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Procedure:

1. Activate the blower to start the airflow and gently position the glider onto the track. The glider will effortlessly hover due to the absence of friction and is likely to move in the direction of one end of the air track. Adjust the intensity of the blower to discover the optimal setting that minimizes friction. To ensure the track is level, release the wing nut on the single leveling screw located beneath the track. Twist the leveling screw until the glider consistently hovers near the center of the track. Once the glider maintains a steady position near the center of the track, secure the wing nut. Avoid sliding the glider along the track when the air supply is turned off, as this will generate significant friction and could potentially damage both the track and the glider.
2. Determine the mass of each of the gliders by using the triple beam balance. Ensure that the mass of the metal flag as well as any additional attachments on the glider is accounted for. Weigh the mass hanger and document all of these measurements.
3. Fasten a length of string to the red glider by either tying or taping it to the flag, and then extend it down the air track and over the pulley. It is crucial that the string remains parallel to the track as it spans from the glider to the pulley. Secure the mass hanger to the opposite end of the string.
4. For the initial trial, the experiment will utilize the glider and an empty mass hanger, acknowledging that the mass hanger still contributes a non-negligible mass to the M2 value. Several practice runs should be performed initially to release the glider from a stationary position and verify that the glider travels approximately one meter along the track.
5. Captura should be used to create a video of this first trial.
6. Using Tracker, adjust the origin's position of the glider, set a Calibration Stick, and then create a Point Mass track. Tracker will automatically calculate velocities, so Click "Table" in the lower right corner of Tracker, choose "Vx," and deselect "y" since only horizontal motion is relevant. Navigate through the glider's motion by shift-clicking your way, focusing on the glider's leading edge or a distinctive mark like tape or paint to mark the motion of the glider.
7. Export the data into excel and create a velocity vs time graph. Fit a linear line to it and display the equation. Determine the acceleration of the system using this equation.
8. Repeat the trials by adding masses to the mass hanger in 10g increments up to 40g additional for runs using the red glider. Repeat the trials by adding 20g increments up to 80g additional for the second glider.
9. Analyze the data by creating a graph of the hanging mass and hanger (M2) and the mass of the glider (M1) in the form of calculated acceleration vs M2/(M1+M2) for all 10 trials together.