Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Due date:\_\_\_\_\_\_\_\_\_\_\_\_\_ Score:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Overview:** You are designing a garden bed, to **allow people to grow fresh vegetables, flowers, fruit and herbs year round, with minimal extra heating or cooling**. Your design needs to be well planned out in order to maximize the area while utilizing all material. Support all reasoning through sound mathematical evidence.

**Material: Cost:**

2x6 - 12ft long lumber --------- $8.08

2x12 – 12ft long lumber --------- $17.28

Screw #8 – 1” 100 pieces --------- $4.65

Screw 2 ½” --------- $8.47

Wheels x4 --------- $2.98 **each**

Soil contain 32 dry qt --------- $9.77

Seed (you select) --------- $\_\_\_\_\_\_\_

**Prediction:** When designing and creating a garden bed there will be mathematics involved in every step. What do you expect to learn from this project? Think of mathematical concepts required for completing this project. Write down any formula that you might be using.

**Design:** Using a pencil, ruler, and protractor create your design on next page. Make sure to provide measurement for each part. Use the following scale for your drawing

1Inch = 1 feet

Scale 1 inch = 1feet

**Building:** As you build your garden bed using the material listed below write down the material you have used. This will help you calculate the final cost for your project. Remember that you may not use the entire piece. In that case you will have to calculate the partial cost.

|  |  |
| --- | --- |
| **Material:** | **Number of pieces used** |
| 2x6 - 12ft long lumber |  |
| 2x12 – 12ft long lumber |  |
| Screw #8 – 1” 100 pieces |  |
| Screw 2 ½” 100 pieces |  |
| Wheels x4 |  |
| Soil contain 32 dry qt |  |
| Seed |  |

**Area:** Calculate the area of your garden bed. What is the difference between surface area and area?

Area= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (formula)

**Surface area.** Calculate the surface area of your garden bed. Explain what surface area represents.

Surface area = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (formula).

**Volume:** Calculate the volume of your garden bed. What is volume?

**Soil:** One bag of soil contains \_\_\_\_\_\_\_\_\_ and cost \_\_\_\_\_\_\_\_\_\_. Based on the volume how much of soil (number of bag) will your garden bed need?

**Step 1:** Each bag of soil contains 32 dry quarts. We calculated the volume in cubic ft. Convert 32 dry quarts to cubic ft.

**Hint: 1dry quart = 0.03889 cubic foot**

**32 dry quarts = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cubic ft**

**Step 2:** Now calculate the number of bags of soil you need for your garden bed.

**Because each bag of soil contains \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cubic ft of soil and the volume of the garden bed is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cubic ft. I will need \_\_\_\_\_\_\_\_\_\_\_\_\_ bag(s) of soil.**

**Final cost:** Now figure out the final cost of your garden bed. Consider all of the material involved in creating your garden bed.

|  |  |  |  |
| --- | --- | --- | --- |
| **Material** | **Cost per piece** | **Number of pieces used** | **Final cost** |
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|  |  | TOTAL |  |

**Conclusion:** What did you learn from this project? What obstacle if any you overcome while working on this project? Do you have a better understanding of certain mathematical concepts?

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| |  | | --- | | **Garden Bed Rubric** |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | CATEGORY | 4 | 3 | 2 | 1 | | Product | A product is provided that is proportional to the scale design. | A product is provided that is somewhat proportional to the scale design. | A product is provided that is slightly proportional to the scale design. | A product is provided that is not proportional the scale design. | | Area of garden bed | Includes measurements along with a detailed derivation of the formula for finding the accurate areas. | Includes measurements along with a derivation of the formula for finding the accurate areas. | Includes measurements along with only the formula for finding the accurate areas. | Includes measurements along the areas. | | Surface Area of garden bed | Includes measurements along with a detailed derivation of the formula for finding the accurate surface areas. | Includes measurements along with a derivation of the formula for finding the accurate surface areas. | Includes measurements along with only the formula for finding the accurate surface areas. | Includes measurements along the surface areas. | | Volume of Planting Beds | Includes measurements along with a detailed derivation of the formula for finding the accurate volume. | Includes measurements along with a derivation of the formula for finding the accurate volume. | Includes measurements along with only the formula for finding the accurate volume. | Includes measurements along the volume. | | Final cost | Final cost is accurately calculated by using fractions and percent. | Final cost is somewhat accurately calculated using estimation. | Final cost is close to actual cost but not exact | Final cost does not come close to actual cost. | | Conclusion | Conclusion show good understanding of mathematical concepts used and learned for this project and is well written. | Conclusion show some understanding of mathematical concepts used and learned for this project and is well written. | Conclusion show very little understanding of mathematical concepts used and learned for this project and is well written. | Conclusion show no understanding of mathematical concepts used and learned for this project and is well written. | | Use of Class Time | Used time well during each class period. Focused on getting the project done. Never distracted others. | Used time well during each class period. Usually focused on getting the project done and never distracted others. | Used some of the time well during each class period. There was some focus on getting the project done but occasionally distracted others. | Did not use class time to focus on the project OR often distracted others. | |  |  |  |  |  | |