#1

|  |  |
| --- | --- |
| **Material** | **Titanium** |
| **Material Properties** | * Lightweight; Lighter than steel; Heavier than aluminum * Strong * Not as corrosive as aluminum and steel. * Holds strength at high temperatures |
| **Application** | Used for many modern air structures |
| **Cost** | $$$$ Expensive |
| **Class Material Equivalent** | Heavy duty aluminum foil |

#2

|  |  |
| --- | --- |
| **Material** | **Steel** |
| **Material Properties** | * Heavy; 3X heavier than aluminum * 4X Stronger than aluminum; 3X stiffer than aluminum * Holds strength at high temperatures better than aluminum |
| **Application** | Landing gears |
| **Cost** | $$$ Expensive |
| **Class Material Equivalent** | Cardboard |

#3

|  |  |
| --- | --- |
| **Material** | **Aluminum** |
| **Material Properties** | * Lightweight * Strong * Not as corrosive as other steel * Loses strength at high temperatures (i.e think if this is good/bad for re-entering the earth’s atmosphere) |
| **Application** | Used for many flight structures; Allowed to be used for space crafts with little to no requirements for high performance or light weight |
| **Cost** | $$ Cheaper than Composites |
| **Class Material Equivalent** | Aluminum Foil |

#4

|  |  |
| --- | --- |
| **CORE Material** | **Insulation Blankets** |
| **Material Properties** | * Thermal protection * Reflective * Electric insulator |
| **Application** | Launch vehicles  Multiple spacecrafts and satellites  Instruments in vacuum |
| **Cost** | $ Affordable |
| **Class Material Equivalent** | Space Blanket |

#5

|  |  |
| --- | --- |
| **Material** | **Composite materials** |
| **Material Properties** | * Depends on Composite type   + Polymer   + Metal   + Carbon * High tensile strength (stiff) * function in high temperature |
| **Application** | Used for many modern air structures |
| **Cost** | Varies |
| **Class Material Equivalent** | Foam Core Board |

#6

|  |  |
| --- | --- |
| **Material** | **Thermal Protection** |
| **Material Properties** | * Flexible * Reusable * Lightweight * Holds strength at high temperatures |
| **Application** | Used for many modern air structures, especially those required to re-enter atmosphere at high speeds |
| **Cost** | $ Cheaper than metal |
| **Class Material Equivalent** | Cardstock, felt or fabric |

#7

|  |  |
| --- | --- |
| **Material** | **Additional Structural Supports** |
| **Material Properties** | * Strong * Not as corrosive as other steel * Lightweight |
| **Application** | This material re-enforces the structural integrity of the spacecraft |
| **Cost** | $ Affordable |
| **Class Material Equivalent** | Pipe cleaners, popsicle sticks, paper clips, straws, rubber bands, wire, construction paper |

#8

|  |  |
| --- | --- |
| **Material** | **Capture mechanisms** |
| **Material Properties** | * **Tethers and Nets** * **Magnets** * **Lasers** * **Adhesives** |
| **Application** | These materials gather or collect the space junk |
| **Cost** | $$ moderate |
| **Class Material Equivalent** | Magnets, string, and mesh netting |

#9

|  |  |
| --- | --- |
| **Material** | **Tools** |
| **Material Properties** | * Lightweight * Strong * Not as corrosive as other steel * Loses strength at high temperatures (i.e think if this is good/bad for re-entering the earth’s atmosphere) |
| **Application** | These are the key tools that will be a provided resource in constructing your spacecraft; |
| **Cost** | Free |
| **Class Material Equivalent** | Scissors, rulers, pencils, masking tape, glue, hot glue, duct tape, pencils, etc. |