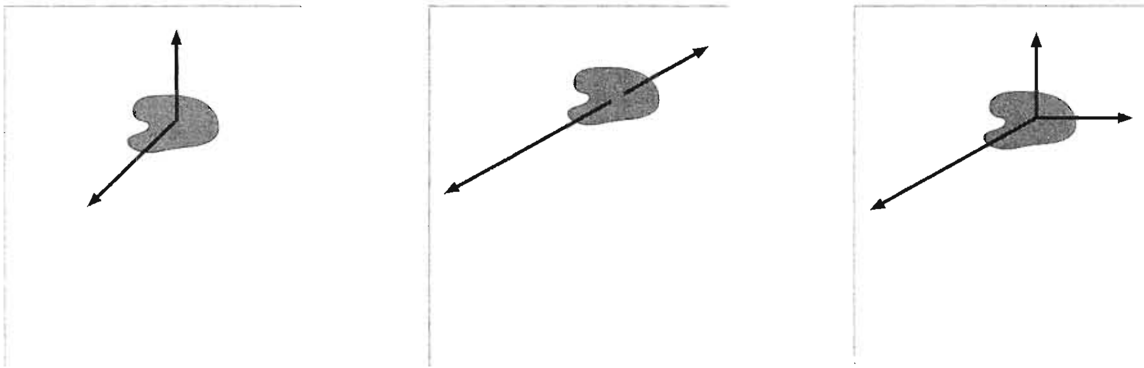
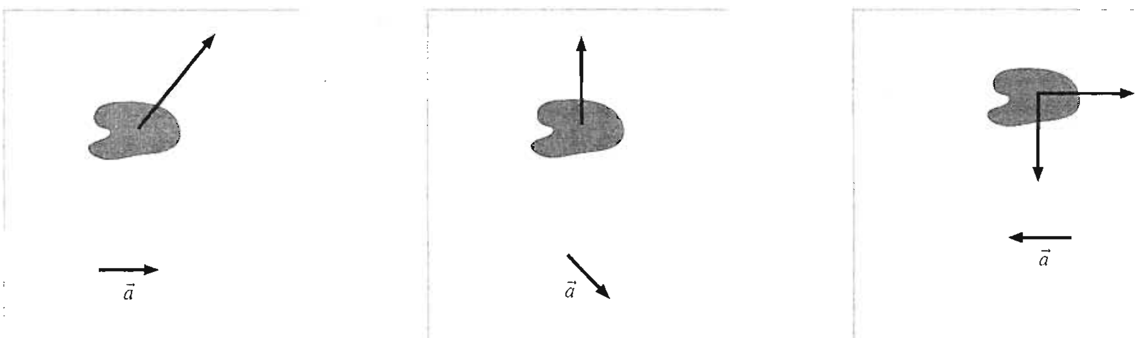
4.6 Newton's Second Law

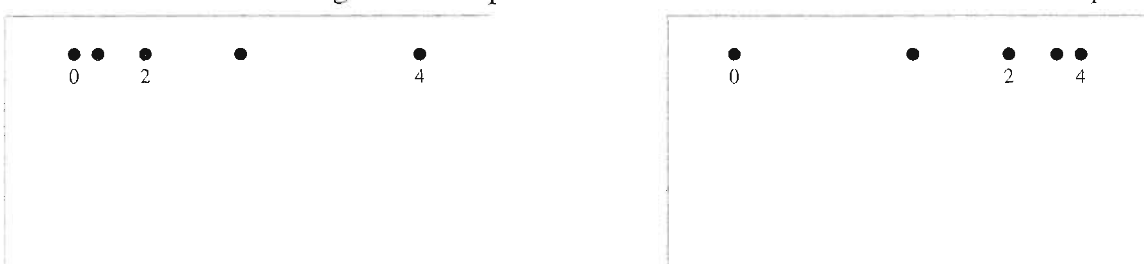
13. Forces are shown on three objects. For each:
    a. Draw and label the net force vector. Do this right on the figure.
    b. Below the figure, draw and label the object's acceleration vector.



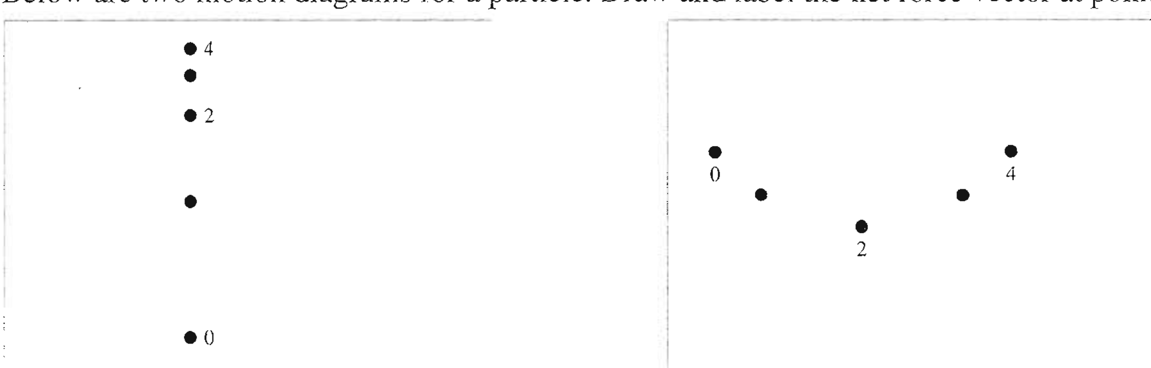
14. In the figures below, one force is missing. Use the given direction of acceleration to determine the missing force and draw it on the object. Do all work directly on the figure.



15. Below are two motion diagrams for a particle. Draw and label the net force vector at point 2.



16. Below are two motion diagrams for a particle. Draw and label the net force vector at point 2.



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Concept-Development Practice Page 5-2

Force and Acceleration

1. Skelly the skater, total mass 25 kg, is propelled by rocket power.

   a. Complete Table I
   (neglect resistance)

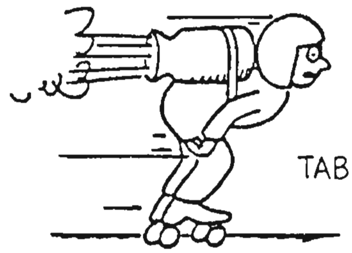


TABLE I

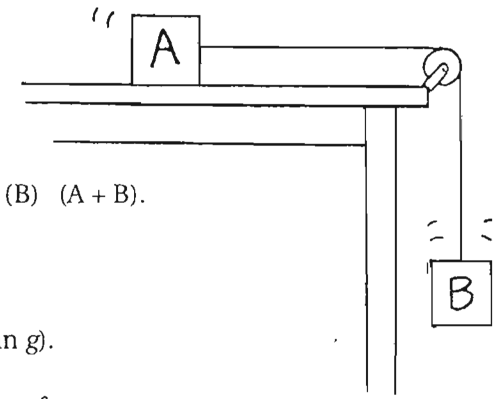
FORCE	ACCELERATION
100 N	
200 N	
	10 m/s²

   b. Complete Table II for a constant 50-N resistance:

TABLE II

FORCE	ACCELERATION
50 N	0 m/s²
100 N	
200 N	

2. Block A on a horizontal friction-free table is accelerated by a force from a string attached to Block B. B falls vertically and drags A horizontally. Both blocks have the same mass *m*. (Neglect the string's mass.)



(Circle the correct answers)

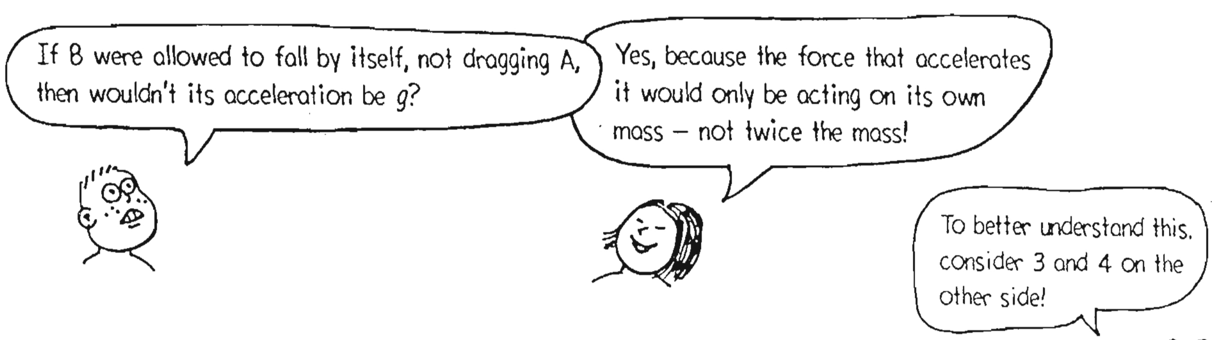
   a. The *mass* of the system [A + B] is (*m*) (2 *m*).

   b. The *force* that accelerates [A + B] is the weight of (A) (B) (A + B).

   c. The weight of B is (*mg*/2) (*mg*) (2 *mg*).

   d. Acceleration of [A + B] is (less than *g*) (*g*) (more than *g*).

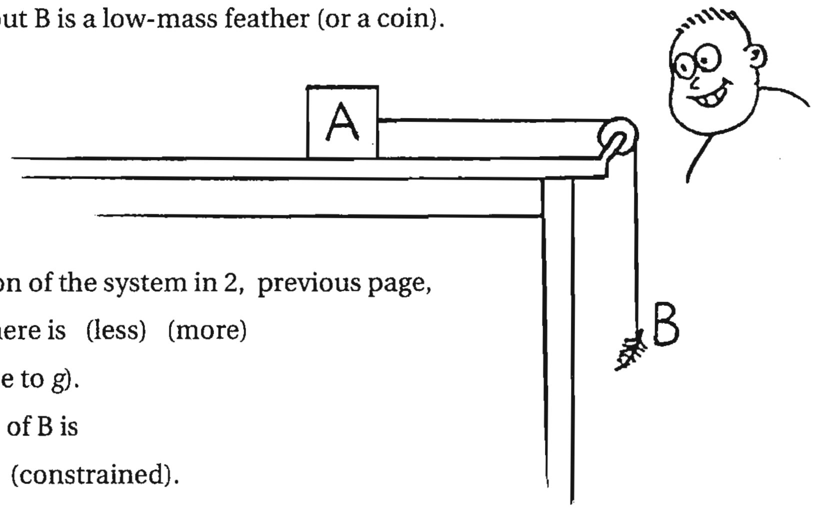
   e. Use *a* = to show the acceleration of [A + B] as a fraction of *g*.________________________



Conceptual PHYSICS

Force and Acceleration continued

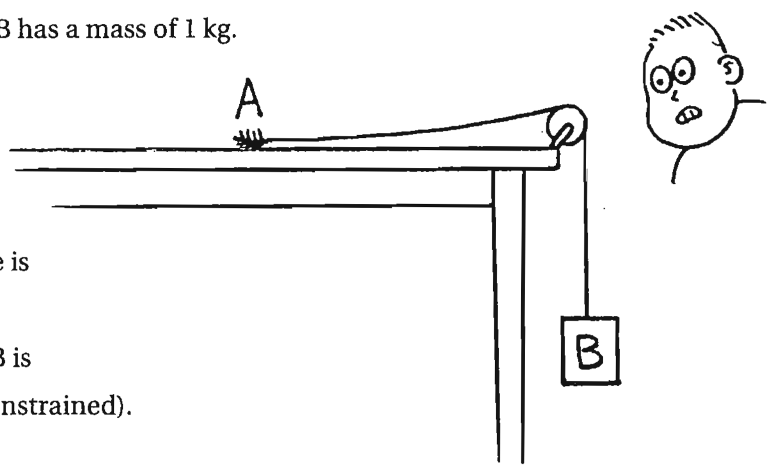
3. Suppose A is still a 1-kg block, but B is a low-mass feather (or a coin).



   a. Compared to the acceleration of the system in 2, previous page, the acceleration of [A + B] here is (less) (more) and is (close to zero) (close to *g*).

   b. In this case the acceleration of B is (practically that of free fall) (constrained).

4. Suppose A is a feather or coin, and B has a mass of 1 kg.



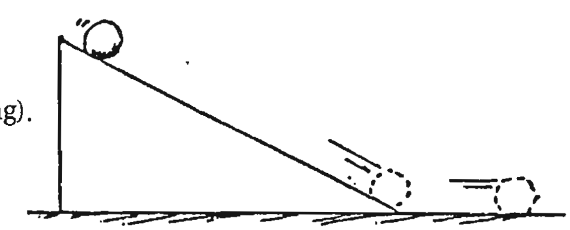
   a. The acceleration of [A + B] here is (close to zero) (close to *g*).

   b. In this case the acceleration of B is (practically that of free fall) (constrained).

5. Summarizing 2, 3, and 4, where the weight of one object causes the acceleration of two objects, we see the range of possible accelerations is

   (between zero and *g*) (between zero and infinity) (between *g* and infinity).

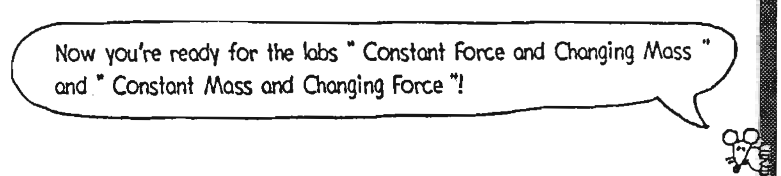
6. A ball rolls down a uniform-slope ramp.



   a. Acceleration is (decreasing) (constant) (increasing).

   b. If the ramp were steeper, acceleration would be (more) (the same) (less).

   c. When the ball reaches the bottom and rolls along the smooth level surface it (continues to accelerate) (does not accelerate).



Conceptual **PHYSICS**

