Procedure

1. Goal: verify rotational dynamics and energy concepts.
2. Plug Sensor into DIG 1 (under rubber flap). Under the **Sensors** menu, choose **Sensor Setup…** and set **DIG 1** to **Rotary Motion**. You should see a live readout of the angular position – check for proper operation.
3. Change the length of the experiment from 10 seconds down to 3.0 seconds. Change sampling rate to 50 per second. Enable Triggering: Increasing across 0.1 rad, collect 10 before.
4. Adjust the sliding mass to a particular measured radius *r*.
5. Click collect and release the bar from a stationary upright position. Inspect graphs – adjust and repeat if necessary.
6. Determine maximum angular displacement, maximum angular speed, maximum angular acceleration in **both** directions.

1. Record the values: rod mass, length, and pivot point, cylinder mass and r, θ_{max}, ω_{max}, α_{max} CW, α_{max} CCW
   Time permitting, repeat with different value(s) of r.
2. Create a graph of angular acceleration vs. angular position, include an appropriate curve fit.
3. Determine the location of the center of mass and the rotational inertia – both relative to the rotation axis.
4. Use the angular displacement to determine the amount of frictional torque.
5. Include this frictional torque as you calculate values expected for the maximum angular speed and maximum angular acceleration in either direction.
6. Assess and evaluate the results!