Middle School DCI

Engineering Design

I Defining and Delimiting Engineering Problems

a Defining and Delimiting Engineering Problems ETS1.A

i The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. MS-ETS1-1

II Developing Possible Solutions

a Developing Possible Solutions ETS1.B

i A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. MS-ETS1-4

ii There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. MS-ETS1-2

iii There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. MS-ETS1-3

iv Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. MS-ETS1-3

v Models of all kinds are important for testing solutions. MS-ETS1-4

III Optimizing the Design Space

a Optimizing the Design Space ETS1.C

i Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design. MS-ETS1-3

ii The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. MS-ETS1-4