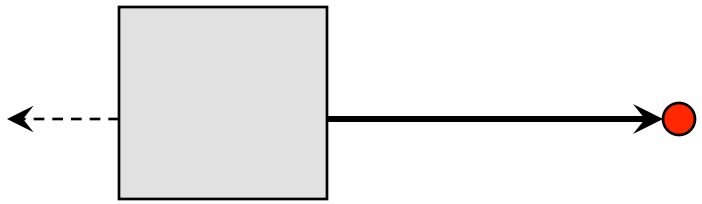
Example: Recoil

- When an object at rest emits a part of itself, in order to conserve momentum, it must go back in the opposite direction.
- What forces are responsible for this motion?

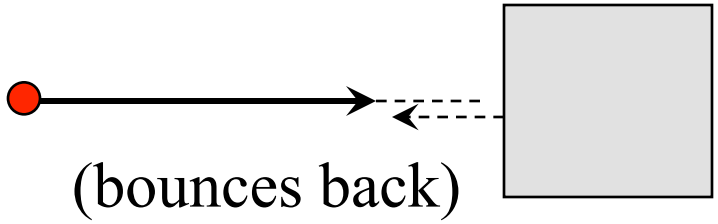


(object goes backwards)

Do it!

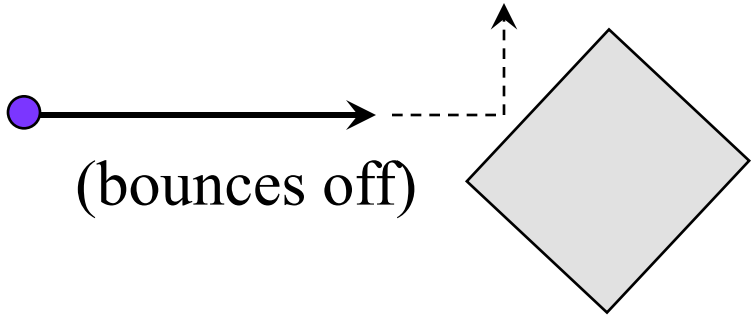
A ball on a table sliding
and hitting a block.
Which ball exerts
the most force on the block?

1.



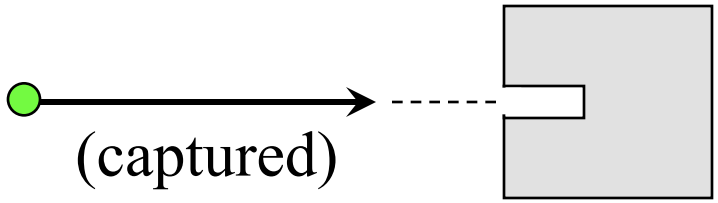
(bounces back)

2.



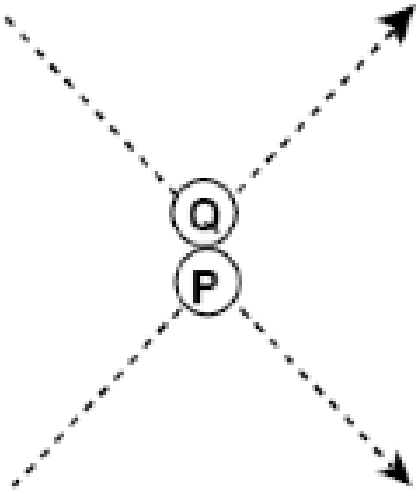
(bounces off)

3.



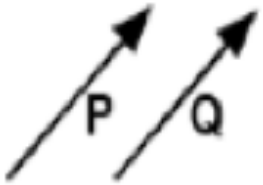
(captured)

The diagram at the right depicts the path of two colliding steel balls rolling on a table. Which set of arrows best represents the direction of the change in momentum of each ball?

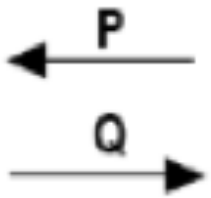


(1)

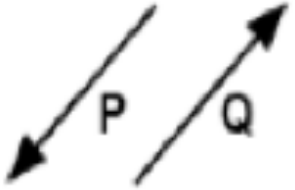
(2)



(3)



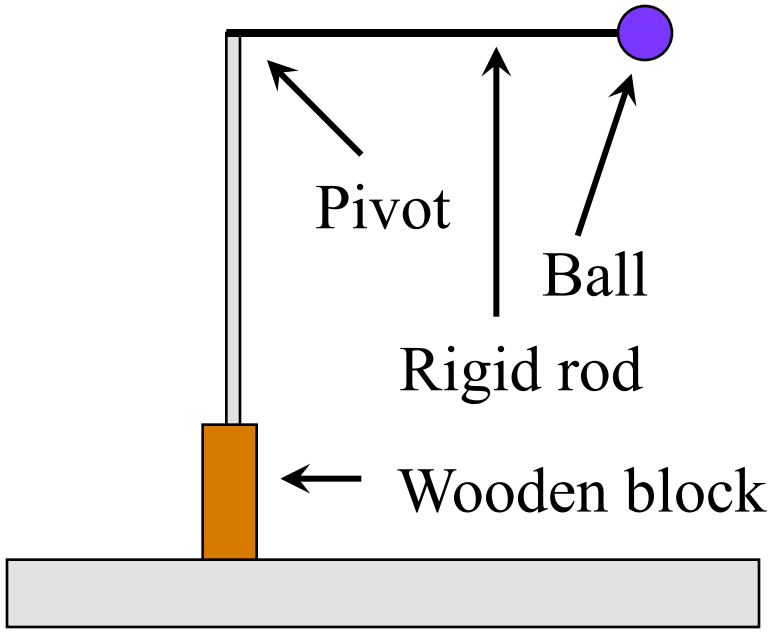
(4)



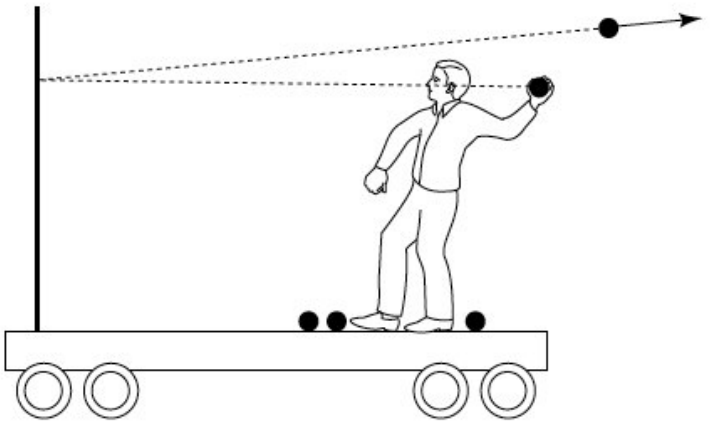
(5)

Which ball will knock the block over?

1. A superball
2. A clay ball of equal mass
3. Both
4. Neither



Suppose you are on a cart, initially a
rest on a track
with negligible friction.

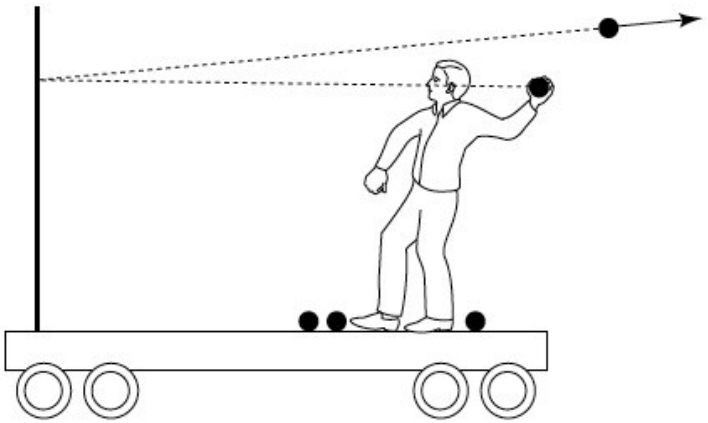


You throw balls at a partition that is
rigidly mounted on the cart. The bal
bounce straight back as shown in the
figure.

Is the total horizontal momentum of the person, cart, partition, plus all the balls conserved in the process of throwing the balls and having them bounce off the partition?

(1) Yes.
(2) No.
(3) You are not given enough information to decide.

Suppose you are on a cart, initially a
rest on a track
with negligible friction.



You throw balls at a partition that is
rigidly mounted on the cart. The bal
bounce straight back as shown in the
figure.

Is the cart put in motion?

(1) Yes. Towards the left
(2) Yes. Towards the right.
(3) No.
(4) You are not given enough information to decide.