

CAPSTONE GLOSSARY

BIG IDEA “A big idea . . . should be the focus of education for understanding. [It] is a concept, theme, or issue that gives meaning and connection to discrete facts and skills. Here are some examples: adaptation; how form and function are related in systems; the distributive property in mathematics. . . . In an education for understanding, a vital challenge is to highlight the big ideas, show how they prioritize the learning, and help students understand their value for making sense of all the ‘stuff’ of content” (Wiggins and McTighe, p. 5).

CAPSTONE Capstones are Design Focused Learning, trans-disciplinary experiences that use the Engineering Design Process (EDP) and inquiry processes to engage students with real-world problems and issues aligned to standards. These experiences, often in the form of long-term projects, more closely resemble the tasks and ambiguities inherent in real life and help to make schoolwork more relevant to students’ lives, increasing the likelihood of the application of learning to novel and new situations. Capstones integrate, are rigorous, and address real problems/issues.

Capstones incorporate individual activities and design challenges to create dynamic learning experiences for students.

ENGINEERING DESIGN Engineering Design is a disciplined approach to problem solving followed by the engineering community and many other professions. The engineering design process creates a satisfactory solution to a need. The need may be to improve an existing situation or to eliminate a problem. Engineering is a decision-making process in which science, mathematics and engineering sciences are applied and Design is the creative expression of knowledge. Engineering Design fuses technical knowledge and creativity.

ESSENTIAL QUESTIONS “Provocative [big] questions [that] will foster inquiry, understanding, and transfer of learning (Wiggins and McTighe, p. 22).” There is no single answer to an essential question.

Examples:

- What is art?
- What threatens life?
- Can things change and still be the same?

EVIDENCE A piece of student work or student performance that provides the teacher with insight as to how well a student is meeting the learning outcomes.

LEARNING OUTCOMES A statement directly aligned to the standard(s) that:

- provides clear intentions
- is often written in student-friendly language
- is at least written to the Bloom’s level of the standard(s)
- is measurable
- can be practiced and explored in a variety of ways
- is representative of skills and content
- represents 5-8 hours of instructional time (approximately 1 outcome for 1 to 1 ½ weeks of the school year or 30-40 outcomes/subject for a school year)
- represents a variety of evidence used to determine mastery

PROTOTYPE Prototypes are routinely used as part of the engineering design process to give engineers and designers the ability to explore design alternatives, test design features and inform design solutions prior to recommending solutions. Almost every engineering discipline uses prototypes in some way, including aerospace, computer, mechanical, civil, environmental and electrical engineering.

TRANSFER Application of concepts and skills from one discipline to another
Example: Apply the chemical concept of equilibrium to homeostasis in biology

