Glossary

active transport the process in which a living membrane expends energy to move substances across

Bernoulli's equation the equation resulting from applying conservation of energy to an incompressible frictionless fluid: $P + 1/2pv^2 + pgh = \text{constant}$, through the fluid

Bernoulli's principle Bernoulli's equation applied at constant depth: $P_1 + 1/2p{v_1}^2 = P_2 + 1/2p{v_2}^2$

dialysis the transport of any molecule other than water through a semipermeable membrane from a region of high concentration to one of low concentration

diffusion the movement of substances due to random thermal molecular motion

flow rate abbreviated Q, it is the volume V that flows past a particular point during a time t, or $Q = V/t$

fluid dynamics the physics of fluids in motion

laminar a type of fluid flow in which layers do not mix

liter a unit of volume, equal to 10^{-3} m^3

osmosis the transport of water through a semipermeable membrane from a region of high concentration to one of low concentration

osmotic pressure the back pressure which stops the osmotic process if one solution is pure water

Poiseuille's law the rate of laminar flow of an incompressible fluid in a tube: $Q = (P_2 - P_1)\ r^4/8\ l$

Poiseuille's law for resistance the resistance to laminar flow of an incompressible fluid in a tube: $R = 8\ l/\ r^4$

relative osmotic pressure the back pressure which stops the osmotic process if neither solution is pure water

reverse dialysis the process that occurs when back pressure is sufficient to reverse the normal direction of dialysis through membranes

reverse osmosis the process that occurs when back pressure is sufficient to reverse the normal direction of osmosis through membranes

Reynolds number a dimensionless parameter that can reveal whether a particular flow is laminar or turbulent

semipermeable a type of membrane that allows only certain small molecules to pass through

terminal speed the speed at which the viscous drag of an object falling in a viscous fluid is equal to the other forces acting on the object (such as gravity), so that the acceleration of the object is zero

turbulence fluid flow in which layers mix together via eddies and swirls

viscosity the friction in a fluid, defined in terms of the friction between layers

viscous drag a resistance force exerted on a moving object, with a nontrivial dependence on velocity