Exploring Volume and Surface Area Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A toy company is planning to sell a set of children’s alphabet blocks. Each block is a **cube** with

1-inch edges, so each block has a volume of 1 cubic inch.

The company wants to package the blocks in a rectangular prism that exactly fits the blocks.

1. Find all the ways the 24 cubes can be arranged into a rectangular prism. Use the table below to record the length, width, height, surface area, and volume of each arrangement. **YOU MAY NOT USE ALL OF THE ROWS IN THE TABLE.** Hint: Use a system to create your different arrangements so you do not miss any!

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| --- | --- | --- | --- | --- |
| Length (in.) | Width (in.) | Height (in.) | Volume (in3) | Surface Area (in.2) |
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2. Which of your arrangements requires the box made with the least material?

3. Which requires the box made with the most material?

4. Which arrangement would you recommend to the toy company? Why?

5. How many different arrangements would there be if the company decided to manufacture and market all 26 alphabet blocks together with the 10 number cubes? List them.

6. How many different rectangular prisms can be made with 8 cubes? Explain how you can find the arrangements without building with the cubes.

7. How many different rectangular prisms can be made with 5 cubes? Give the arrangement(s).

8. Find 3 examples of numbers of cubes that can be arranged into a rectangular prism in only one way. What is special about these examples?