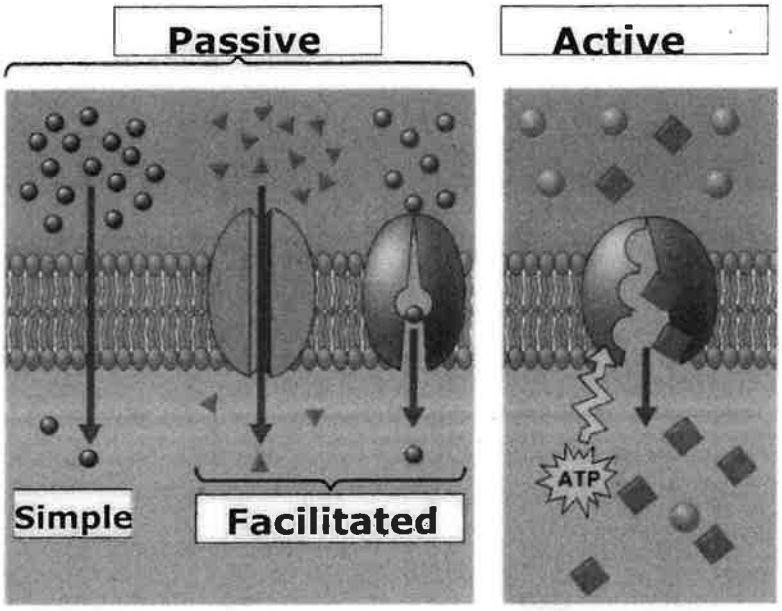
Types of Transport

CSUSM
STEM Success Center

Biology 210 Handout



- No ATP required
- High to low solute concentration
- Simple = easily pass through membrane
- Facilitated = protein required (channel or carrier)

- ATP required
- Low to high solute concentration (against gradient)
- Primary = uses ATP directly
- Secondary = uses a concentration gradient
- Carrier protein is required

Molecule Class	Example	How do these molecules pass through the cell membrane?
Hydrophobic molecules	Hydrocarbons (Benzene)	Passive diffusion
Ions	Na+ (sodium ion) K+ (potassium ion) Ca2+ (calcium ion)	Transport proteins
Small and large charged polar molecules	Water, ethanol, urea	Transport proteins (and slow, passive diffusion)
Large uncharged polar molecules	Glucose	Transport proteins
Small nonpolar molecules	O2, N2, CO2	Passive diffusion

BIO210