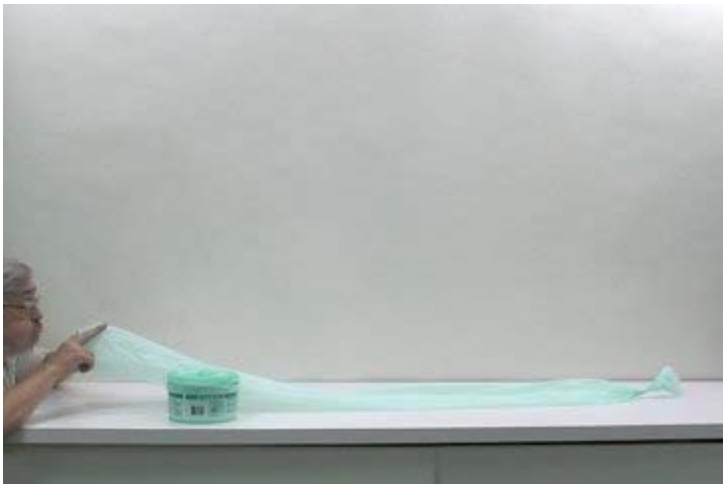
Answer #256

The answer is (a): the "balloon" can be inflated with one good blow, as seen in an mpeg video by clicking your mouse on the photograph below.



When I blow a rapid deep breath into the open end, some air in the region surrounding the air stream that I am blowing gets caught up in that air stream, multiplying the amount of air by a large factor. This air is directed into the balloon due to the direction of the original air stream, inflating the balloon.

This process is called *entrainment*.

Although the Bernoulli effect is often used to explain this demonstration, and one manufacturer sells the material for this demonstration as "Bernoulli bags," it cannot be explained by the Bernoulli effect, but rather by the process of entrainment. The Bernoulli effect deals with changes of velocity and pressure along flow lines in a confined tube or similar enclosure. In open space, pressure differences do not exist; if a pressure difference were to exist the air would be pushed by the higher pressure toward the region of lower pressure, instantly equalizing the original pressure difference between the moving and quiescent air. The microscopic process of entrainment is a different process from the Bernoulli effect.

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For questions and comments regarding the *Question of the Week* contact

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