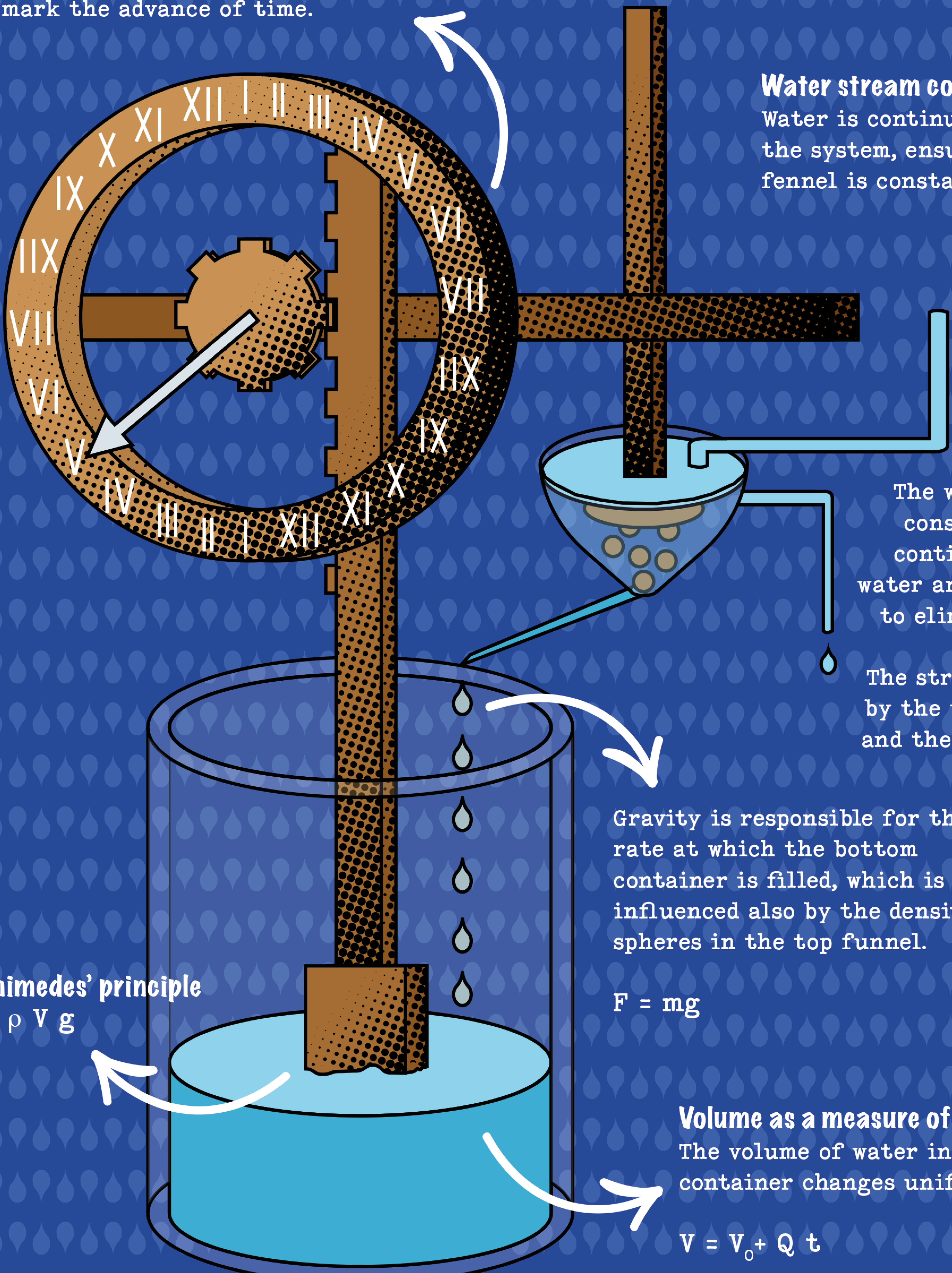
Translation into a clock

The raising level of water pushes the piston upwards. A gear rotates with an angular velocity ω, so that a clock hand can mark the advance of time.

Water stream control

Water is continuously introduced into the system, ensuring its level in the fennel is constant.



The water volume is kept constant thanks to the continuosu inflow of new water and to a channel used to eliminate the overflow.

The stream flow (Q) is fixed by the velocity of water (v) and the surface area of the funnel (A)

$$Q = v\ A$$

Gravity is responsible for the rate at which the bottom container is filled, which is influenced also by the density of spheres in the top funnel.

$$F = mg$$

Archimedes' principle

$$F_B = \rho\ V\ g$$

Volume as a measure of time

The volume of water in the bottom container changes uniformly over time

$$V = V_0 + Q\ t$$

Physics of the water clock

Water clocks are among the most ancient time-measuring instruments in human history. They have been found in many shapes and formes, from a simple pair of containers—where water goes from one bowl to the other in a fixed amount of time, while the passing of time is measured via ticks drawn on the walls of each bowl — to the more complex design shown here. In its simplest form, a water clock can be thought as a hourglass where water replaces sand. In the above, a piston is designed following Archimedes' buoyancy principle so that, taking advantage of the pressure coming from the rising level of water, a rotation is induced in the hand of a clock.

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