**Mars Farm**

**Lesson 7: Baseline food plan**

**Problem Statement:** Students must work together in teams to create a design a growing environment on Mars that will sustain three researchers for three years. Students use the Excel tool to create their first group iteration for their farm.

**Learning Objectives:**

Working in groups, students apply what they learned in lessons 1-6 to create their initial combination of crops. This will become the baseline plan. Each group will record the combination of crops and their associated quantities (print or capture with a screen shot).

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

MS-ETS1-4 Engineering Design

Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

**Materials**

* Science notebooks
* Excel worksheet file (see student worksheet folder)
* Computers

**Lesson Preparation**

* Each group will need a computer with the Excel worksheet file. See teacher note on lesson 6 regarding “pushing out” the file to students and/or adding in additional crops.

**Time Required**: 45 minutes

**Grouping of Students for Instruction**

Same as previous lessons.

**Lesson Components:**

* Using the Excel worksheet, each group selects a combination of fruits and vegetables from the drop-down list. Adjust the quantities to achieve the goal of 1,000 calories per researcher.
* Remind students to use a screen capture to keep track of each iteration and label as such. Also remind children to analyze the use of water vs. area vs. calories vs. variety in the diet!
* If time permits, ask each group to share one iteration with teacher or another group but this is not necessary at this point as this will also be done in the PPT presentations.

**Assessment:**

* A screen capture or print out of the group’s food selection and associated quantities, the calories provided, water and space required, and the maximum growing time. Tape in science notebooks and/or place in Google Drive folders.

**Accommodations:**

* Classrooms have microphones for hearing impaired.
* Teachers could also enlarge any documents under document camera.

**Extensions:**

* If students have time, they could propose other fruits/vegetables to add into the Excel spreadsheet (teacher would need to add) to enhance the calories and/or nutritional value.
* Ask children to extend their findings to locate particular nutritional benefits of propsed fruits and vegetables (vitamins, minerals, etc.) as this may be added to the PPT at the end and also helps to ensure a fairly balanced diet for the researchers.