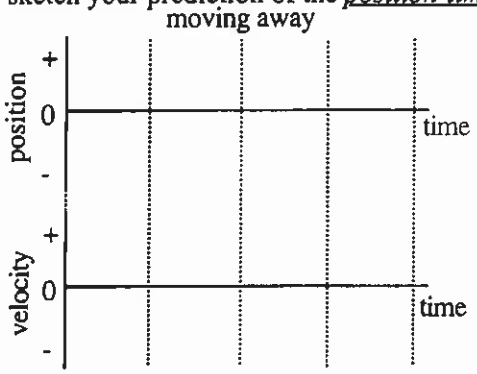
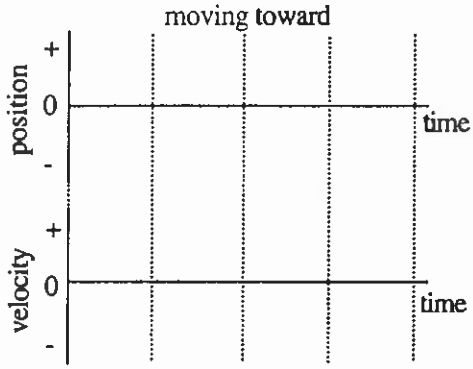
Hand in this sheet **Name**_____

INTERACTIVE LECTURE DEMONSTRATIONS
PREDICTION SHEET—KINEMATICS 2—MOTION OF CARTS

Directions: This sheet will be collected. Write your name at the top to record your presence and participation in these demonstrations. Follow your instructor's directions. You may write whatever you wish on the attached Results Sheet and take it with you.

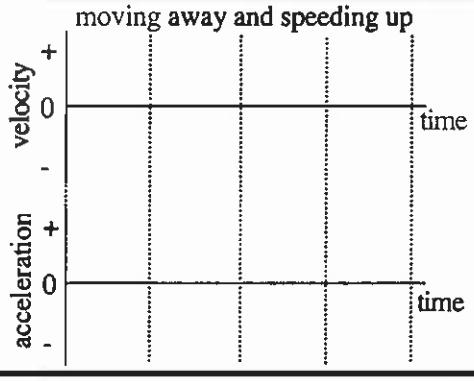
Demonstration 1: On the left velocity axes below sketch your prediction of the *velocity-time* graph of the cart moving away from the motion detector at a steady (constant) velocity. On the left position axes below sketch your prediction of the *position-time* graph for the same motion.



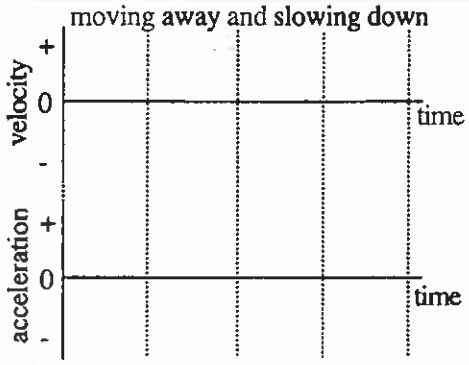


Demonstration 2: On the right velocity axes above sketch your prediction of the *velocity-time* graph for the cart moving toward the motion detector at a steady (constant) velocity. On the right position axes above sketch your prediction of the *position-time* graph for the same motion.

Demonstration 3: Sketch on the axes on the right your predictions for the *velocity-time* and *acceleration-time* graphs of the cart moving away from the motion detector and speeding up at a steady rate.

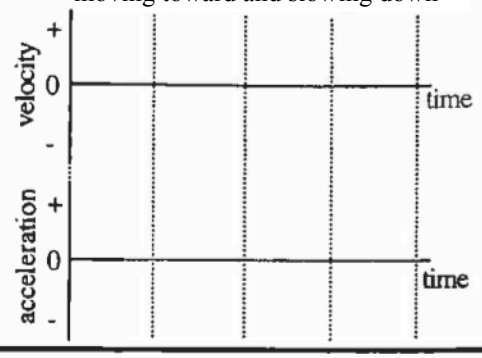


Demonstration 4: Sketch on the axes on the right your predictions for the *velocity-time* and *acceleration-time* graphs of the cart moving away from the motion detector and slowing down at a steady rate.



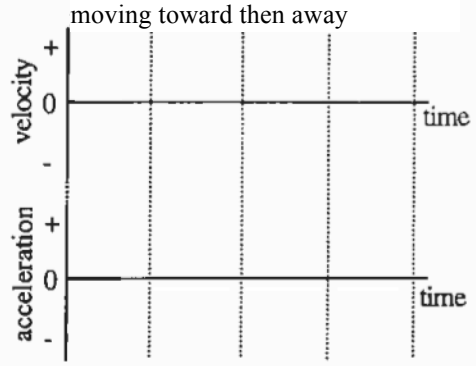
Demonstration 5: A cart is subjected to a constant force in the direction away from the motion detector. Sketch on the axes on the right your predictions for the *velocity-time* and *acceleration-time* graphs of the cart moving toward the motion detector and slowing down at a steady rate. (Start your graph after the push that gets the cart moving.)

moving toward and slowing down



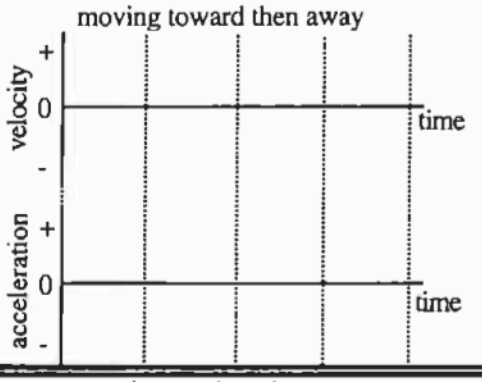
Demonstration 6: A cart is subjected to a constant force in the direction away from the motion detector. Sketch on the axes on the right your predictions of the *velocity-time* and *acceleration-time* graphs of the cart after it is given a short push toward the motion detector (and is released). Sketch velocity and acceleration as the cart slows down moving toward the detector, comes *momentarily* to rest and then speeds up moving away from the detector.

moving toward then away



Demonstration 7: Sketch below your predictions for the *velocity-time* and *acceleration-time* graphs for the cart which is given a short push up the inclined ramp toward the motion detector (and is released) Sketch the graph as the cart slows down moving toward the detector, comes *momentarily* to rest and then speeds up moving away from the detector.

moving toward then away



Demonstration 8: The origin of the coordinate system is on the floor, and the positive direction is upward. A ball is thrown upward. It moves upward, slowing down, reaches its highest point and falls back downward speeding up as it falls. Sketch on the axes on the right your predictions for the *velocity-time* and *acceleration-time* graphs of the ball from the moment just after it is released until the moment just before it hits the floor.

moving up then down