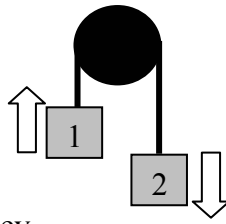


## Newton's Second Law Mental Models: Mechanics: Atwood's Machine

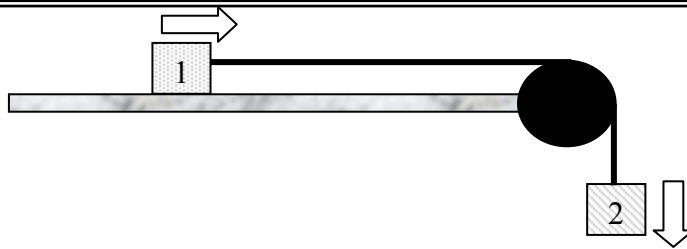


Two blocks of the same mass hang from a pulley.

The pulley and the rope have tiny mass, and are frictionless.

The blocks move at constant speed, block 1 up, block 2 down (indicated by the arrows in the figure). For the following questions (statements), indicate your choice by circling the corresponding letter, a to c.

- Q1.** If block 2 breaks off, so that it will fall to the ground, then block 1 will...
- (a) immediately drop to the ground.
  - (b) slow down to a stop and then drop to the ground.
  - (c) None of the above.
- Q2.** If you suddenly attach a third block (of the same mass) below block 1, then the blocks will...
- (a) slow down to a stop and then start speeding up in the opposite direction.
  - (b) continue moving a constant speed that is less than the original speed.
  - (c) None of the above.
- Q3.** If you suddenly attach a third block (of the same mass) below block 2, then both blocks will...
- (a) speed up to a constant speed that is greater than the original speed.
  - (b) keep on speeding up (until they hit either the pulley or the ground).
  - (c) None of the above.



The two blocks in the figure do not have the same mass.

The pulley and the rope have tiny mass. Friction between the table and block 1 causes both blocks move at a constant speed as indicated by the arrows shown. For the following questions (statements), indicate your choice by circling the corresponding letter, a to c.

- Q4.** If block 2 breaks off, so that it falls to the ground, then block 1 will...
- (a) slow down to a stop.
  - (b) stop immediately.
  - (c) None of the above.
- Q5.** If you suddenly attach a third block to the left of block 1, that has the same mass as block 1, then the blocks will...
- (a) slow down to a constant speed that is less than the present speed.
  - (b) slow down to a stop.
  - (c) None of the above.
- Q6.** If you suddenly attach a third block below block 2, that has the same mass as block 2, then the blocks will...
- (a) keep on speeding up (until they hit either the pulley or the ground).
  - (b) speed up to a constant speed that is greater than their present speed.
  - (c) None of the above.