Continuity of Fluid Flow

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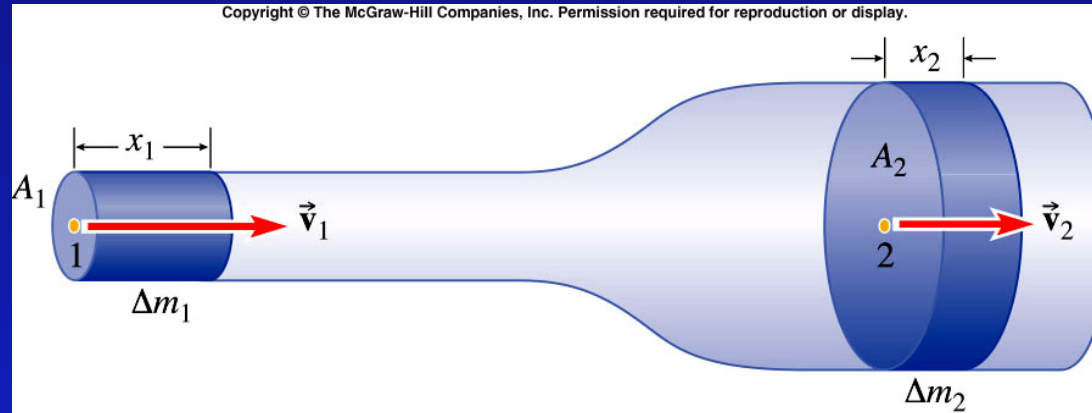
- Watch "plug" of fluid moving through the narrow part of the tube (A_1)

  - Time for "plug" to pass point $\Delta t = x_1 / v_1$

  - Mass of fluid in "plug" $m_1 = \rho \, Vol_1 = \rho \, A_1 \, x_1$ or $m_1 = \rho A_1 v_1 \Delta t$

- Watch "plug" of fluid moving through the wide part of the tube (A_2)

  - Time for "plug" to pass point $\Delta t = x_2 / v_2$

  - Mass of fluid in "plug" $m_2 = \rho \, Vol_2 = \rho \, A_2 \, x_2$ or $m_2 = \rho A_2 v_2 \Delta t$

- Continuity Equation says $m_1 = m_2$ fluid isn't building up or disappearing

  - $A_1 \, v_1 = A_2 \, v_2$