**Lesson 01: Project Introduction**

**Problem statement:** In this project you and your group will design, build, test, and improve (if needed) a running car that is powered from alternate energy sources.

This lesson introduces the problem statement to the students.

**Learning objectives:** Students will understand the problem, be able to restate the problem, and have an idea of what they don’t know concerning the problem.

**Lesson standards (NGSS, CCSS, CTE):**

* Define criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions (MS-ETS1-1)

**Soft skills:**

Collaboration, creativity

**Materials:**

* Problem Letter (1 for every student)

**Lesson preparation:** You will to have a large T-chart on a poster paper made with “Know” and “Need to Know” at the top for the whole class list.

**Time required:**  60 minutes

**Grouping of students for instruction:** Students will be placed into groups of 3 and 4 by the instructor. These groups will be mixed skills and mixed grade levels if possible.

Groups will be given the following roles: Secretary (recorder, brainstorming), Materials manager, Project manager (keeping on schedule, keeping on task, etc.), Janitor

Students will be assigning roles to themselves and possibly switching every lesson or every day

**What is the instruction?**

1. Hook: “I’m shopping for a new car and I’ve been spending a lot of time looking at different cars. I need your help to decide what is important in a car.” Have students make a list of what they think is important in a car.
2. Hand out the problem letter to all students in the class and have them read it silently. Then they turn and talk to their group members about what the letter is telling them and asking them to do.
3. Explain to students the concept of criteria and constraints in an engineering project. Discuss why a company might be requiring criteria and constraints
4. Ask students to make a list of the criteria that the problem is asking them to consider in this car. They should put a star next to whatever they think may be a more important criteria.
5. Have students complete the table on the worksheet “Know/Need to Know”. A couple ideas have been filled in.
6. On their own, students will be filling in the table. What do they know about cars, about how to solve this problem, etc. What are they unsure about concerning cars or what they are supposed to do.
7. Then have them turn to their group, compare their lists and add or modify their original lists. Come back together as a class and have a discussion about what should go on the class list as a whole.
8. Career connections: Have each student get a device that can access the internet and has flash. Have them go to the following website and explore the different engineering careers: <http://www.egfi-k12.org/>

**Accommodations:** Make sure an electronic translator or human translator is available to read and discuss the letter for EL students. If you have any students with reading disabilities, you will want to provide the text early to those students or explain to them early what is being asked in the text.

**Extensions:** None needed

**References/Resources:**

Project introduction letter