

Auxiliary Concept: Process Design

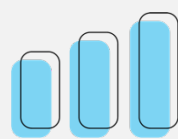
Engineering Literacy Dimension: Engineering Knowledge

Domain: Engineering Technical Applications

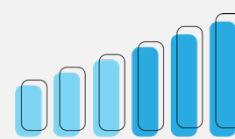
Overview: *Process Design* concerns the development and organization of facilities to support the desired transformation of materials, both physically and chemically. This concept is important to Engineering Literacy as it encompasses the knowledge necessary for coordinating the appropriate production procedures and manufacturing processes involved with transforming materials into desired end products. In addition, this knowledge supports the continual optimization of production processes and manufacturing facilities to minimize the waste of resources, enhance production efficiency, and increase an organization's profits.

Performance Goal for High School Learners

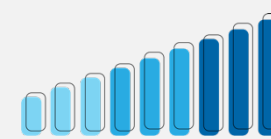
I can, when appropriate, draw upon the knowledge of Process Design content and practices, such as (a) *process controls and systems*, (b) *process flow, piping, and instrumentation diagrams*, (c) *recycle and bypass processes*, and (d) *industrial chemical operations*, to visually represent the procedures and facilities necessary to produce a desired product.



Basic



Proficient



Advanced

PROCESS CONTROLS & SYSTEMS

I can describe chemical process control, identifying its purpose and applications in chemical plants.

I can explain the basic components and organization of chemical process control systems.

I can discuss what should be considered in designing, developing, and implementing chemical process control systems for chemical plants.

PROCESS FLOW, PIPING, & INSTRUMENTATION DIAGRAMS

I can describe the basic functions and components of piping and instrumentation diagrams.

I can interpret the process flow with a given piping and instrumentation diagram.

I can create a piping and instrumentation diagram for my design of a chemical process.

RECYCLE & BYPASS PROCESSES

I can describe recycle and bypass processes, identifying its purpose and applications in chemical plants.

I can explain the basic components and organization of recycle and bypass processes.

I can discuss what should be considered in designing, developing, and implementing recycle and bypass processes for chemical plants.

INDUSTRIAL CHEMICAL OPERATIONS

I can describe the process of designing, optimizing, and implementing chemical processes in chemical manufactures.

I can explain the basic components and organization of chemical manufactures.

I can discuss what should be considered in operating chemical manufactures (e.g. process control, workers, transports, maintenance, regulatory compliance, etc.)