The scenario

Subject (field/title)	**Air pressure/ Scale in a vacuum**
Length of movie	1:32
Main Goals	Fluid statics. Presentation of the properties of atmospheric pressure. Archimedes' principle.
Detailed Goals	Experimental checking whether air weight. Archimedes' principle for gases. Buoyant force in gases.
Structure and description of experiments:	
1. Introduction	Description: We live at the bottom of an ocean of air. Above us is a layer of atmosphere made up of air. The question often arises, does air weigh? The film provides an answer to this question through a simple experiment.
2. Main subject	Description: Baroscope. Observation of the behavior of the balance/baroscope placed under the pump cover, before and after the air is pumped out from the pump cover .
Part 1,	
Experiment 1,	**Tools:** • Baroscope with a glass bulb filled with air, • Vacuum pump • Manometer **Description:** On the arms of the lever with a low-friction bearing, a glass bubble filled with air is suspended on one side and an adjustable counterweight on the other. There is a scale by the handle. We balance the scale with a movable counterweight. We place the balanced baroscope under the cover of the vacuum pump. We close the air supply valve and pump out the air from the cover of the vacuum pump. We observe the indications of the manometer and the behavior of the baroscope. The pressure under the cover of the vacuum pump decreases and the glass bulb of the baroscope falls down. We close the valve connecting the lampshade with the vacuum pump. We open the air supply valve. Air gets under the bell of a vacuum pump . The pressure increases (to atmospheric pressure). The baroscope returns back to balance.

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	Questions: Why did the glass bubble of the baroscope fall down after the pressure under the glass was reduced? Does air weigh? How can you check that air weighs? What physical law can be used to explain the behavior of the baroscope when the pressure is increased and decreased under the bell of a vacuum pump? **Conclusions:** There is a buoyant force in the air, according to Archimedes' principle. The air weight. The baroscope has been balanced in the air. The air surrounding the glass bubble, according to Pascal's principle, exerted atmospheric pressure on it from all sides. After pumping out the air from the bell of vacuum pomp (lowering the pressure), the density of the air surrounding the bubble decreased. Objects with a higher density sink, so the bubble goes down. The baroscope remained in in balance in the air - the forces acting on it are balanced: the force of gravity acting vertically downwards and the buoyancy force directed upwards (we ignore the forces related to the suspension of the bubble). After lowering the pressure of the gas surrounding the bubble, the balance is disturbed: the value of the buoyant force decreased, the force of gravity remained unchanged, the bubble sank.
3. Summary, evaluation and remarks	The video can be used as an introduction to the lesson: question: why does the air bubble fall down when the pressure under the bell is reduced? The video can illustrate the content of the lesson: Archimedes' principle for gases. The video can be used as a control question: Does air weigh? What experiment can show that air weight? The video can be used during discussion about: the first balloon flight, which was constructed by brothers Joseph and Jacques Montgolfier, using Archimedes' principle for gases in everyday life. **Level:** primary school and high school

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