

### The scenario

<b>Subject</b>	<b>Fluid Mechanics / Swimming Bodies</b>
<b>Length</b>	2:43
<b>Main goals</b>	Conditions of swimming bodies
<b>Detailed objectives</b>	
<b>Structure and description of experiments</b>	
<b>1. Introduction</b>	Description: Demonstration of the effect of buoyancy and gravity on bodies in liquids.
<b>2. Main subject</b>	Description: Explanation of the conditions for swimming or diving bodies. Observing the swimming of bodies larger, smaller and the same density as water.
<b>Part 1</b>	
<b>(0:39)</b>	<p><b>Tools:</b> Container with water, plasticine, scales, identical fillable bodies, i.e. bodies of the same volume.</p> <p><b>Description:</b> Fill the container with water and prepare the bodies. Fill one body with water, so that both parts are submerged under the water surface and connected under water. Fill the second body with plasticine. The third body will be filled only with air.</p>
<b>Experiment 1 (0:53)</b>	By weighing and comparing, we can find out that the heaviest body is filled with plasticine and the lightest is the body filled with air. The volume of the bodies is the same, therefore the body filled with plasticine has the highest density and the empty body has the lowest density. Filled bodies therefore have different weights and different densities.
<b>Experiment 1 (1:24)</b>	<p>We gradually submerge the bodies under the surface and observe how they behave. We found that the more dense a body is, the more it sinks, or sinks to the bottom. A body filled with water floats in water. A body with less density than water floats on the surface, on the surface of the liquid. The size of the buoyant force acting on a body located in a liquid depends on its volume and the density of the liquid in which the body is located. The magnitude of the force of gravity depends on the weight of the body.</p> <p><b>Questions:</b> Why does a body of the same volume sometimes sink to the bottom and sometimes rise to the surface after being immersed in a liquid?</p>
<b>(1:24)</b>	<b>Conclusions:</b> The body sinks to the bottom: the resultant of the forces acting on the body is directed downwards. The force of gravity is greater than the force of buoyancy. The density of the body is greater than the density of the liquid.
<b>(1:37)</b>	

<p><b>(1:50)</b></p>	<p>The body floats in the liquid: The resultant of the forces acting on the body is zero. Gravitational force is equal to buoyant force, liquid density is equal to body density.</p> <p>A body floats: The resultant of the forces acting on the body is directed upwards and the body rises to the free surface of the liquid. When the body reaches the surface, it partially emerges and settles. The force of gravity acting on the body is less than the buoyant force, and the density of the body is less than the density of the liquid.</p>
<p><b>3. Summary, evaluation and notes</b></p>	<p><b>Application:</b> Swimming bodies in liquids. Archimedes' law is used when sailing ships, submarines and when measuring the density of substances with hydrometers.</p> <p><b>Notes:</b> The magnitude of the buoyant force acting on bodies in the liquid is proportional to the weight of the displaced amount of liquid, or the weight of the submerged body, or the submerged part of the body.</p> <p><b>Level:</b> primary school (ISCED 2 / 6th, 8th grade)</p>