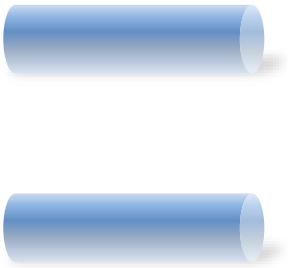
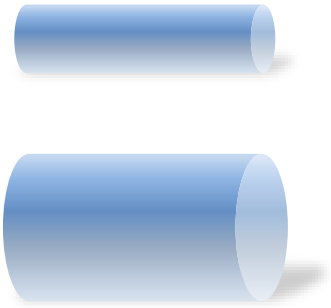
FLUID SPEED AND VOLUME FLOW RATE

- There are TWO main terms that deal with **"how quickly"** a fluid FLOWS**:**

Fluid Speed (——) → $v =$ ——



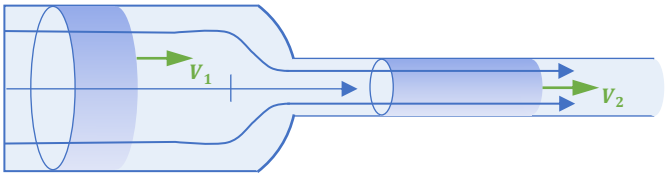
Volume Flow Rate (——) → $Q =$ —— $=$ ____



EXAMPLE**:** A long, horizontal pipe has a 2 m² cross-sectional area**.** If it takes water 5 seconds to traverse an 80-m segment of the pipe, calculate**: (a)** the fluid speed**; (b)** the volume flow rate**.**

FLOW CONTINUITY

● Flow CONTINUITY: Because an IDEAL Fluid is incompressible, its _____ (____) never changes!



→ ____ = _____ = _____ = Constant

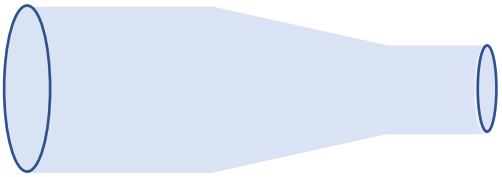
- This is often called the _____ Equation.

- So if Area changes, _____ changes:

→ _____ = _____

- Pipe are usually cylindrical → **A =** _____

EXAMPLE 2: A garden hose with a radius of 2 cm has water flowing into it with 2 m/s. At the end of the hose is a nozzle with a radius of 1 cm. **(a)** Find the speed of water in the nozzle. **(b)** In how many minutes does it fill up a 350 L bath tub?



EXAMPLE: CONTINUITY / PROPORTIONAL REASONING

EXAMPLE**:** Water flows in a horizontal cylindrical pipe. If the water has speed V at point A, and point B has double the diameter of A, what is the water speed at B**?**

a) V / 4
b) V / 2
c) V
d) 2 V
e) 4 V