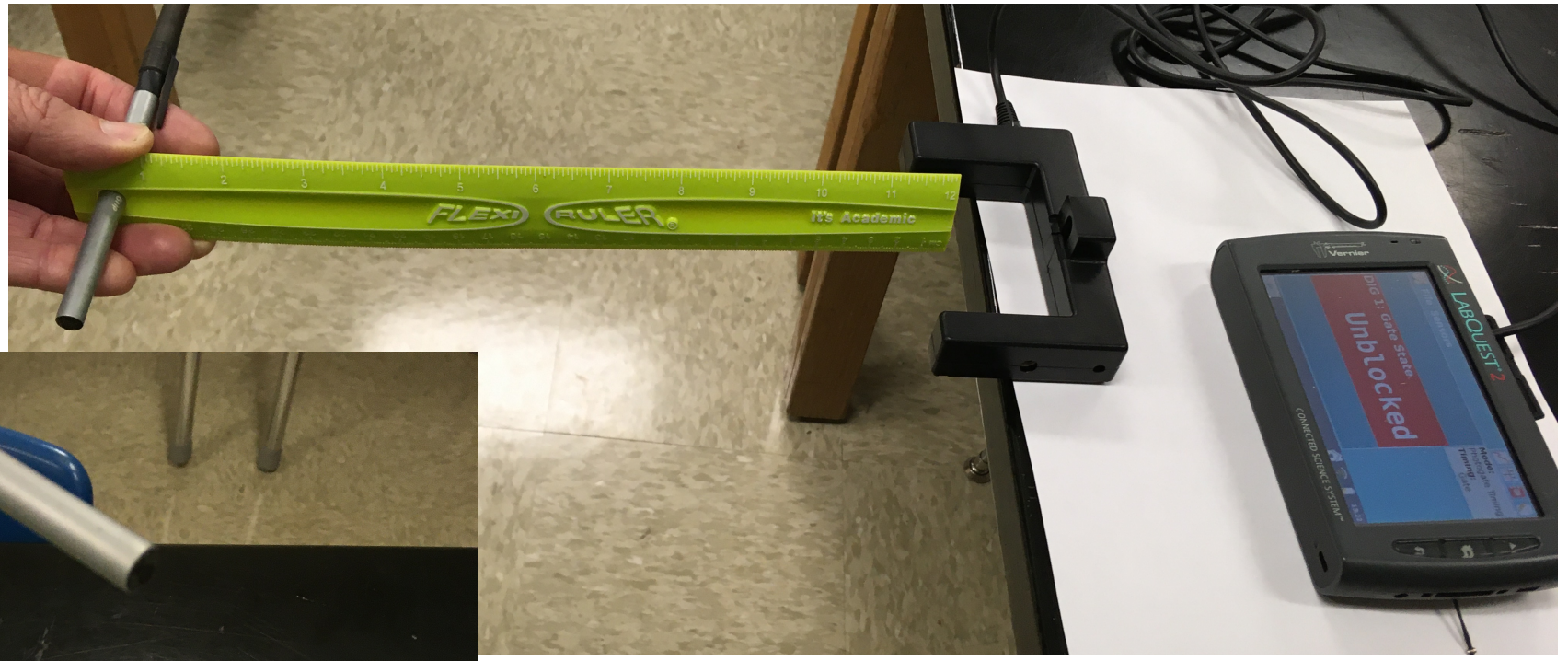
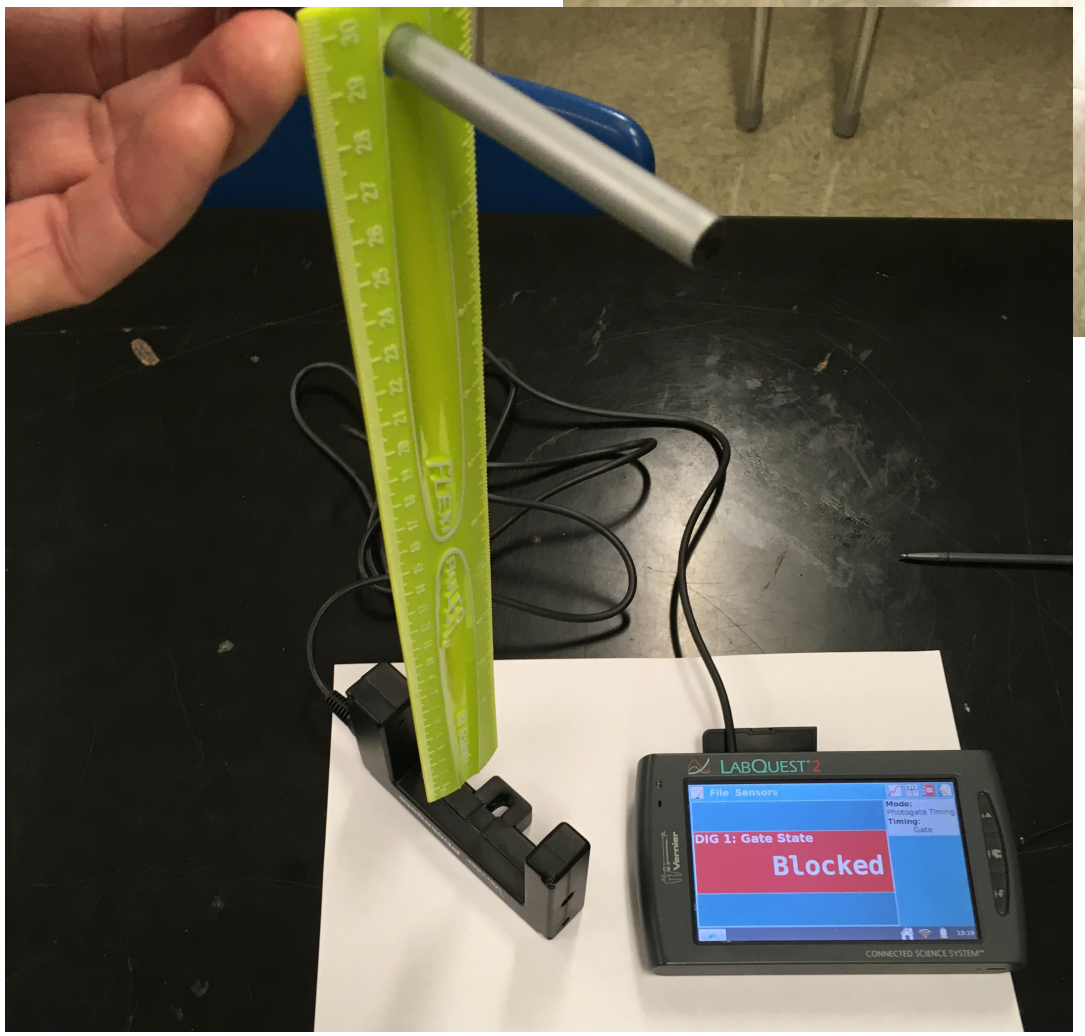
Mini-Lab: Ruler Pendulum Swing

1. Goal: measure maximum speed and initial acceleration of free end of the swinging ruler.
2. Use a pen or pencil to form an axle for the ruler.
3. Connect the photogate to DIG1 port under rubber flap.
4. Adjust the data collection to Photogate Timing and Gate. Enter length of object equal to the width of the ruler (≈3.5 cm) and choose to "End with Stop" (instead of number of events).
5. Release the ruler from a horizontal position and allow the free end to swing through the infrared beam (look for the small hole in the gate housing). Repeat several times – no need to start and stop.
   Do not allow the ruler to impact (and damage) the photogate.
6. Use the analyze menu statistics tool and/or trace on the graph to determine the speed and compare to theoretical.
7. Rearrange the gate to measure the time for the ruler to pass through at the beginning of the swing and again compare results to theoretical.





Repeat multiple trials using the two orientations shown here. This allows you to measure the motion of the free end: initial (with ruler horizontal) and final (with ruler vertical). Tap on the green Collect button, do multiple trials, and then tap on the red Stop.