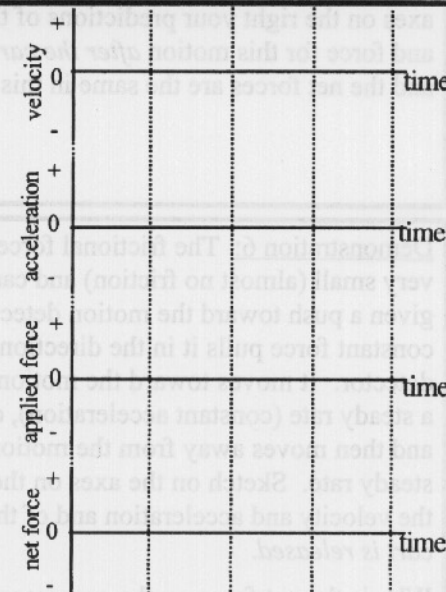
Hand in this sheet **Name**____________________

INTERACTIVE LECTURE DEMONSTRATIONS
PREDICTION SHEET--NEWTON'S 1ST & 2ND LAWS

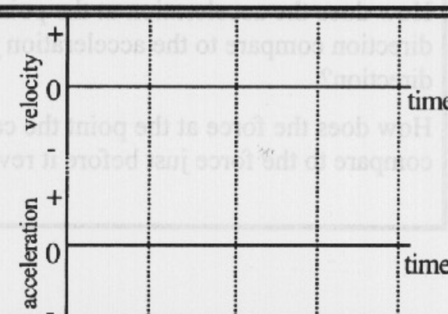
Directions: This sheet will be collected. Write your name at the top to record your presence and participation in these demonstrations. Follow your instructor's directions. You may write whatever you wish on the attached Results Sheet and take it with you.

Demonstration 1: The frictional force acting on the cart is very small (almost no friction) and can be ignored. The cart is pulled with a constant force (the applied force) so that it moves away from the motion detector speeding up at a steady rate (constant acceleration). On the axes to the right sketch your predictions of the velocity and acceleration of the cart and the applied and net force on the cart after it is released and during the time the cart is moving under the influence of the constant force. (Applied and net force are the same in this case. Why?)

Demonstration 2: The frictional force acting on the cart is now increased. The cart is pulled with the same constant force (the applied force) as in Demonstration 1 so that it moves away from the motion detector speeding up at a steady rate (constant acceleration). On the same axes to the right sketch your predictions of the velocity and acceleration of the cart and the applied and net force on the cart after it is released. (Note that the applied and net force are different now. Which determines the acceleration?) We are measuring only the applied force.

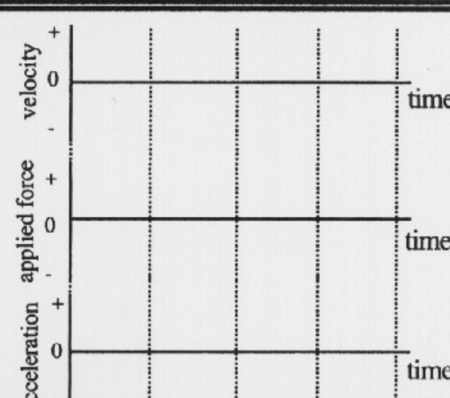


Demonstration 3: The cart has equal and opposite forces acting on it (due to two fans blowing in opposite directions). The frictional force is very small (almost no friction) and can be ignored. The cart is given a quick push away from the motion detector and released. Sketch on the right your predictions of the velocity and acceleration of the cart *after it is released.* What is the net (or resultant) force after it is released?

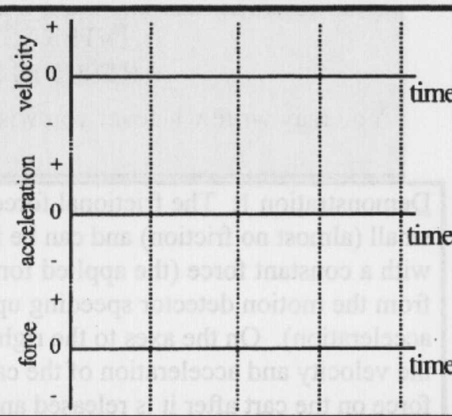


Demonstration 4: The frictional force acting on the cart remains very small (almost no friction). The cart is given a brief pull away from the motion detector and then released. Sketch on the axes on the right your predictions of the velocity and applied force for the motion, *including the time during the pull.* Is the net force the same as the applied force in this case?

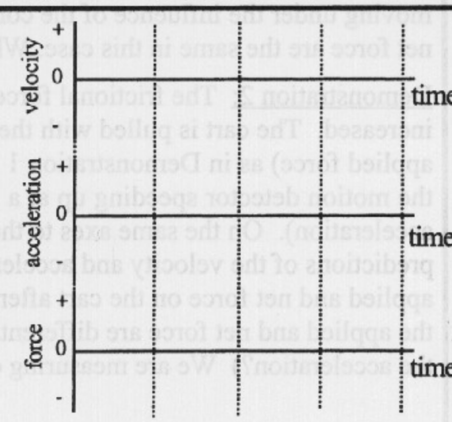
What does the acceleration look like? Sketch your prediction on the acceleration-time axes on the right (below the force).



Demonstration 5: The frictional force acting on the cart remains very small (almost no friction) and can be ignored. The cart is given a push toward the motion detector and released. A constant force pulls it in the direction away from the motion detector. The cart moves toward the motion detector slowing down at a steady rate (constant acceleration). Sketch on the axes on the right your predictions of the velocity, acceleration and force for this motion *after the cart is released*. (The applied and the net forces are the same in this case.)



Demonstration 6: The frictional force acting on the cart remains very small (almost no friction) and can be ignored. The cart is given a push toward the motion detector and released A constant force pulls it in the direction away from the motion detector. It moves toward the motion detector slowing down at a steady rate (constant acceleration), comes to rest *momentarily* and then moves away from the motion detector speeding up at a steady rate. Sketch on the axes on the right your predictions of the velocity and acceleration and of the force on the cart *after the cart is released.*



Why is the net force on the cart essentially the same as the applied force in this case?

How does the acceleration at the point the cart reverses direction compare to the acceleration just before it reverses direction?

How does the force at the point the cart reverses direction compare to the force just before it reverses direction?

Keep this sheet

INTERACTIVE LECTURE DEMONSTRATIONS
RESULTS SHEET--NEWTON'S 1ST & 2ND LAWS

You may write whatever you wish on this sheet and take it with you.

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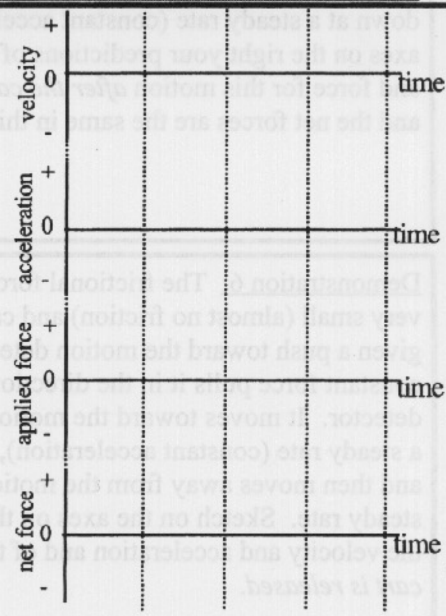

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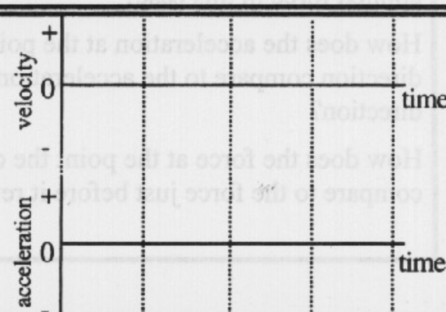

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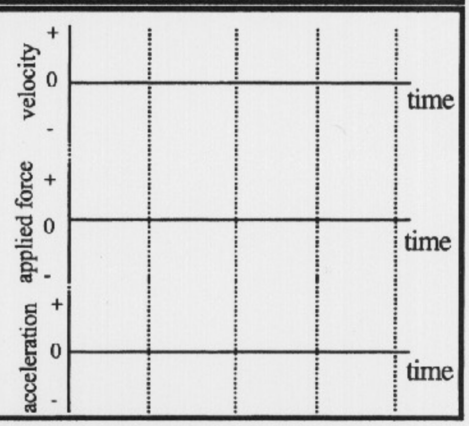

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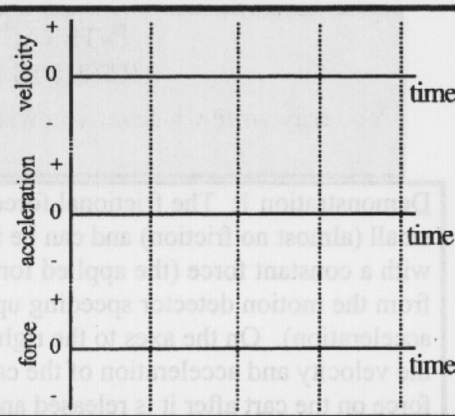

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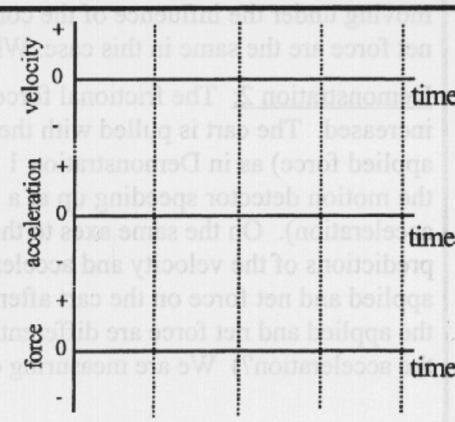

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How does the force at the point the cart reverses direction compare to the force just before it reverses direction?