Team Members _____

BOX IT UP

Research on Sample Packages

Read the *Box It Up* scenarios online and select a scenario.

Scenario: 2 Volume Needed: 990-1000 cubic centimeters

Find sample packages that have volumes similar to the package you must design. Measure the dimensions of at least four packages with similar volumes, and use the data to complete the table below. Record all measurements and results in units that match those given in the scenario. Provide at least four sample packages.

Sample Package Product	Package Length	Package Width	Package Height	Package Volume
Packaging box	30 cm	20 cm	16.5 cm	990 cubic cm
Tool box	10.5 cm	20 cm	6.25 cm	1312.5 cubic cm
Plastic storage box	17.5 cm	17.5 cm	3.25 cm	995.31 cubic cm
Case of 4 tissue boxes	25 cm	20 cm	2.5 cm	1250 cubic cm

Determine at least three different sets of measurements that will produce a rectangular prism with the volume that your client requests.

Length	Width	Height	Volume
30 cm	20 cm	16.5 cm	990 cubic cm
17.5 cm	17.5 cm	3.25 cm	995.31 cubic cm
5.25 cm	9 cm	20 cm	945 cubic cm

Answers in tables will vary.

Use the information from your tables to answer the following questions.

1. How does the volume change if you increase only the height, width, or length of the container? What happens if you manipulate two dimensions at the same time? How can you manipulate all three dimensions in any combination and still stay within the requested volume range?

If you increase any of the dimensions, the volume increases. If you increase two dimensions at the same time, the volume increases a lot more. You can manipulate all three dimensions by making sure that all are still factors of the volume. You can choose two dimensions to increase, then multiply them together, and divide the volume by that answer to find the third factor that can be the third dimension.

2. How can you keep the volume consistent if you decide to change a dimension of the container?

If you change one dimension of the container, you should divide the volume by the new dimension, then see what two numbers are factors of that answer.

3. How are the numbers that represent the dimensions of the rectangular prism related to the volume?

The dimensions are all factors of the volume.

4. Write a paragraph that summarizes your findings. Use mathematical vocabulary to explain the relationship between the height, width, and length measurements of a rectangular prism and its volume. Discuss the effect of changing one measurement on the volume of the rectangular prism, and describe how to change the measurements and maintain the same volume.

The height, width and length of the rectangular prism are all factors of the volume. An increase to any of the dimensions will increase the volume, unless one or both of the other dimensions are decreased. You can change the measurements of the rectangular prism and maintain the same volume by dividing the volume by the new measurement, then finding two factors of the quotient.

