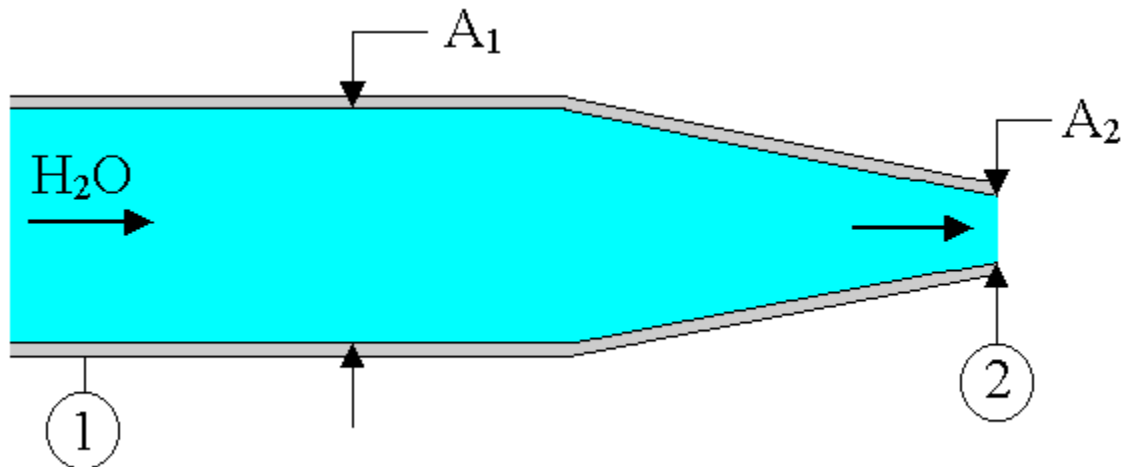


CONTINUITY

Case 2: Steady, Incompressible, 1-D (or quasi 1-D) flow

Now consider a water nozzle, like the ones we attach to garden hoses. Assume again steady flow (i.e., the faucet is turned on and left at a certain setting without increasing or decreasing the flow rate).



Starting again with the same general expression as before:

$$\dot{m}_1 = \dot{m}_2 \Rightarrow \rho_1 Q_1 = \rho_2 Q_2 \quad (1)$$

Since the flow is incompressible, eq.(1) becomes again

$$Q_1 = Q_2 \quad (2)$$

or

Continuity eq. for **steady, incompressible, 1-D (or quasi 1-D) flow**

$$V_1 A_1 = V_2 A_2$$

Note: V_1 and V_2 are the average velocities at sections 1 and 2 respectively.