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A pendulum experiment on added mass and equivalence. RUSSELL DONNELLY, University of Oregon, DOUGLAS NEILL, Willamette University, DEAN LIVELYBROOKS, University of Oregon, UNIVERSITY OF OREGON TEAM — The concept of added mass in fluid mechanics has been known for many years. A familiar example is the accelerated motion of a sphere through an inviscid fluid which has an added mass of one-half the mass of the fluid displaced. This result is widely used in quantum fluids; for example giving a finite mass to a trapped electron in superfluid helium-4, which is a free electron in a bubble about 36 Angstroms in diameter. A derivation of this result is contained in Landau-Lifshitz "Fluid Mechanics", Section 12. The period of oscillation of a simple pendulum in a vacuum is independent of the mass because of the principle of equivalence of gravitational and inertial masses. In a fluid however, both buoyancy and added mass enter the problem. We present results of experiments of simple pendulums of different materials oscillating in various fluids. The results agree closely with the results obtained for the added mass in inviscid fluids, as expected.

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