Center Activity Answer Key
Activity 5.41

Same Volume, Different Shape

★ **Check Understanding**

Possible answers: Accept any two variations of the following: $(10 \times 2) \times 1$, $(5 \times 4) \times 1$, $(2 \times 5) \times 2$, $(2 \times 2) \times 5$; Check that sketches match the expressions.

Recording Sheet

Volume column:

Row 1: 30 cubic units
Row 2: 18 cubic units
Row 3: 24 cubic units
Row 4: 12 cubic units

Prism 2 column:

Check sketches to verify that their volume is the same as shown in the *Volume* column. Sample answers for prisms in *Prism 2* column might include the following, with dimensions in any order:

Row 1: $(15 \times 2) \times 1$, $(10 \times 3) \times 1$, $(5 \times 2) \times 3$
Row 2: $(9 \times 2) \times 1$, $(3 \times 6) \times 1$, $(18 \times 1) \times 1$
Row 3: $(6 \times 2) \times 2$, $(12 \times 2) \times 1$; $(8 \times 3) \times 1$
Row 4: $(12 \times 1) \times 1$, $(6 \times 1) \times 2$, $(4 \times 3) \times 1$

★★ **Check Understanding**

Possible answers: Accept any three variations of the following: $(24 \times 1) \times 1$, $(12 \times 2) \times 1$, $(8 \times 3) \times 1$, $(6 \times 2) \times 2$, $(4 \times 3) \times 2$; Check that sketches match the expressions.

Recording Sheet

Volume column:

Row 1: 24 cubic units
Row 2: 18 cubic units
Row 3: 12 cubic units
Row 4: 54 cubic units
Row 5: 48 cubic units
Row 6: 40 cubic units

Prism 2 column:

Check sketches to verify that their volume is the same as shown in the *Volume* column. Sample answers for prisms in *Prism 2* column might include the following, with dimensions in any order:

Row 1: $(6 \times 2) \times 2$, $(12 \times 2) \times 1$; $(8 \times 3) \times 1$
Row 2: $(9 \times 2) \times 1$, $(3 \times 6) \times 1$, $(18 \times 1) \times 1$
Row 3: $(12 \times 1) \times 1$, $(6 \times 1) \times 2$, $(4 \times 3) \times 1$
Row 4: $(27 \times 2) \times 1$, $(18 \times 3) \times 1$, $(9 \times 2) \times 3$, $(6 \times 3) \times 3$
Row 5: $(12 \times 1) \times 4$, $(3 \times 4) \times 4$, $(2 \times 2) \times 12$
Row 6: $(20 \times 2) \times 1$, $(10 \times 2) \times 2$, $(5 \times 2) \times 4$

★★★ **Check Understanding**

Possible answers: Accept any four variations of the following: $(24 \times 1) \times 1$, $(12 \times 2) \times 1$, $(8 \times 3) \times 1$, $(6 \times 2) \times 2$, $(4 \times 3) \times 2$; Check that sketches match the expressions.

Recording Sheet

Volume column:

Row 1: 120 cubic centimeters
Row 2: 36 cubic centimeters
Row 3: 60 cubic centimeters
Row 4: 18 cubic centimeters
Row 5: 48 cubic centimeters
Row 6: 40 cubic centimeters

Prism 2 column:

Check sketches to verify that their volume is the same as shown in the *Volume* column. Sample answers for prisms in *Prism 2* column might include the following, with dimensions in any order:

Row 1: $(5 \times 2) \times 12$, $(15 \times 2) \times 4$, $(12 \times 2) \times 5$, $(10 \times 6) \times 2$, $(8 \times 5) \times 3$
Row 2: $(18 \times 2) \times 1$, $(12 \times 1) \times 3$, $(9 \times 4) \times 1$, $(6 \times 2) \times 3$
Row 3: $(20 \times 1) \times 3$, $(15 \times 2) \times 2$, $(12 \times 1) \times 5$, $(10 \times 3) \times 2$, $(5 \times 2) \times 6$
Row 4: $(9 \times 2) \times 1$, $(3 \times 6) \times 1$, $(18 \times 1) \times 1$
Row 5: $(12 \times 1) \times 4$, $(3 \times 4) \times 4$, $(2 \times 2) \times 12$
Row 6: $(20 \times 2) \times 1$, $(10 \times 2) \times 2$, $(5 \times 2) \times 4$

Center Activity Answer Key
Activity 5.42

Find the Prism

★ **Check Understanding**

20 cubic feet; Prisms built should show 5 layers with 2 rows of 2 cubes in each row.

Recording Sheet

The prisms in the rows match these evaluated expressions. Measures are in cubic units:

Row 1: $9 + 9 = 18$, $(2 \times 2) \times 4 = 16$, $7 \times 3 = 21$
Row 2: $4 \times 8 = 32$, $6 + 6 + 6 + 6 + 6 = 30$, $(4 \times 2) \times 3 = 24$

★★ **Check Understanding**

80 cubic inches; Sketches should show a prism with 5 layers, each made up of 4 rows of 4 cubes; Possible answer: The numbers in parentheses represent multiplying the number of rows and the cubes per row in each layer. The 5 means that there are 5 layers: $(4 \times 4) \times 5 = 16 \times 5 = 80$.

Recording Sheet

The prisms in the rows match these evaluated expressions. Measures are in cubic units:

Row 1: $10 \times 6 = 60$, $(3 \times 2) \times 8 = 48$, $12 + 12 + 12 = 36$

Row 2: $6 + 6 + 6 = 18$, $(13 \times 2) \times 2 = 52$, $(2 \times 2) \times 6 = 24$

Row 3: $8 \times 3 = 24$, $20 \times 4 = 80$, $10 + 10 + 10 = 30$

★★★ **Check Understanding**

120 cubic inches; Sketch should show a prism made of 5 layers; each layer is made up of 4 rows with 6 cubes per row: $(6 \times 4) \times 5 = 24 \times 5 = 120$.

Recording Sheet

The prisms in the rows match these evaluated expressions. Measures are in cubic units:

Row 1: $(4 \times 2) \times 7 = 56$, $(3 \times 2) \times 8 = 48$, $9 \times 8 = 72$

Row 2: $12 \times 5 = 60$, $(13 \times 2) \times 2 = 52$, $9 + 9 + 9 = 27$

Row 3: $14 + 14 = 28$, $20 \times 4 = 80$, $12 + 12 + 12 + 12 = 48$

Center Activity Answer Key
Activity 5.43

Use Volume Vocabulary

★ **Check Understanding**

24 cubic feet; Sample: The crate is a rectangular prism. I can use the volume formula: length × width × height, or 4 × 2 × 3 = 24 cubic feet. A prism is a 3-dimensional figure, so its volume is in cubic feet.

Recording Sheet

The model is a **rectangular prism** made of 1-inch **unit cubes.** Its **base** is a rectangle made of **3** rows of **5** unit cubes, for a total of **15** unit cubes. The model has **2** layers. The **volume** of the model is: *area of the base* × **height,** or (**5** × **3**) × **2** = **30** cubic inches.

The diagram shows the **dimensions** of the box as: **length** = 5 in., **width** = 3 in., **height** = 2 in. You can use the **formula** *l* × *w* × *h* to find the volume: **5** × **3** × **2** = **30** cubic inches. Both ways give the same volume.

★★ **Check Understanding**

160 cubic feet; Sample: The crate is a rectangular prism. I can use the volume formula: length × width × height, or 8 × 4 × 5 = 160 cubic feet. The answer is in cubic feet because a prism is a 3-dimensional figure.

Recording Sheet

The model is a **rectangular prism** made of 1-inch **unit cubes.** Its **base** is a rectangle made of **3** rows of **5** unit cubes, for a total of **15** unit cubes. The model has **2** layers. The **volume** of the model is: *area of the base* × **height,** or (**5** × **3**) × **2** = **30** cubic inches.

The diagram shows the **dimensions** of the box as: **length** = 5 in., **width** = 3 in., **height** = 2 in. You can use the **formula** *l* × *w* × *h* to find the volume: or **5** × **3** × **2** = **30** cubic inches. Both ways give the same volume.

★★★ **Check Understanding**

160 cubic feet; Sample: The base of the crate measures 8 feet across and 4 feet deep. This is its length and width. The height of the crate is 5 feet. I can substitute these numbers into the volume formula: length × width × height, or 8 × 4 × 5 = 160 cubic feet. The answer is in cubic feet because a prism is a 3-dimensional figure.

Recording Sheet

The model is a **rectangular prism** made of 1-inch **unit cubes.** Its **base** is a rectangle made of **3** rows of **5** unit cubes, or **15** unit cubes. The model has **2** layers. The **volume** of the model is: *area of the base* × **height,** or (**5** × **3**) × **2** = **30** cubic inches.

The diagram shows the **dimensions** of the box as: **length** = 5 in., **width** = 3 in., **height** = 2 in. The volume **formula** will give the same volume: *l* × *w* × *h,* or **5** × **3** × **2** = **30** cubic inches. Both ways give the same volume.

Center Activity Answer Key
Activity 5.44

Volume of Composite Figures

★ **Check Understanding**

54 cubic meters; front and back figures:
$(3 \times 2 \times 6) + (3 \times 2 \times 3) = 36 + 18 = 54$

Recording Sheet

Composite Figure 1: 208 cubic inches; back and front figures: $(8 \times 2 \times 8) + (5 \times 2 \times 8)$; right and left figures: $(3 \times 2 \times 8) + (5 \times 4 \times 8)$
Composite Figure 2: 120 cubic centimeters; back and front figures: $(9 \times 4 \times 2) + (6 \times 4 \times 2)$; right and left figures: $(10 \times 4 \times 2) + (5 \times 4 \times 2)$

★★ **Check Understanding**

54 cubic meters; Possible answer: front and back figures: $(3 \times 2 \times 6) + (3 \times 2 \times 3) = 36 + 18 = 54$; top and bottom figures:
$(3 \times 2 \times 3) + (4 \times 3 \times 3) = 18 + 36 = 54$

Recording Sheet

Row 1: 208 cubic inches; 460 cubic centimeters

Row 2: 44 cubic feet; 120 cubic centimeters

★★★ **Check Understanding**

Answers will vary depending on figure drawn. The answer should clearly show two different ways to break the figure and to calculate the volume.

Recording Sheet

Row 1: 120 cubic centimeters; 3,000 cubic millimeters

Row 2: 192 cubic feet; 312 cubic inches