**Engineering Design – Grades 3-5**

***Phase A:*** **Defining the Problem**

As engineers think of possible solutions to a problem they must take into account the resources available and possible goals of different solutions. Different possible solutions can be compared and evaluated based on the how well they meet the needs of a problem and how well they use available resources.

For example, a possible solution to a broken arm could be a splint made with branches of a tree and string. While this solution would receive high marks in the middle of the woods away from civilization, in a hospital it would rank far below a plaster or fiberglass cast even though they are all possible solutions to the same problem.

Interactive Notebook Activity:

Think of the “problem” as a part in a system. A system may contain many working parts, functioning together to complete a task. The problem may be an improvement to the system, or a new system entirely. How would you define the “problem” of the system you are examining?

1. *I think the problem is…*

What are some parts of this problem (describe the system)?

1. *Some “parts” of the system are…*

What are the criteria of a successful solution?

Criteria are the desired features of a solution, like durability, function, cost, etc.

1. *Successful solutions would:*
   1. *Function by…*
   2. *Last (durability)…*
   3. *Cost…*

What materials or resources do you have to work with (constraints)?

1. *My solution is limited by (materials or resources)…*

**Whole Group Discussion: Defining the Problem**

What are the group’s thoughts about the problem and the system containing the problem?

1. *The problem is…*
2. *The system is made of…*

What are the criteria for a success solution as described by the group discussion?

1. *The group defined…*

What are the constraints of a success solution as described by the group discussion?

1. *The group defined…*