The scenario

Subject	**Fluid Mechanics / Archimedes' Principle**
Length	6:00
Main objectives	Archimedes' principle
Detailed objectives	
Structure and description of experiments	
1. Introduction	Description: The experiment verifies the validity of Archimedes' principle.
2. Main subject	Description: Formulation of Archimedes' principle based on experimental results.
Part 1	
(0:39) **Experiment 1 (1:00)** **(1:44)** **(2:25)**	**Utilities:** Stand, force meter, measuring cylinder with water, water container, one hollow and one solid body . **Description:** By inserting a solid body into a hollow body, we make sure that the volume of the body and the cavity are the same. We hang the bodies on the load cell suspended on the stand and measure them also G = 0.62 N. We immerse the whole body in water and measure the force F = 0.42 N, with which the body acts on the force meter. We will determine the size of the hydrostatic buoyancy force Fvz = G – F = 0.20 N from the measured drafts. Fill the cavity of the second body with water. We will measure the magnitude of the force F', which the system of bodies now acts on the force meter. We compare this force with the weight G of bodies immersed in water and we see that the magnitudes of both forces are the same, i.e. F'= G. **Questions:** What is Archimedes' principle? How to verify the validity of Archimedes' principle? **Conclusions:** A body immersed in a liquid is buoyed by hydrostatic buoyancy. The magnitude of the hydrostatic buoyancy force is equal to the weight of liquids of the same volume as the volume of the submerged part of the body .
Part 2	
(2:42) **Experiment 1 (3:04)**	**Utilities:** Stand, hanger, containers for making isosceles scales, identical bodies/weights with a hook, water collection container, water drain container, electronic scales, measuring cylinder . **Description:** We will make isosceles scales from hangers, containers and weights, with one container on each side and a weight suspended below it.

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Experiment 2 (5:20)	Pour water into the drain pan. We take isosceles scales and dip one body into the drainage container. The water that the body pushed out after immersion drained into the collection container. Pour the water from the collection container into the container above the submerged body. The balance of the scales has changed again. The body that we immersed in the water pushed out as much water as was necessary to bring the scales into balance. I.e. A body immersed in water is buoyed by a force equal to the weight of the water displaced by the body. **Questions:** What do we observe on isosceles scales? How does the balance change? **Conclusions:** A body immersed in a liquid is lightened by buoyancy. The magnitude of the hydrostatic buoyancy force is equal to the weight of liquids of the same volume as the volume of the submerged part of the body.
3. Summary, evaluation and notes	**Application:** Swimming bodies **Notes:** A solid body immersed in a substance in a gaseous state is, just like in a liquid, lightened by the force of buoyancy. For a body with density ρ_t, which is immersed in a gas of density V with its entire volume ρ_p the aerostatic buoyancy force acts. Archimedes' principle also applies to bodies immersed in gases. **Level:** elementary school (ISCED 2 / 6th, 8th grade)

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