4-17: **Learning Goals**

- Let's use what we learned about fractions to find shipping costs.

4-17-1: Determining Shipping Costs (Part 1)

An artist makes necklaces. She packs each necklace in a small jewelry box that is $1\frac{3}{4}$ inches by $2\frac{1}{4}$ inches by $\frac{3}{4}$ inch.

A department store ordered 270 necklaces. The artist plans to ship the necklaces to the department store using flat-rate shipping boxes from the post office.

Which of the flat-rate boxes should she use to minimize her shipping cost?

1. Read the problem statement. What additional information will you need to solve this problem?

2. Discuss this information with your group. Make a plan for using this information to find the most inexpensive way to ship the jewelry boxes. Once you have agreed on a plan, write down the main steps.
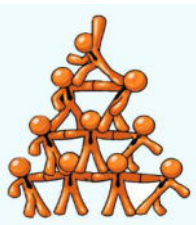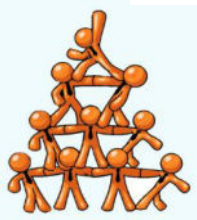
4-17-2: Determining Shipping Costs (Part 2)

Work with your group to find the best plan for shipping the boxes of necklaces. Each member of your group should select a different type of flat-rate shipping box and answer the following questions. Recall that each jewelry box is $1\frac{3}{4}$ inches by $2\frac{1}{4}$ inches by $\frac{3}{4}$ inch, and that there are 270 jewelry boxes to be shipped.

For each type of flat-rate shipping box:

1. Find how many jewelry boxes can fit into the box. Explain or show how the jewelry boxes can be packed in the shipping box. Draw a sketch to show your thinking, if needed.

2. Calculate the total cost of shipping all 270 jewelry boxes in shipping boxes of that type. Show your reasoning and organize your work so it can be followed by others.

4-17-3: Determining Shipping Costs (Part 3)

1. Share and discuss your work with the other members of your group. Your teacher will display questions to guide your discussion. Note the feedback from your group so you can use it to revise your work.

2. Using the feedback from your group, revise your work to improve its correctness, clarity, and accuracy. Correct any errors. You may also want to add notes or diagrams, or remove unnecessary information.

3. Which shipping boxes should the artist use? As a group, decide which boxes you recommend for shipping 270 jewelry boxes. Be prepared to share your reasoning.
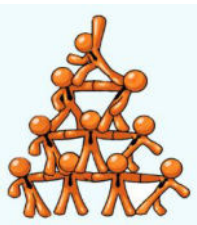
4-17-3: Determining Shipping Costs (Part 3)

- How many different ways can the jewelry boxes fit into each shipping box?

- How does the orientation of the jewelry boxes affect how they fit within the shipping boxes?

- Do some shipping boxes have more wasted space than others? Why?

- Can you use diagrams to show and compare the unused spaces in different configurations?

- Are there ways to reduce the amount of wasted space when shipping exactly 270 jewelry boxes?

- How does the orientation of the jewelry boxes affect the cost of shipping with each shipping box?

- Is there a way to increase the number of jewelry boxes that will fit into a shipping box? How?
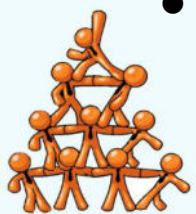
4-17: Lesson Synthesis

- When did you have to make assumptions to make the problem solving possible or more manageable? What assumptions did you make?

- Was there any missing information you had to find out before you could proceed?

- Were there times when you had to change course or strategy because the approach you had chosen was not productive?

4-17: Learning Targets

- I can use multiplication and division of fractions to reason about real-world volume problems.