**Design for Manufacturability Activity**

**Objective**

Students are challenged to create an airplane that uses less parts and costs less than the provided airplane. Any of the pieces can be removed or redesigned as long as the rules are followed. Each color of Lego is assigned a price listed below and used to calculate the reduction of cost for the manufacturing of the airplane.

**Rules**

* Plane must have two rear wheels, one front wheel
* Plane must look like an airplane, and be able to function like an airplane with two main wings, two rear wings and an upright wing in the rear
* The pointed nose cone must be at the front of the airplane
* Plane must be symmetrical (same pieces on each side)
* The plane must have a cockpit window

**Cost Table**

|  |  |  |  |
| --- | --- | --- | --- |
| Original Airplane Cost: $800 | |  |  |
|  |  |  |  |
| **Color of Lego** | **Price ($)** | **# of Pieces Removed** | **Cost Removed (# \* Price)** |
| Blue | 3 |  |  |
| Yellow | 10 |  |  |
| White | 5 |  |  |
| Black | 5 |  |  |
| Clear | 10 |  |  |
| Light Grey | 5 |  |  |
| Dark Grey | 6 |  |  |
| Red | 8 |  |  |
|  |  | Total Cost Removed |  |

**Reduction Percentage Calculation**

\* 100 = Percent Cost Reduction

|  |  |
| --- | --- |
| Total Original Cost | $800 |
| Total Cost Removed |  |
| Percent Cost Reduction |  |

**Justification:** List some reasons why your team chose to take off certain Lego pieces (not needed, does not decrease functionality, extra weight, etc.)

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**Example Cost Table**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Color of Lego** | **Price ($)** | **# of Pieces Removed** | **Cost Removed (# \* Price)** |
| Blue | 3 | 4 | 12 |
| Yellow | 10 | 10 | 100 |
| White | 5 | 10 | 50 |
| Black | 5 | 8 | 40 |
| Clear | 10 | 5 | 10 |
| Light Grey | 5 | 13 | 65 |
| Dark Grey | 6 | 6 | 36 |
| Red | 8 | 2 | 16 |
|  |  | Total Cost Removed | 329 |

**Reduction Percentage Calculation**

\* 100 = Percent Cost Reduction

|  |  |
| --- | --- |
| Total Original Cost | $800 |
| Total Cost Removed | $329 |
| Percent Cost Reduction | 41% |