

# Auxiliary Concept: Electrical Power

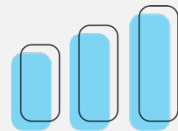
**Engineering Literacy Dimension:** Engineering Knowledge

**Domain:** Engineering Technical Applications

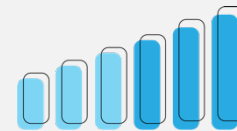
**Overview:** *Electrical Power* concerns the knowledge related to the systems that generate, store, transform, distribute, and use electricity to perform work. Electrical Power is important to engineering literacy as it enables engineering professionals to make informed decisions related to the use and creation of electrical devices and components to generate, transfer, and use electrical energy which is critical as these decisions can greatly impact our society and environment.

## Performance Goal for High School Learners

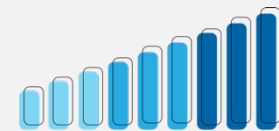
I can, when appropriate, draw upon the knowledge of Electrical Power content, such as (a) *motors and generators*, (b) *alternating and direct current*, (c) *electrical materials*, (d) *electro-magnetics*, (e) *voltage regulation*, (f) *electricity transmission and distribution*, and (g) *magnetism*, to determine and justify which electrical materials are most appropriate for an engineering task involving electrical power systems, using mathematical equations and the correct units.



Basic



Proficient



Advanced

### MOTORS & GENERATORS

I can distinguish between motors and generators in terms of their uses in electrical circuits.

I can explain how motors and generators convert energy and how they are structured.

I can determine and justify which type of motors or generators are most appropriate to a given design problem.

### AC & DC

I can describe how electrical power is transmitted and distributed.

I can explain the differences between AC and DC and evaluate circuit designs with either as a power source.

I can determine and justify which power supply is most appropriate to a given design problem.

### ELECTRICAL MATERIALS

I can identify a variety of electrical materials and explain their conducting ability.

I can discuss when a certain material would be appropriate.

I can determine and justify which electrical materials are most appropriate to electromotive force to solve an electrical power system design problem.

### ELECTRO-MAGNETICS

I can describe what an electromagnetic field is.

I can explain the behavior of electromagnetic fields, using mathematical descriptions (e.g. Maxwell's equations including Gauss's law, Faraday's law, Ampere's circuital law, and Gauss's law for magnetism and Lorentz force law, etc.).

I can analyze an electromagnetic field, using mathematical equations and correct units.