Design Based Learning Units (DBLs)

According to the Standards for Technological Literacy published by the International Technology

Design projects are being used to motivate and teach science and technology in elementary, middle, and high-school classrooms across America: they can serve to open doors to possible science

Development Center (LRDC) has spent a considerable amount of effort researching and refining how
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Based Learning Unit (DBL). The DBL is a well thought out design-project where the student develops a technological solution using limited resources. The DBL is carefully designed and orchestrated so that students feel that they have a lot of choice and freedom in their design, but the DBL is designed so that the student can only successfully solve the problem by applying the mathematical concept that the teacher intended to highlight. The DBL, a highly scripted but open-ended engineering design problem, has the dual benefit of being able to teach academic concepts in rich interactive ving, scientific inquiry skills, and engineering design competencies.

For the DBL to motivate students and teach core concepts effectively and efficiently across a variety of settings, the units must be developed in very particular ways. Just giving students a design challenge produces chaos. Telling students exactly what to do at every step produces boredom and little learning. A well designed DBL begins with an engineering design problem with clearly defined rubrics that define what a successful solution looks like, coupled with seemingly unlimited student choice about how they might solve the problem. The engineering design process systematizes the thinking and the learning issues that must be supported. Thus, students practice a real design process but also receive carefully designed lessons that foreground the STEM concepts the teacher has pre-determined important to teach. The figure below shows the typical macrostructure of a DBL unit. The DBL teaches systematic design process while motivating and supporting STEM learning.