

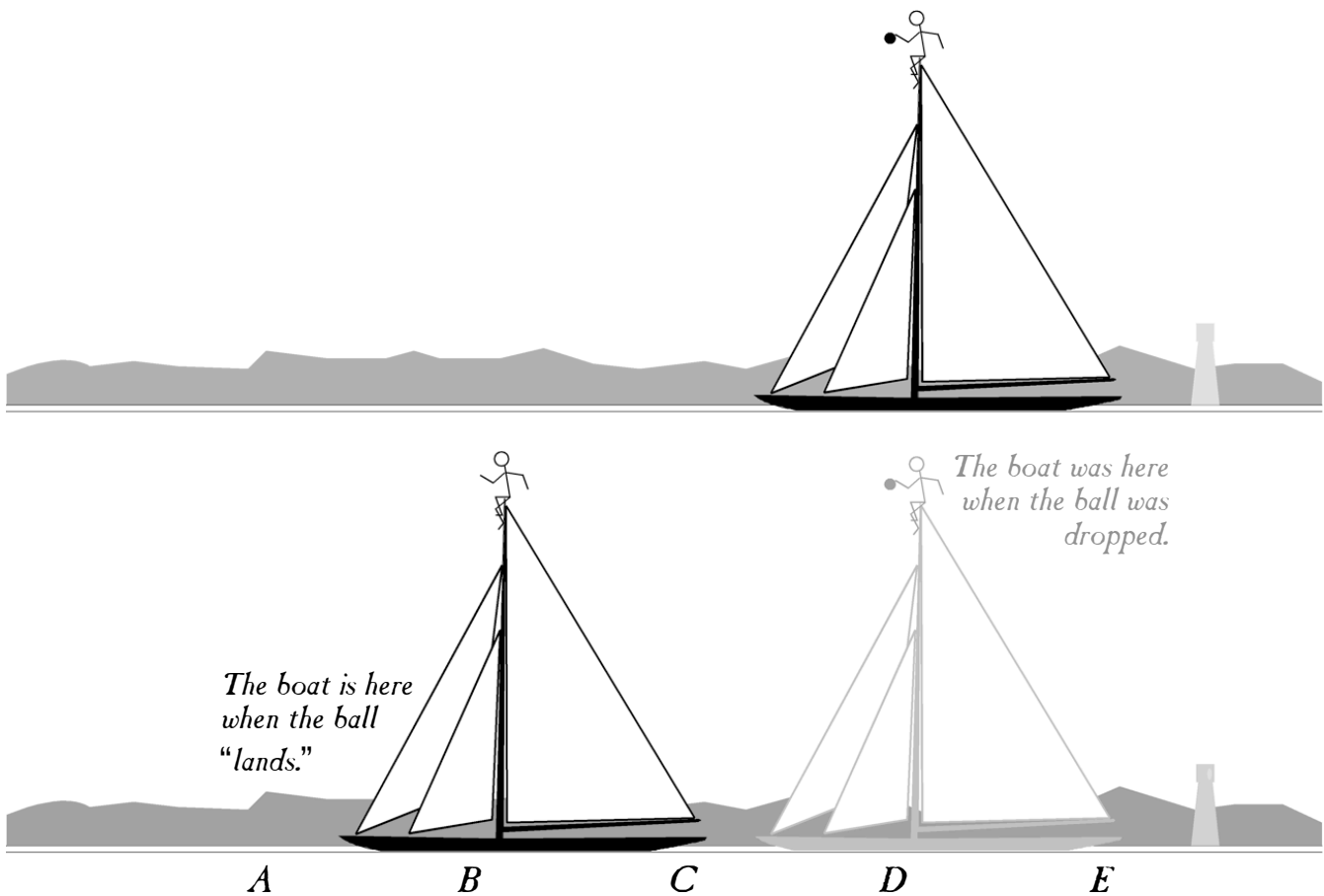
CANNONBALL

A DEMONSTRATION OF FREE FALL FROM A MOVING PLATFORM Physics Cinema Classics: Ball Falling from Ship Mast

Name: _____

P-G-S: _____

A sailboat moves with uniform motion from right to left across our field of view. When it reaches the position indicated in the upper diagram, a cannonball is dropped from the top of the mast. In the time it takes the cannonball to fall to the deck, the ship moves some distance to the left. (The cannonball is heavy and aerodynamic; it is not affected by air resistance or wind. When the cannonball was dropped, it was not given a push in any direction; it was simply dropped by a person sitting atop the mast.) The lower diagram shows the position of the boat when the cannonball lands and a ghost image of the position of the boat when the cannonball was dropped.



Where will the ball hit when it "lands"?

- A. To the left of position B.
- B. At the base of the mast.
- C. Between positions B and D.
- D. Directly below the point at which it was dropped (behind the current position of the boat).
- E. To the right of position D.

RECORD YOUR ANSWER AND ARGUMENTS FOR THE SELECTIONS OFFERED ON THE BACK.

Choose three of the selections below and write arguments for them. (You will need to write two arguments supporting conclusions you don't believe.) Then select the choice you believe will be the actual outcome. Draw the path of the cannonball on the lower diagram on the front. The path begins at the top of the mast of the ghost ship and ends at the point you chose from the selections below.

*PRE-demonstration: Arguments
in favor of THIS position*

*POST-demonstration: How
COULD it have landed here?*

A. To the left of position B.

B. At the base of the mast.

C. Between positions B and D.

D. Directly below the point at which it was dropped (behind the current position of the boat).

E. To the right of position D.

ACTUAL OUTCOME

Which one happened and why? Describe and explain after demonstration.

Without erasing any of your previous work, show the actual path of the cannonball on the lower diagram on the front.

After the demonstration has been done and you understand the reason for its outcome, describe what would have to happen for the ball to land at the OTHER positions.