Estimate Volume

Essential Question How can you use an everyday object to estimate the volume of a rectangular prism?

Investigate

Izzy is mailing 20 boxes of crayons to a children's-education organization overseas. She can pack them in one of two different-sized shipping boxes. Using crayon boxes as a cubic unit, about what volume is each shipping box, in crayon boxes? Which shipping box should Izzy use to mail the crayons?

Materials ■ rectangular prism net B ■ 2 boxes, different sizes

A. Cut out, fold, and tape the net to form a rectangular prism. Label the prism "Crayons." You can use this prism to estimate and compare the volume of the two boxes.

B. Using the crayon box that you made, count to find the number of boxes that make up the base of the shipping box. Estimate the length to the nearest whole unit.

Number of crayon boxes that fill the base:

Box 1: _____   Box 2: _____

C. Starting with the crayon box in the same position, count to find the number of crayon boxes that make up the height of the shipping box. Estimate the height to the nearest whole unit.

Number of layers:

Box 1: _____   Box 2: _____

Box 1 has a volume of _____ crayon boxes

and Box 2 has a volume of _____ crayon boxes.

So, Izzy should use Box _____ to ship the crayons.

Draw Conclusions

1. **MATHEMATICAL PRACTICE** ⑥ **Explain** how you estimated the volume of the shipping boxes.

_____

_____

_____

_____

2. **MATHEMATICAL PRACTICE** ① **Analyze** If you had to estimate to the nearest whole unit to find the volume of a shipping box, how might you be able to ship a greater number of crayon boxes in the shipping box than you actually estimated? Explain.

_____

_____

_____

Make Connections

The crayon box has a length of 3 inches, a width

of 4 inches, and a height of 1 inch. The volume of the

crayon box is _____ cubic inches.

Using the crayon box, estimate the volume
of the box at the right in cubic inches.

- The box to the right holds _____ crayon boxes in each

  of _____ layers, or _____ crayon boxes.

- Multiply the volume of 1 crayon box by the
  estimated number of crayon boxes that fit in
  the box at the right.

$$\text{_____} \times \text{_____} = \text{_____}$$

So, the volume of the shipping box at the right

is about _____ cubic inches.

Name _____

Share and Show

Estimate the volume.

1. Each tissue box has a volume of 125 cubic inches.

There are _____ tissue boxes in the larger box.

The estimated volume of the box holding the tissue

boxes is _____ × 125 = _____ cu in.

✓ 2. Volume of chalk box: 16 cu in.

Volume of large box: _____

✓ 3. Volume of small jewelry box: 30 cu cm

Volume of large box: _____

Problem Solving • Applications

4. **MATHEMATICAL PRACTICE ②** **Use Reasoning** Jamie is mailing a large box of donated books to a community center. The volume of each book is 80 cubic inches. The picture shows the number of books she put in the box. Jamie can fit one more layer of books in the box. About what is the volume of the box?

_____
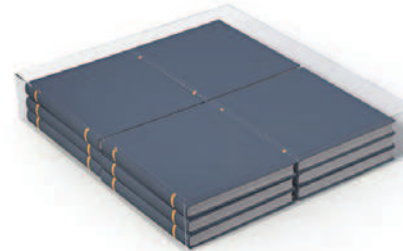
5. **GO DEEPER** Anna is collecting boxes of cereal to deliver to a food bank. The volume of each cereal box is 324 cubic inches. The picture shows the cereal boxes she has collected so far. A large delivery box holds three times as many boxes as Anna collected. About what is the volume of the delivery box?

_____

© Houghton Mifflin Harcourt Publishing Company