

# Auxiliary Concept: Mass Transfer & Separation

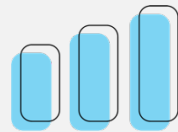
**Engineering Literacy Dimension:** Engineering Knowledge

**Domain:** Engineering Sciences

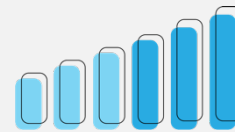
**Overview:** *Mass Transfer & Separation* is the science that explains and governs a range of separation processes to include absorption, distillation, humidification and drying, and membrane separations, as well as transport processes in equilibrium. This concept is important to Engineering Literacy as it is the basis on which engineers design equilibrium staged chemical processes and analyze chemical or physical principles of materials in order to select appropriate techniques for mass transfer and separation operations.

## Performance Goal for High School Learners

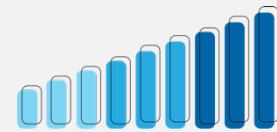
I can, when appropriate, draw upon the knowledge of Mass Transfer & Separation content, such as (a) *molecular diffusions* (b) *separation systems* (c) *equilibrium state methods*, (d) *humidification and drying* (e) *continuous contact methods* and (f) *convective mass transfer*, to analyze the mechanism of transfer due to difference in concentrations to solve problems in a manner that is analytical, predictive, repeatable, and practical.



Basic



Proficient



Advanced

### MOLECULAR DIFFUSIONS

I can define chemical molecular diffusion, describing its basic conditions.

I can explain the factors influencing diffusivity of mass, using mathematical descriptions.

I can analyze the diffusion rate of mass, using mathematical equations and correct units.

### SEPARATION SYSTEMS

I can describe the basic process of separation.

I can explain the basic components and organization of separation systems.

I can plan a mass separation process for a collective mass.

### EQUILIBRIUM STATE METHODS

I can describe the basic concept of equilibrium stage operations.

I can explain the basic process of equilibrium stage operations.

I can justify whether among different methods, the equilibrium stage method is most appropriate for a certain mass transfer or separation.

### HUMIDIFICATION & DRYING

I can describe the basic logic of humidification and drying operations.

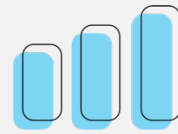
I can explain the basic process of humidification and drying operations.

I can justify whether among different methods, the humidification and drying method is most appropriate for a certain mass transfer or separation.

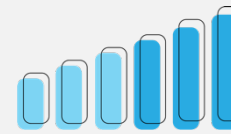
## Auxiliary Concept: Mass Transfer & Separation Cont.

### Performance Goal for High School Learners

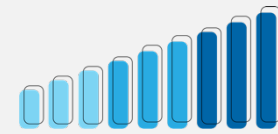
I can, when appropriate, draw upon the knowledge of Mass Transfer & Separation content, such as (a) *molecular diffusions* (b) *separation systems* (c) *equilibrium state methods*, (d) *humidification and drying* (e) *continuous contact methods* and (f) *convective mass transfer*, to analyze the mechanism of transfer due to difference in concentrations to solve problems in a manner that is analytical, predictive, repeatable, and practical.



Basic



Proficient



Advanced

### CONTINUOUS CONTACT METHODS

I can describe the basic logic of continuous contact operations.

I can explain the basic process of continuous contact operations.

I can justify whether among different methods, the continuous contact method is most appropriate for a certain mass transfer or separation.

### CONVECTIVE MASS TRANSFER

I can define convective mass transfer, describing its basic conditions.

I can explain the factors influencing convective mass transfer, using mathematical descriptions.

I can analyze the convective mass of mass, using mathematical equations and correct units.