

PROJECT MUSE: More Understanding with Simple Experiments

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MUSE URL: <http://education.epsdivisions.org/muse/>

Main goals of the MUSE project

- to go beyond excitement by helping students to get more understanding from simple experiments;
- to propose teachers some approaches and means to be used in class practice thus enlarging the range of their choices.

Target Audience

In-service and pre-service teachers; Physics education and physics education research communities

Educational added value

- Comments on possible ways of fostering students' understanding beyond teaching rituals
- Discussion of naive ideas and reasoning strategies conflicting with physics knowledge
- Spotlighting various viewpoints of the same phenomenon that may favor its links with contents not often presented in current teaching materials

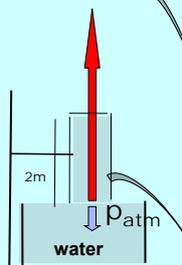
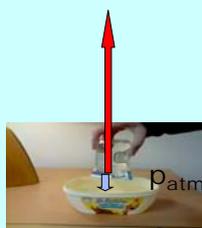
This poster and related documents downloadable from MUSE URL

Example: Fluids

Reconsidering common explanations such as symbolised in the force diagrams below:

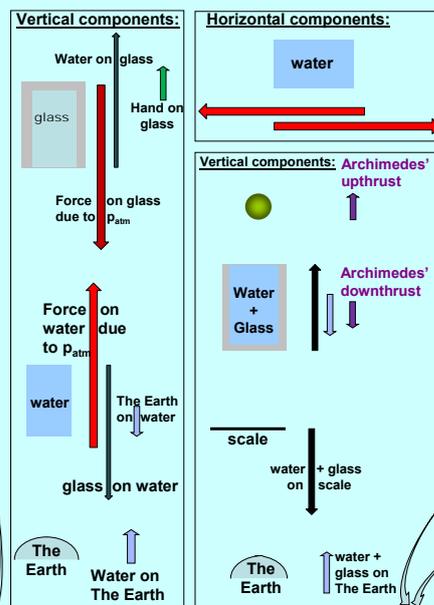
- the cardboard « feels » from above, the weight of the water and from below the force due to atmospheric pressure;
- what is holding this column of water 2m above the water level in the glass? It's atmospheric pressure (...). In the tube, there is no air, and no pressure is exerted on the water

Marie Curie/Isabelle Chavannes (1907)



Suggesting clarifying elements

Here: dislocated diagrams



Suggesting and justifying targeted variants such as

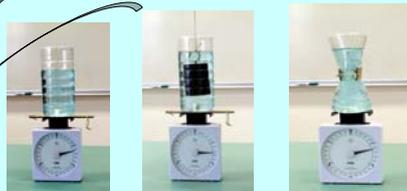


stressing the **symmetrical** action of the surrounding air

Other experiments discussed in this spirit



stressing the **reciprocal force of Archimedes' upthrust: Archimedes' downthrust**



stressing the non obvious relationship between force exerted on the stand and pressure in the liquid at the bottom of the bottle.

Discussing tentative interpretations of common views:

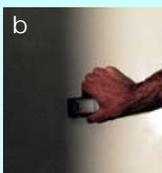
- the idea that an object *always* exerts its weight on the stand
- the third law is disregarded
- agent (air, pushing) / patient (water, lifted up)
- localised, not systemic approach

More materials on : siphon, love-meters, surface tension, water jets from bottles...

Next: **light and vision**



Light source, object, screen



Moving cell phone across the penumbra



View "seen" by a cell phone

Relating shadows to received light (eclipse, coloured shadows...)

More on : refraction, fibres, mirage, ...