**Draw a Robot Model**

**Part I. Proportion Problems Exercise**

**Directions**

Calculate the proportion problem listed below before you draw a model of your robot. A proportion involves ratios. A proportion is a statement showing that two ratios are equal. If two ratios are equal, their cross products are equal. For example, “*a is to b”* as “*c is to d”* *used to calculate a proportion and the scale* *measurements*.

a : b : : c : d, a/b = c/d, b ≠ 0, d ≠ 0

1. **2 in = 1 ft**

Use the ratio to write a proportion. Cross multiply to solve.

|  |  |  |
| --- | --- | --- |
| **2 in =** | | **X in** |
| **1 ft** |  | **2 ft** |

**2. 1.5 in = 1 ft**

Use the ratio to write a proportion. Cross multiply to solve.

|  |  |  |  |
| --- | --- | --- | --- |
| **1.5 in** | **= X in** | | |
|  |  |  |  |
| **1 ft** | **1.5 ft** | | |

1. **2.5 in = 1 ft**

Use the ratio to write a proportion. Cross multiply to solve.

|  |  |  |  |
| --- | --- | --- | --- |
| **2.5 in** | **= X in** | | |
|  |  |  |  |
| **1 ft** | **2.5 ft** | | |
|  |  | | |

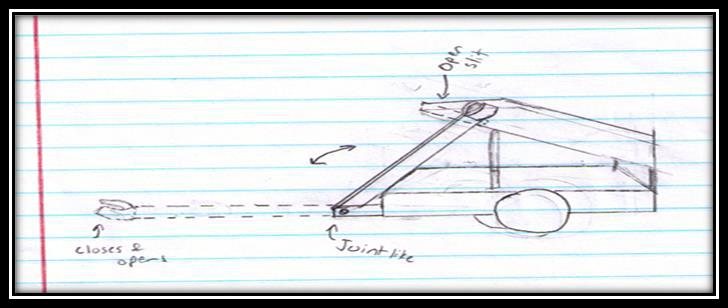
**Part II. Draw Robot Model**

**Directions**

Draw a model of your robot. Make a new drawn-to-scale drawing of your robot using rulers and the scale measurements from your calculations. (Refer to the drawings below.) Pick a ratio to convert the life-size measurements to the drawn-to-scale measurements. For example, one foot equals one inch. The ratio will then be used to write a proportion to find the scale measurements.

**Example 1: Drawing of the Wheels, Bed, and Arm**

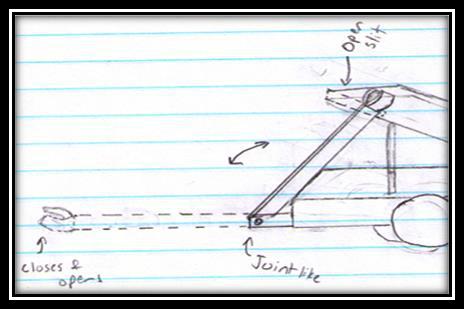
* Wood wheels with a rubber coating
* Plastic bed at a 45 degree angle
* Robot arm with a hook at the end



*Drawing from the Nimitz High School Robotics Team*

**Example 2: Drawing of the Robot Arm**

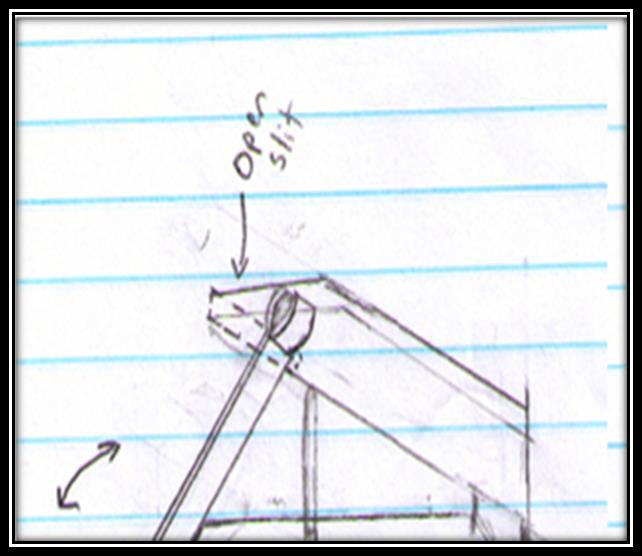
* Joint-like bend allows arm to move from the floor to the open slit in the bed, allowing the arm to grip and drop-off items
* Hook at the end opens and closes, allowing it to grip the items
* Both movements (the bend of the arm and the grip of hook) are powered by servos



*Drawing from the Nimitz High School Robotics Team*

**Example 3: Drawing of the Base/Bed**

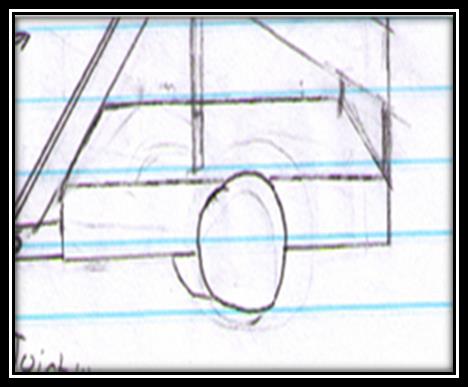
* Angled at 45 degrees
* Made of plastic
* Has an open slit, allowing the arm to drop off items



*Drawing from the Nimitz High School Robotics Team*

**Example 4: Drawing of the Wheels**

* Wooden wheels covered with the rubber material to increase traction
* Wheels powered by separate motors



*Drawing from the Nimitz High School Robotics Team*