**Mission to Mars: Space Launch System Design Challenge**

**PART 3: IMAGINE POSSIBLE SOLUTIONS – MECHANICAL ENGINEERS**

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| **PHASE 1 – INVESTIGATING ROCKET STRUCTURES** |

**Question:** Which **individual structures** on a rocket will support the project goal of reaching the highest possible launch height?

1. Review your research from Part 2 (days 1 & 2). Make a list of the NASA SLS structures you believed to be most important.
2. Use the teacher page to access the *NASA’S Most Powerful Rocket* link. As you watch the video, make a list of the structures you believe should be included in your group’s SLS prototype.
3. The goal of your prototype is to reach the highest possible height. As you watch *Launching a Rocket,* make a list of structures that would allow this to happen.

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| **PHASE 2 – MODELING A PROTOTYPE** |

**Question:** Which **design** will be most effective at achieving the goal of the project while also taking into consideration the prototype constraints?

**Directions:**

* On the teacher page you will find the *Tinkercad* link. Open the link.
* Use this online platform, to design three possible rocket prototypes.
* When you open the Tinkercad page, you will be prompted to enter a nickname. Your nickname will be your class hour followed by your table group number with a period in between the two numbers.
  + *Example:* Group 3 from 1st hour will have the nickname **1.3**
* While you design, please note:

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| **Prototype Constraints** |
| * Only 1 RS-25 engine may be used * Engine must be located on the bottom of the rocket * Rocket cannot exceed 10 grams of mass |

* In the table below you will list the advantages and disadvantages of each design you make. If you decide to work with the other mechanical engineer at your table group, you will only have three different ideas. If you decide to work individually, you will have six different ideas.

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| **Idea #1** | | **Idea #2** | | **Idea #3** | |
| Advantages | Disadvantages | Advantages | Disadvantages | Advantages | Disadvantages |
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| **PART 3 CONCLUSIONS** |

With the other mechanical engineer at your table group, draw a final design of your rocket. This design will be presented to your SLS team. Label the most important structures and describe the advantages they provide in achieving the highest possible height. The final design you recommend could be one of the ideas you made in Phase 2 or could be a combination of ideas from this phase.