Developing the Context

Display the Muffles' New Boxes poster (or Appendix D) and continue the Muffles story as follows:

> *One day, as he is packing truffles, Muffles' assistant, Patricio, has a great idea. He tells Muffles, "You know, you can put boxes together and make a new, larger box for your assortments. Look, if I take two boxes and put them together, I have a new box!" You could put the vanilla truffles in one box and the dark chocolate truffles in the other. You could sell this two-flavor assortment box for $20." Muffles is fascinated by this idea and wonders, "What sizes of larger boxes can be made using several of the original boxes, put together?"*

Tell students that they will use 2 × 5 box blueprints to explore the following questions:

- *What sizes and shapes of boxes can be made from several of the original boxes put together?*
- *How many flavors would each larger assortment box hold if Muffles always fills a 2 x 5 section of the box with one type of truffle?*

Facilitate a brief group discussion on these questions using cutouts of the 2 × 5 box blueprints in Appendix E. Clarify that Muffles will only use rectangular boxes. Lay out three different arrangements of boxes, A, B, and C, and explain that Muffles only wants boxes that are rectangular, of type A and C, and with only one layer.

As students share their ideas, model what they are saying with the 2 × 5 blueprints and ask how they would label these new arrays. After this brief discussion, provide students with multiple copies of the 2 × 5 blueprints (Appendix E) and send them off to investigate.

☼ Introduce a new truffles box scenario and explain that students will need to use 2 x 5 box blueprints to create new designs for larger truffles boxes.

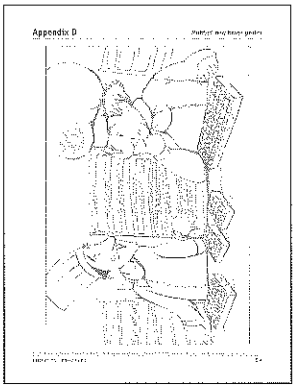


Figure A

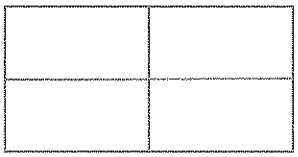


Figure B

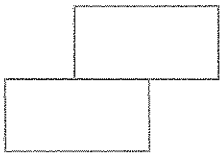
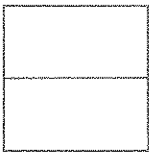


Figure C

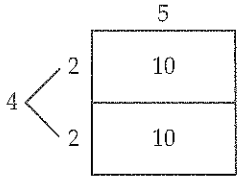


☼ Note students' strategies as they work on new box designs.

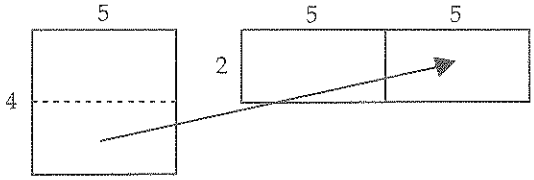
Supporting the Investigation

The purpose of this investigation is not to find combinations for different types of truffles (strawberry and vanilla, or chocolate and strawberry) but to determine how many different larger one-layer boxes can be designed out of the 2 × 5 small boxes. As students build new arrays, you will see them exploring a number of big ideas. Look for these big ideas as you confer with students:

✦ As one dimension doubles, the other halves. Generalized, this idea can be explained with the associative property: 2 × (2 × 5) = (2 × 2) × 5.



Example: (2 × 5) + (2 × 5)



Example: 4 × 5 = (2 × 2) × 5 = 2 × (2 × 5)