

## Move Your Mass Preliminary Lab

### *Physics*

For this lab, you will use a set of initial measurements and calculations to predict the acceleration of a dynamics cart. You will then test your prediction by using the same physical system used for your initial measurements. You will need to work in groups of several students to make your initial measurements and calculations.

1. Set up a dynamics cart, track, motion sensor, string, pulley, and hanging mass so that the cart reliably moves at a rate that can be easily tracked by the motion sensor. Make sure that you have the track leveled and that you can control the movement of the cart as it reaches the end of the track.
2. With your group, make free-body diagrams of the cart and the hanging mass. Verify your drawings with the teacher. *Make sure you have accurate diagrams in your notes.*
3. Using your drawings and the principles of Newton's second law, discuss with your group how you can use this system to accurately calculate the force of friction that is opposing the motion of your cart. *In your notes, describe what you will do and write the equations you will need. Make sure to differentiate between similar variables (e.g., the mass of the hanging mass and the mass of the cart should be distinguishable in your equations).*
4. After verifying your idea in step 3, make the measurements and calculations necessary to determine the force of friction on your cart. Show your work to the teacher. *Make sure you document your calculations, showing all your work, in your notes.*