

Worksheet 2 – DEMONSTRATION OF WEIGHTLESSNESS IN FREE FALL

Úloha: You can also observe the state of weightlessness on the surface of the Earth, during free fall. If an object moves in a free fall, it moves rapidly and the fictitious force compensates for the acting gravitational force. The state of weightlessness can be observed, for example, in the following falling objects:

- a) Plastic PET bottle filled with water. If a full open PET bottle falls down the bore, the liquid will not leak out. It is in a state of weightlessness and no force is exerted on the liquid, thanks to which it could leak from the bottle. The experiment can also be performed with a filled juice box. The liquid does not flow out of it through the hole in the straw during the fall either.
- b) A special tool - a dynamometer with a weight suspended in a transparent box or frame. To demonstrate the state of weightlessness in free fall, it is possible to make a special device - a transparent box in which a weight is suspended on a dynamometer. The device must be made relatively durable to withstand the impact after a fall, albeit on a soft surface. At rest, the dynamometer shows a deflection corresponding to the mass of the weight. If we let the device fall, there will be a state of weightlessness inside and the dynamometer will show zero deflection. The dynamometer will act the same when the box is thrown upwards, horizontally or obliquely. Give it a try.

Solution:

Prepare and run the experiment as specified. Observe the occurrence of weightlessness during a free fall. Try to document the course of the experiment with a camera with a short exposure time.