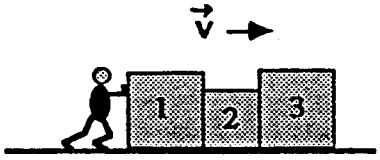
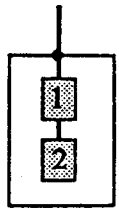
Free-Body Diagrams—4

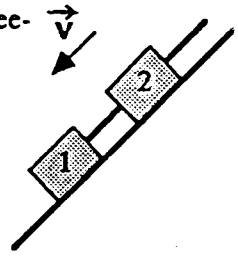
Construct a free-body diagram for block 2. The horizontal surface has friction.



Construct a free-body diagram for block 1 hanging in the upward moving elevator.



Construct a free-body diagram for block 2. The surface has friction.



Save space below for answer.

Free-Body Diagrams—5

Construct a free-body diagram for the person running toward the right without slipping.

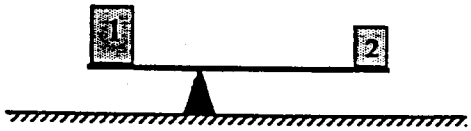
Construct a free-body diagram for the person running toward the right without slipping.

Construct a free-body diagram for the box sitting on the back of the flat-bed truck that moves with increasing speed toward the right.

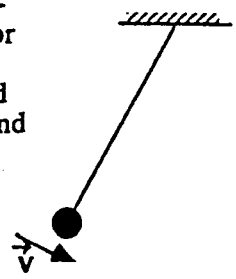
Leave space below vacant for answer.

Free-Body Diagrams—6

Construct a free-body diagram for the beam. Ignore the weight of the beam.



Construct a free-body diagram for the heavy ball swinging toward the right at the end of the cable.



Construct a free-body diagram for the ball at the position shown as it moves through the air in an arc. Ignore air resistance.

Save space below for answer.

Relating Force and Motion - 1

A block is shown below in three different situations.
(a) For each situation construct a motion diagram for the block.
(b) Next, construct a free-body diagram for the block, and
(c) determine the direction of the net force.
(d) Complete the table near the bottom of the page indicating the directions of the velocity, the acceleration, and the net force for each situation.
(e) Finally, decide if the net force seems to be proportional to the velocity, to the acceleration, or to neither one.

	(I) A block, intitially at rest, is pushed gently toward the right on a horizontal, frictionless surface causing its speed toward the right to increase. 	(II) The block coasts at constant speed on the horizontal, frictionless surface. 	(III) The block, moving right, is opposed by a gentle push that causes its speed to decrease. 
(a) Motion diagram			
(b) Free-body diagram			
(c) Direction of net force if not zero.			

(d) Complete the table indicating if each quantity is zero (0), points left (◄—), or points right (—►).

	I	II	III
$\vec{v}$			
$\vec{a}$			
$\vec{F}_{net}$			

(e) Based on the information shown in the table, does there seem to be a relation between the net force acting on the block and its velocity or acceleration? If so, describe that relationship.

Relating Force and Motion—2

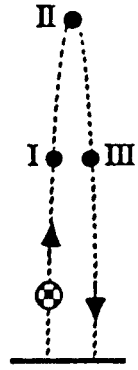
A ball is thrown vertically upward.

(a) Use either a motion diagram or the subtracting velocity technique to determine the direction of the ball's acceleration at positions I, II, and III.

(b) Construct a free-body diagram for the ball at positions I, II and III. Ignore air resistance.

(c) Complete the table near the bottom of the page indicating the directions of the velocity, the acceleration, and the net force at each position.

(d) Finally, decide if the net force is proportional to the velocity, to the acceleration, or to neither one.



(a)	Motion diagram at I	Subtract velocities to find direction of the acceleration at II (or is the acceleration zero?)	Motion diagram at III
(b)	Free-body diagram at I	Free-body diagram at II	Free-body diagram at III

(c) Complete the table below indicating if each quantity is zero (0), points up (↑), or points down (↓) at each position.

	I	II	III
$\vec{v}$			
$\vec{a}$			
$\vec{F}_{net}$			

(e) Based on the information shown in the table, does there seem to be a relation between the net force acting on the block and its velocity or acceleration? If so, describe that relationship.