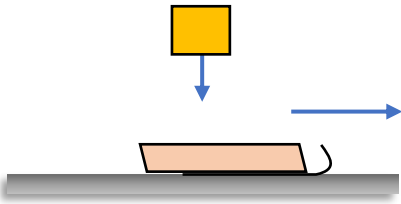


CONCEPT: ADDING MASS TO A MOVING OBJECT/SYSTEM

- In some problems, mass is added to an object that's already moving.
 - When this happens, both objects in the system (old mass + new mass) have the same final velocity.
 - Because momentum is conserved, whenever 1 object gains/loses momentum, the other loses/gains the same amount.

EXAMPLE: A 70-kg sled is moving 10m/s to the right on smooth ice when a 30-kg box is dropped vertically onto it. Calculate the **a)** final speed of the system; **b)** change in momentum of the box; **c)** change in momentum of the sled.



PROBLEM: A 40-kg skater runs parallel to a 3-kg skateboard. Both are moving to the right at 10m/s. The skater jumps on the board, and they move continue moving right (i.e. no change in direction). Calculate the final speed of the system.

CONSERVATION OF MOMENTUM

- 1) Draw Diagrams for Before & After
- 2) Write Conservation of Momentum EQ
- 3) Plug in values & solve