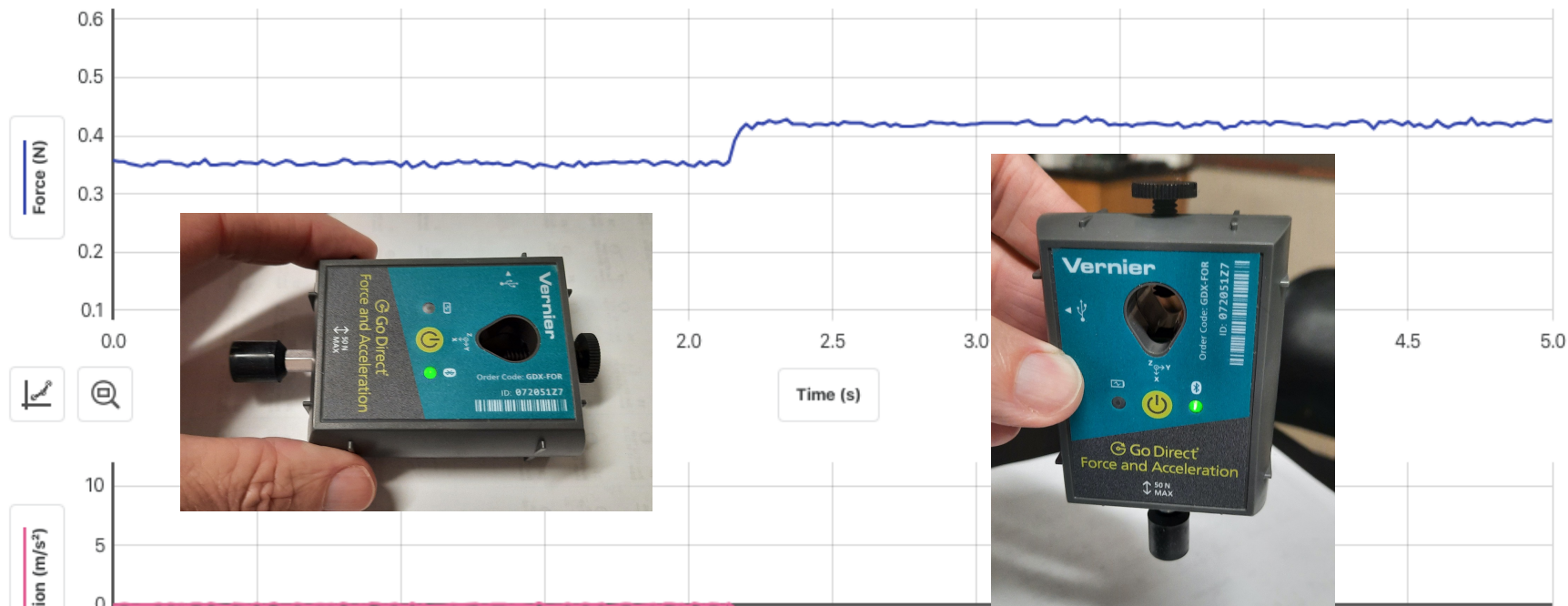
COLLECT



Data Set 3			
	Force (N)	X-axis acceleration (m/s <sup>2</sup> )	Accelerometer (m/s <sup>2</sup> )
236	0.31	3.01	3.288
237	0.32	3.90	4.711
238	0.31	4.46	5.861
239			
240			
241			
242			
243			
244			
245	0.30	6.07	7.874
246	0.29	7.06	8.738
247	0.29	7.53	8.163
248	0.30	8.07	7.874
249	0.31	5.29	6.437
250	0.32	3.92	4.711
251	0.33	1.25	2.985

This column was  
*calculated*  
from  
*only* the force  
data. But how?!

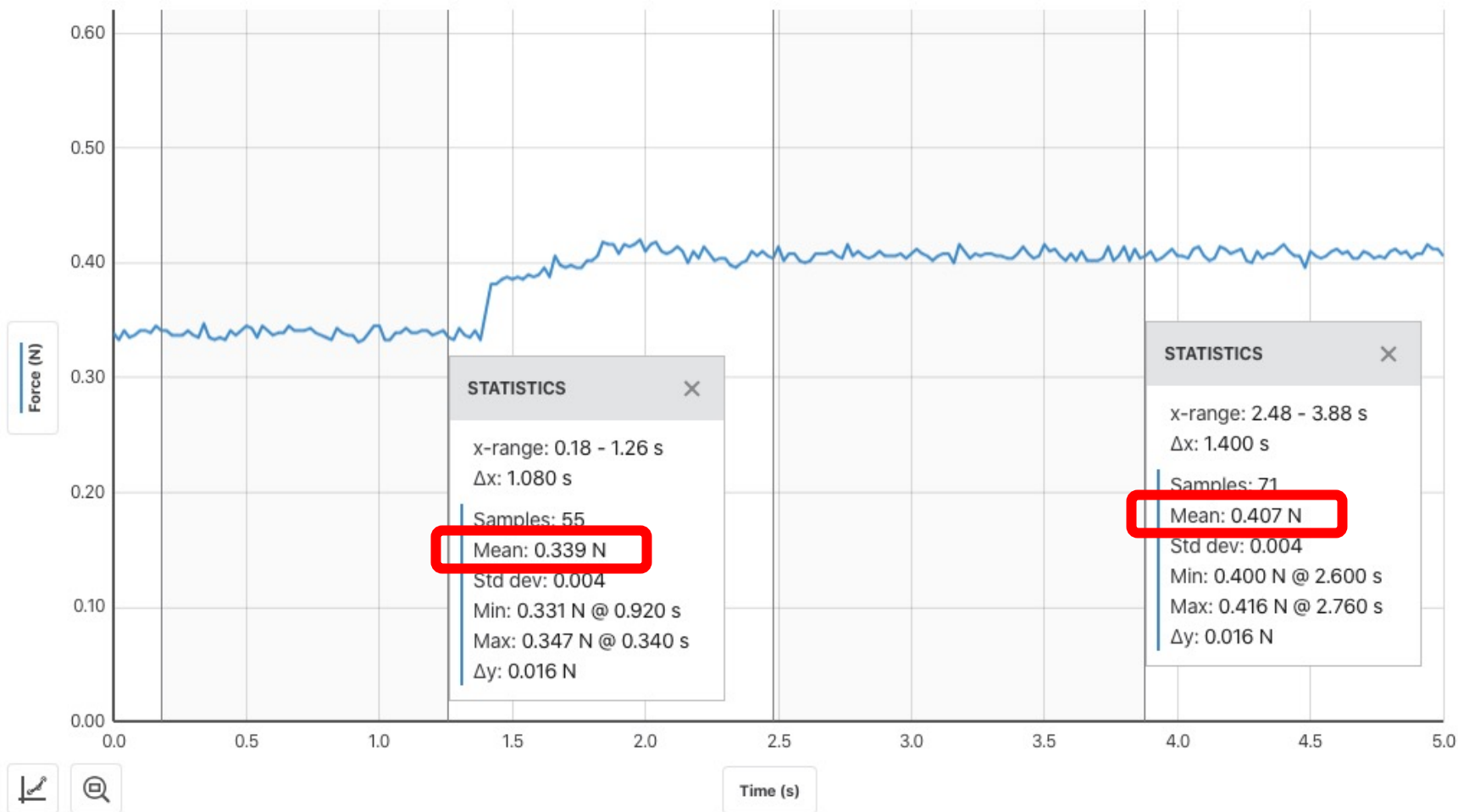
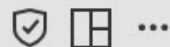




Collect force data, holding the device at rest horizontally and also holding at rest vertically as shown. Notice the different force readings. Use this to determine your equation for calculating acceleration from the force data.

Untitled

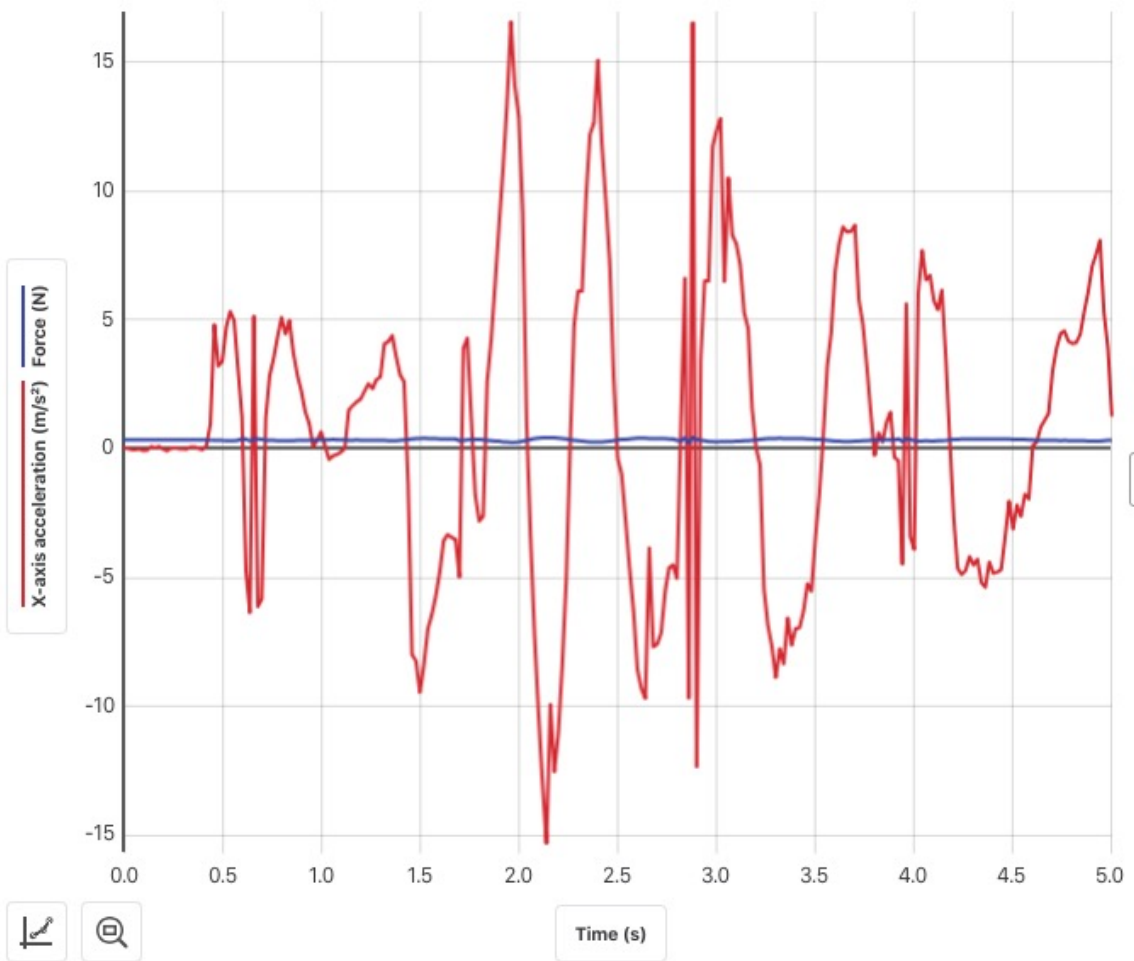
COLLECT



Mode: Time Based Rate: 50 samples/s

Force: 0.33 N

X-axis acceleration: -0.06 m/s<sup>2</sup>



Data Set 1

Time (s)	Force (N)	X-axis acceleration (m/s²)	
236	4.70	0.35	
237	4.72	0.35	
238	4.74	0.35	
239	4.76	0.35	
240	4.78	0.35	
241	4.80	0.35	0.40
242	4.82	0.36	0.33
243	4.84	0.35	0.35
244	4.86	0.36	0.84
245	4.88	0.36	1.25
246	4.90	0.35	0.79
247	4.92	0.35	0.55
248	4.94	0.35	0.68
249	4.96	0.35	0.69
250	4.98	0.35	0.84
251	5.00	0.36	0.43

- Column Options
- Add Manual Column
- Add Calculated Column

Untitled

COLLECT



Data Set 1

Time (s)	Force (N)	X-axis acceleration (m/s <sup>2</sup> )
4.70	0.36	-0.47
4.72	0.35	0.06
4.74	0.35	0.30
4.76	0.35	0.40
4.78	0.35	0.24
4.80	0.35	0.09
4.82	0.35	0.84
4.84	0.35	0.84
4.86	0.35	0.84
4.88	0.35	0.84
4.90	0.35	0.84
4.92	0.35	0.84
4.94	0.35	0.84
4.96	0.35	0.84
4.98	0.35	0.84
5.00	0.36	0.43

## Add Calculated Column

Name

Accelerometer

Units

m/s<sup>2</sup>

Displayed Precision

3

- Decimal Places  
 Significant Figures

 Use Scientific Notation

Expression

INSERT EXPRESSION

CANCEL

APPLY

Figure it out! Enter an equation to calculate acceleration based on measurement of force. Then test your idea! Modify if necessary.

