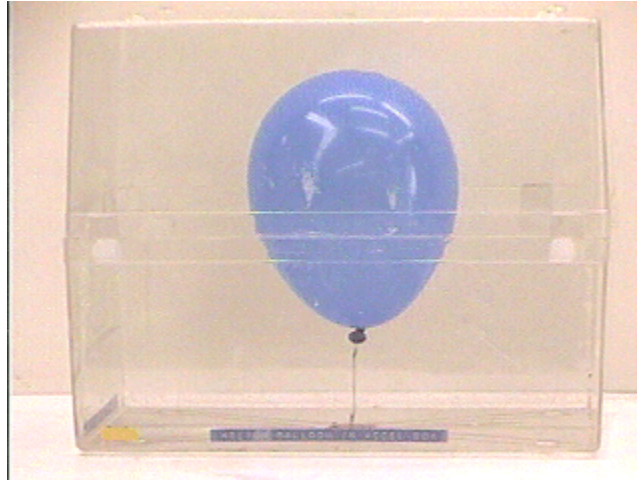


## Answer #71

The answer is (a): the helium balloon will move toward the *front* of the accelerated container, in particular, in the direction of the acceleration. This can be seen on an mpeg video by clicking your mouse on the photograph below.



In fact, when the container slides, and then quickly stops, at the end of its motion the balloon will clearly be seen to move in the backward direction.

This motion involves the inertia of the balloon relative to the inertia of the air in the container, both of which want to keep their momentum constant even when the container undergoes acceleration. However, because the air is more dense it possesses more inertia, so when the container is accelerated the heavier air moves to the rear of the container and the lighter helium balloon moves to the front.

The helium balloon acts as a type of *accelerometer*, pointing in the direction of the acceleration of the box. Thus when the box slows down the balloon also points in the direction of the acceleration, which is now to the rear, as seen in the mpeg.

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