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The scenario

Subject	Fluid Mechanics / Buoyant Force
Length	5:18
Main objectives	Hydrostatic buoyancy force
Detailed objectives	
Structure and description of experiments	
1. Introduction	Description: The experiment verifies the existence of buoyancy.
2. Main subject	Description: Demonstrate that a body immersed in a liquid act on a hydrostatic buoyant force, determining the magnitude of the buoyant force.
Part 1	
(0:39)	**Utilities:** Stand, scales, forme meter, container with liquid of density 1 (water), two bodies-weights of the same volume of different density
(0:43)	**Description:** By weighing, we compare the masses of bodies. The bodies have the same volume, but have different densities, which is confirmed by comparing their weights. A body with more mass has more density, a body with more mass has more density.
Experiment 1 (1:16)	We hang a body with a smaller weight (density) on a forme meter and measure its weight G = 0.5 N. We immerse the whole body suspended on a force meter in a liquid of density 1 (water) in a container with water and measure the magnitude of the force F = 0.32 N, which the body acts on the force meter. **Questions:** Why does the force meter show a lower force value when the body is immersed in a liquid?
(1:59)	**Conclusion:** By comparing the magnitude of the forces measured by the force meter, we find that the force F < G. A body immersed in a liquid is overloaded, i.e. j. The hydrostatic buoyancy force acts on the body upwards F_{vz}, for which it applies $F_{vz} = G – F = 0,18$ N.
Experiment 2 (2:08)	We hang the body with greater density on the force meter and measure its weight G = 1.46. We immerse the body suspended on the force meter completely in water in a container with water and measure the magnitude of the force F = 1.28 N, which the body acts on the force meter. By comparing the magnitude of the forces measured by the force meter, we again find that the force F < G. A body immersed in a liquid is overloaded, t. j. hydrostatic buoyancy force acts on the body upwards F_{vz}, for which it applies $F_{vz} = G – F = 0,18$ N.
(2:52)	We will compare the magnitude of the buoyant force acting on bodies of the same volume with different weights (densities) immersed in the same liquid (water).

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	Questions: Why does the same buoyancy force act on both bodies of different mass (density) immersed in water ? **Conclusion:** The magnitude of the buoyant force by which a body immersed in a liquid is lightened does not depend on the density (mass) of the body.
Part 2	
(3:01)	**Utilities:** Stand, scales, force meters, container with liquid of density 1 (water), container with liquid of density 2 (glycerin) two bodies-weights of the same volume of different density .
Experiment 1 (3:19)	We hang the body on the force meter and measure its weight G = 0.53 N. We immerse the body suspended on the force meter in water in a container with water and measure the force F = 0.34 N that the body exerts on the force meter.
(4:03)	By comparing the magnitude of the forces measured by the force meter, we again find that the force F < G. A body immersed in a liquid is overloaded, i.e. j. hydrostatic buoyancy force acts on the body upwards F_{vz}, for which approximately applies F_{vz} = G – F = 0,19 N.
(4:05)	We repeat the experiment by immersing the body to different depths. If approximately one-third of the body is submerged, the body acts on the force meter with a force of approximately F = 0.48 N, and the magnitude of the buoyant force will be F_{vz} = G – F = 0,05 N. If approximately two-thirds of the body is submerged, the body acts on the force meter with a force of approximately F = 0.41 N, and the magnitude of the buoyant force will be F_{vz} = G – F = 0,09 N. If the entire body is submerged, the body acts on the force meter with a force of approximately F = 0.34 N, and the magnitude of the buoyant force will be F_{vz} = G – F = 0,19 N. **Questions:** Does the magnitude of the buoyant force depend on the depth of the bottom of the body below the free surface of the liquid?
Experiment 2 (4:13)	We hang the body on a force meter and measure its weight G = 0.53 N. We immerse the whole body suspended on the force meter in a container with a liquid with a density of 2 (glycerine) and measure the force F = 0.29 N that the body immersed in glycerin acts on the force meter .
(5:02)	By comparing the magnitude of the forces measured by the force meter, we again find that the force F < G. A body immersed in a liquid is overloaded, i.e. j. the hydrostatic buoyancy force Fvz acts on the body upwards, for which it approximately applies F_{vz} = G – F = 0,24 N.
(5:06)	Comparison of the magnitude of the forces with which the body acts on the force meter, in the case when it is immersed in water and in glycerin. A body immersed in water acts on the force meter with a

	force F = 0.34 N, i.e. F_{vz} = 0,19 N. A body immersed in water exerts a force on the force meter F = 0,29 N, i.e. F_{vz} = 0,24 N. A body immersed in liquids of different density sinks differently. **Conclusion:** The magnitude of the buoyancy force by which a body immersed in a liquid is overburdened depends on the size of the volume of the immersed body, or the submerged part of the body, and on the density of the liquid in which the body is immersed.
3. Summary, evaluation and notes	**Application:** Immersion of bodies in liquids . **Notes:** A body immersed in a liquid is overburdened by a buoyant force, the size of which is equal to the weight of a liquid with the same volume as the volume of the immersed body or a submerged part of the body. **Level:** elementary school (ISCED 2 / 6th, 8th grade)

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