**Mars Tower Lab**

**Scenario:** NASA has asked you and your team of physicists to design a tower that they will be using on their next mission to Mars. The tower needs to be able to support a camera (approximately the size and mass of a golf ball) so it can videotape what is happening on the surface. The higher the camera, the better the video will be. The materials that you will be given are very similar in strength to the materials that NASA will be using.

**Constraints:**

1. The materials given cannot be cut into smaller pieces
2. You can only use the materials provided
3. Your tower must be able to stand on its own without the help of other materials (i.e. it cannot lean on a wall, be taped to the floor, or glued because NASA will not be able to use those methods on Mars.)

**Materials:**

* 50 Paperclips
* 50 Plastic Straws
* 1 Golf Ball

**Procedure:**

1. With your team come up with an initial plan and sketch for your tower design. Use the back of this page to draw your initial design
2. On your design explain why you chose that design/plan
3. As you proceed to build your tower, write any struggles or changes that you needed to make to your initial plan
4. Once you have finished the tower compare it to your original design and complete the following. Remember to be thorough and answer in full and complete sentences
   1. What were the changes that needed to be made from your initial design?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. If you had time to design/build another tower under the same rules and using the same materials, what would you do differently?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. What do you fell are the strengths of your groups design over other groups in class?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

NASA thanks you for your help and is very excited to see the different designs that you all come up with.

**Rubric**

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| **Collaboration** | **4**  Team members worked productively together. Everyone contributed to the initial design, final design, and construction. Team members created a plan that incorporated all team members’ ideas. | **3**  Team members worked productively together. A majority of the team contributed to all stages of the project. Team members listened to one another’s ideas but did not include everyone in the final designs. | **2**  Team members did not work productively together. Only a few members of the team contributed to the design, construction, and final product. Team members did not listen to all members’ ideas and incorporate them into the design. | **1**  Team members did not work productively together. One person completed most of the project without the input from their teammates. Members did not listen to each other’s ideas and come up with a plan that satisfies all members |
| **Initial design** | **4**  The initial design is drawn neatly with clear and descriptive explanations about their design. | **3**  The design is drawn neatly with majority clear explanations about their design. | **2**  The design is readable with some basic descriptions about the design. | **1**  The design is not readable and or has no descriptions about the design. |
| **Construction** | **4**  All team members worked together building the tower. The team wrote down all struggles they faced and changes they had to make to their design. | **3**  Most team members worked together building the tower. The team wrote down most of the struggles they faced and a majority of the changes they made to their design. | **2**  A few team members worked together building the tower. The team wrote down some struggles they faced and or some changes they needed to make to their design. | **1**  Very few team members worked together building the tower. The team did not write down any struggles they faced and or any changes they needed to make to their design. |
| **Final Design and write up** | **4**  The final write up answered all of the questions with clear explanations. The final design was able to support the camera for more than 30 seconds. The final design was taller than 20 inches. | **3**  The final write up answered most of the questions with clear explanations. The final design was able to support the camera for more than 30 seconds. The final design was taller than 20 inches | **2**  The final write up answered some of the questions clearly. The final design was able to support the camera for more than 20 seconds and or was taller than 20 inches. | **1**  The final write up answered few to no questions with clear explanations. The final design was not able to support the camera for more than 20 seconds and or was not taller than 20 inches. |