Chapter 11 Planner  
Page 573 - 618  
Unit: Geometry

Expected Grade For the Chapter:________________ / 130 points

Lesson 11.1  Page 576  7-16 all, 23-25, 39-44 all  
Points Possible: 5  Grade:_____________

Lesson 11.2  Worksheet 11.2  
Points Possible: 5  Grade:_____________

Lesson 11.3  Worksheet 11.3  
Points Possible: 5  Grade:_____________

Review 11.1-11.3  
Points Possible: 10  Grade:_____________

Quiz 11.1-11.3  
Points Possible: 25  Grade:_____________

Lesson 11.4  Worksheet 11.4  
Points Possible: 5  Grade:_____________

Lesson 11.5  Worksheet 11.5  
Points Possible: 5  Grade:_____________

Lesson 11.6  Worksheet 11.6  
Points Possible: 5  Grade:_____________

Review  Chapter 11  
Points Possible: 15  Grade:_____________

Test Chapter 11  
Points Possible: 50  Grade:_____________

Achieved Grade For the Chapter:________________ 130 points

Name:________________
Lesson 11.1
Three-Dimensional Figures
Page 575-578

Main Idea
1. ______________________________________________________________
2. ______________________________________________________________

<table>
<thead>
<tr>
<th>Plane</th>
<th>Solid</th>
<th>Polyhedra</th>
<th>Edge</th>
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<table>
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<th>Base</th>
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<table>
<thead>
<tr>
<th>Pyramid</th>
<th>Cylinder</th>
<th>Cone</th>
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</table>

**EXAMPLE** Identify Solids

A. Identify the solid. Name the bases, faces, edges, and vertices.

**CHECK Your Progress**

A. Identify the solid. Name the bases, faces, edges, and vertices.
1. B. Identify the solid. Name the bases, faces, edges, and vertices.

2. A. ARCHITECTURE An architect’s sketch shows the plans for a new skyscraper. Each unit on the drawing represents 80 feet. Draw a top view and find the area of the ground floor.

2. B. Draw a top-count view of the building.

2. C. How many floors are in the skyscraper if each floor is 16 feet high?

2. A. ARCHITECTURE An architect’s sketch shows the plans for a new office building. Find the area of the ground floor if each unit represents 75 feet.

2. B. ARCHITECTURE An architect’s sketch shows the plans for a new office building. Draw a top-count view of the building.

2. C. ARCHITECTURE An architect’s sketch shows the plans for a new office building. How many floors are in the office building if each floor is 15 feet high?

CONCEPT SUMMARY

<table>
<thead>
<tr>
<th>Polyhedron</th>
<th>triangular prism</th>
<th>rectangular prism</th>
<th>triangular pyramid</th>
<th>rectangular pyramid</th>
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<td>Polygon Base</td>
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</table>
Lesson 11.2
Volume of Cylinders

Main Idea
1. ____________________________________________________________
2. ____________________________________________________________

KEY CONCEPT

Volume of a Prism

Words

Symbols

EXAMPLE Volume of a Rectangular Prism

1. Find the volume of the prism.

\[ V = Bh \]

Formula for volume of a prism

1. Formula
2. Substitute
3. Solve
4. Label
5. Check

CHECK Your Progress

1. Find the volume of the prism.

1. Formula
2. Substitute
3. Solve
4. Label
5. Check

2. Find the volume of the triangular prism.

1. Formula
2. Substitute
3. Solve
4. Label
5. Check

CHECK Your Progress

2. Find the volume of the triangular prism.

1. Formula
2. Substitute
3. Solve
4. Label
5. Check
1. Formula
2. Substitute
3. Solve
4. Label
5. Check

Real-World EXAMPLE

- **BAKING** Cake batter is poured into a pan that is a rectangular prism whose base is an 8-inch square. If the cake batter occupies 192 cubic inches, what will be the height of the batter?

CHECK Your Progress

- **SWIMMING POOLS** A swimming pool is filled with 960 cubic feet of water. The pool is a rectangular prism 20 feet long and 12 feet wide and is the same depth throughout. Find the depth of the water.

Standardized Test EXAMPLE

- Find the volume of the solid.
  - A. 252 m³
  - B. 972 m³
  - C. 918 m³
  - D. 1458 m³

CHECK Your Progress

- Find the volume of the solid.

KEY CONCEPT

- **Volume of a Cylinder**

<table>
<thead>
<tr>
<th>Words</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbols</td>
<td></td>
</tr>
</tbody>
</table>

EXAMPLE Volume of a Cylinder

- A. Find the volume of the cylinder. Round to the nearest tenth.

EXAMPLE Volume of a Cylinder

- B. Find the volume of the cylinder. Round to the nearest tenth. Diameter of base 10 m, height 2 m

CHECK Your Progress

- A. Find the volume of the cylinder. Round to the nearest tenth.

CHECK Your Progress

- B. Find the volume of the cylinder. Round to the nearest tenth. Diameter of base 8 cm, height 6 cm
Lesson 11.3
Volume of Pyramids, Cones
Page 589-592

Main Idea
1. ______________________________________________________________
2. ______________________________________________________________

KEY CONCEPT
Volume of a Pyramid

<table>
<thead>
<tr>
<th>Words</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbols</td>
<td>[Diagram of a pyramid with labels for h and B]</td>
</tr>
</tbody>
</table>

EXAMPLE: Volume of a Pyramid

1. Find the volume of the pyramid. Round to the nearest tenth if necessary.

\[ V = \frac{1}{3} Bh \]

Formula for volume of a pyramid

CHECK Your Progress

2. Find the volume of the pyramid. Round to the nearest tenth if necessary.

KEY CONCEPT
Volume of a Cone

<table>
<thead>
<tr>
<th>Words</th>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>Symbols</td>
<td>[Diagram of a cone with labels for h and r]</td>
</tr>
</tbody>
</table>

EXAMPLE: Volume of a Cone

2. Find the volume of the cone. Round to the nearest tenth.

\[ V = \frac{1}{3} \pi r^2 h \]

Formula for volume of a cone

CHECK Your Progress

2. Find the volume of the cone. Round to the nearest tenth.

EXAMPLE Volume of a Sphere

3 Find the volume of the sphere. Round to the nearest tenth.

CHECK Your Progress

3 Find the volume of the sphere. Round to the nearest tenth.

4 A. LANDSCAPING When mulch was dumped from a truck, it formed a cone-shaped mound with a diameter of 15 feet and a height of 8 feet. What is the volume of the mulch?

4 B. LANDSCAPING When mulch was dumped from a truck, it formed a cone-shaped mound with a diameter of 15 feet and a height of 8 feet. A person shoveling the mulch removes it at a rate of 1.5 ft³ every minute. How long does it take for the pile of mulch to be completely removed?
Main Idea
1. ____________________________
2. ____________________________

**Check Your Progress**

**A. Find the lateral area and the surface area of the rectangular prism.**

![Diagram of a rectangular prism with dimensions 8 in. x 5 in. x 14 in.]

**B. Find the lateral area and the surface area of the triangular prism.**

![Diagram of a triangular prism with dimensions 3 ft x 4 ft x 5 ft x 7 ft]
### Key Concept: Lateral Area and Surface Area of Cylinders

<table>
<thead>
<tr>
<th>Words</th>
<th>Model</th>
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<tbody>
<tr>
<td><strong>Symbols</strong></td>
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<tr>
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<tr>
<td><strong>Symbols</strong></td>
<td></td>
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</tbody>
</table>

#### Example
**Surface Area of a Cylinder**

2. Find the lateral area and surface area of the cylinder. Round to the nearest tenth.

#### Check Your Progress

2. Find the lateral area and the surface area of the cylinder. Round to the nearest tenth.

#### Real-World Example

3. **CEREALS** A company packages its cereal in a rectangular prism that is 2.5 inches by 7 inches by 12 inches. It is considering packaging it in a cylinder-shaped container having a 6-inch diameter and a height of 7.5 inches. Which uses the least amount of packaging?

#### Check Your Progress

3. **CANDY** A candy company is deciding between two types of packaging for its gumballs. The first option is a rectangular prism that is 6 inches by 4 inches by 1.5 inches. The second option is a cylinder having a radius of 2 inches and a height of 5 inches. Which option requires less packaging?
Lesson 11.5
Surface Area: Pyramids and Cones
Page 602-604

Main Idea
1. ________________________________________________________
2. ________________________________________________________

1. **Find the surface area of the square pyramid.**

   ![Square Pyramid]
   
   8 ft
   8.9 ft

---

**CHECK Your Progress**

1. **Find the surface area of the square pyramid.**

   ![Square Pyramid]
   
   3 m
   5.5 m

---

2. **CANOPIES** A canopy is in the shape of a square pyramid that is 3.4 meters on each side. The slant height is 2 meters. How much canvas is used for the canopy?

---

2. **TENT** A tent is in the shape of a square pyramid that is 8 feet on each side. The slant height is 10 feet. Find the surface area of the tent.
Find the surface area of the cone. Round to the nearest tenth.

\[ S = \pi rl + \pi r^2 \]

Formula for surface area of a cone

CHECK Your Progress

Find the surface area of the cone. Round to the nearest tenth.
Lesson 11.6

Main Idea

1. 

2. 

Homework
Worksheet 11.6
Page 597-599
**KEY CONCEPT**

**Ratios of Similar Solids**

**Words**  If two solids are similar with a scale factor of \( \frac{a}{b} \), then the surface areas have a ratio of \( \left( \frac{a}{b} \right)^2 \) and the volumes have a ratio of \( \left( \frac{a}{b} \right)^3 \).

**Models**

<table>
<thead>
<tr>
<th>Solid A</th>
<th>Solid B</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
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</tbody>
</table>

**EXAMPLE**  Find Surface Areas of Similar Solids

3 A cylinder has a surface area of 245 square inches. If the dimensions are doubled, what is the surface area of the new cylinder?

**CHECK Your Progress**

3 A cube has a surface area of 294 square centimeters. If the dimensions are doubled, what is the surface area of the new cube?

**Real-World EXAMPLE**

4 **DOLLHOUSE**  A small model of a fish tank for Eva’s dollhouse is built on a scale of 1 cm to 5 in. and has a volume of 24 cm³. What is the volume of the actual fish tank?

**CHECK Your Progress**

4 **TRAINS**  A scale model of a railroad boxcar is built on a scale of 1 inch to 50 inches and has a volume of 72 cubic inches. What is the volume of the actual boxcar?
Worksheets
For
Chapter 11
Skills Practice

Volume: Prisms and Cylinders

Find the volume of each solid shown or described. If necessary, round to the nearest tenth.

1. \[ \text{rectangular prism: length } 11 \text{ ft, width } 7 \text{ ft, height } 4 \text{ ft} \]

2. \[ \text{triangular prism: base of triangle } 28 \text{ m, altitude of triangle } 26 \text{ m, height of prism } 41 \text{ m} \]

3. \[ \text{cylinder: radius } 5 \text{ in., height } 10 \text{ in.} \]

4. \[ \text{rectangular prism: length } 3 \text{ yd, width } 27 \text{ yd, height } 8 \text{ yd} \]

5. \[ \text{triangular prism: base of triangle } 15 \text{ cm, altitude of triangle } 8 \text{ cm, height of prism } 4 \text{ cm} \]

6. \[ \text{rectangular prism: length } 10 \text{ ft, width } 12 \text{ ft, height } 26 \text{ ft} \]

7. \[ \text{cylinder: radius } 24 \text{ mm, height } 15 \text{ mm} \]

8. \[ \text{pyramid: base of triangle } 5 \text{ in., altitude of triangle } 8 \text{ in., height of pyramid } 4 \text{ in.} \]

9. \[ \text{cylinder: radius } 10 \text{ cm, height } 5 \text{ cm} \]

10. rectangular prism: length 18 ft, width 9 ft, height 1 ft

11. triangular prism: base of triangle 22 yd, altitude of triangle 14 yd, height of prism 30 yd

12. Find the height of a cylinder with a radius of 12 inches and a volume of 3754.8 in³. Round to the nearest tenth.
11-2 Word Problem Practice

Volume: Prisms and Cylinders

1. CONSTRUCTION Johnson Construction Company is going to build a house on a concrete slab. The slab is to have dimensions 30 feet by 20 feet by 2 feet. How many cubic feet of concrete should the construction company order?

2. PACKAGING The Fresh Chili Company is changing the size of their cans of chili. The new can needs to hold 500 cubic centimeters of chili. The height of the can is to be 11 centimeters. What must the radius of the new can be? Round your answer to the nearest tenth.

3. WASTE COLLECTION At Peter’s job, he needs to empty wastebaskets. The cylindrically shaped wastebaskets have a height of 3 feet and a diameter of \(1\frac{1}{2}\) feet. Peter empties the wastebaskets into a dumpster that is shaped like a rectangular prism. If the dumpster is 8 feet wide, 6 feet deep, and 5 feet tall, how many wastebaskets full of trash will fit in the dumpster?

4. AGRICULTURE Sue is going to build a planter as sketched below. How many cubic feet of dirt will be needed to fill the planter?

5. When the reservoir is completely full, how many gallons of water does it hold? (Hint: 1 yd\(^3\) holds approximately 202 gallons.)

6. After 75 days of no rain, the reservoir is now only 4 yards deep. How many gallons of water have been used?

7. Find the average gallons-per-day rate of water that was used from the reservoir.

WATER STORAGE For Exercises 5–7, use the following information.

The town of Old Creek, Oklahoma, has a water reservoir that is shaped like a triangular prism. The area of the triangular surface of the reservoir is 1500 square yards, and the depth is 20 yards.
Find the volume of each solid. If necessary, round to the nearest tenth.

1. \( \text{Volume of a sphere: } \frac{4}{3} \pi r^3 \)

2. \( \text{Volume of a triangular pyramid: } \frac{1}{3} \times \text{base area} \times 
   \text{height} = \frac{1}{3} \times \frac{1}{2} \times \text{base} \times \text{height} \)

3. \( \text{Volume of a cone: } \frac{1}{3} \pi r^2 h \)

4. \( \text{Volume of a triangular pyramid: } \frac{1}{3} \times \text{base area} \times 
   \text{height} = \frac{1}{3} \times \frac{1}{2} \times \text{base} \times 2 \text{ yd} \times 7 \text{ yd} \)

5. \( \text{Volume of a triangular pyramid: } \frac{1}{3} \times \text{base area} \times 
   \text{height} = \frac{1}{3} \times \frac{1}{2} \times 12 \text{ ft} \times 5 \text{ ft} \)

6. \( \text{Volume of a sphere: } \frac{4}{3} \pi r^3 \)

7. \( \text{Volume of a triangular pyramid: } \frac{1}{3} \times \text{base area} \times 
   \text{height} = \frac{1}{3} \times \frac{1}{2} \times 20 \text{ ft} \times 23 \text{ ft} \)

8. \( \text{Volume of a sphere: } \frac{4}{3} \pi r^3 \)

9. \( \text{Volume of a cone: } \frac{1}{3} \pi r^2 h \)

10. \( \text{Volume of a rectangular pyramid: } \frac{1}{3} \times \text{base area} \times 
   \text{height} = \frac{1}{3} \times \text{length} \times \text{width} \times \text{height} \)

11. \( \text{Volume of a cone: } \frac{1}{3} \pi r^2 h \)

12. \( \text{Volume of a sphere: } \frac{4}{3} \pi r^3 \)
1. **ARCHITECTURE** Although the Eiffel Tower in Paris is not a solid pyramid, its shape approximates that of a pyramid with a square base measuring 120 feet on a side and a height of 980 feet. If it were a solid pyramid, what would be the Eiffel Tower’s volume, in cubic feet?

2. **WEATHER** After a snow storm, you and a friend decide to build a snowman. You use three spheres of snow to build the snowman. The bottom sphere has a diameter of 4 feet, the middle has a diameter of 2 feet, and the head has a diameter of 18 inches. What is the volume of the snowman? Round your answer to the nearest cubic foot.

3. **ICE CREAM** A spherical scoop of ice cream is placed on a waffle cone. The diameter of the ice cream scoop is 6.4 centimeters. The waffle cone has a diameter of 5 centimeters and a height of 9 centimeters. If all the ice cream melts before you eat any, how much of the melted ice cream will overflow the waffle cone? Round your answer to the nearest tenth.

4. **HISTORY** The Great Pyramid of Khufu in Egypt has a square base measuring 756 feet on a side and a height of 481 feet. The stones used to build the Great Pyramid were limestone blocks with an average volume of 40 cubic feet. How many of these blocks were needed to construct the Great Pyramid? Round your answer to the nearest whole number.

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**FARMING** For Exercises 5–7, use the following information. Round to the nearest whole number if necessary.

Mr. Mills has just finished his corn harvest. He filled 12 trucks with corn and needs to move the corn to one of the two silos on his farm. Each truck bed is shaped like a rectangular prism having dimensions 10 feet wide, 20 feet long, and 6 feet tall. Mr. Mills needs to fit all the corn in the same silo.

5. How much corn has Mr. Mills harvested?

6. How much corn will each silo hold?

7. Which silo should Mr. Mills put all of his corn in? How many more full truckloads of corn could he store in the larger silo?
11-4 Skills Practice

Surface Area: Prisms and Cylinders

Find the lateral area and surface area of each solid shown or described. If necessary, round to the nearest tenth.

1. [Diagram of a rectangular prism with dimensions 9 in., 5 in., and 4 in.]
2. [Diagram of a triangular prism with dimensions 8 m, 10 m, and 10 m, and 12 m, 15 m, and 10 m.]
3. [Diagram of a trapezoidal prism with dimensions 10 ft, 11 ft, and 20 ft, and 14.9 ft.]
4. [Diagram of a rectangular prism with dimensions 16 in., 14 in., and 4 in.]
5. [Diagram of a triangular prism with dimensions 4 m, 4 m, and 4 m, and 3.5 m, 4 m, and 4 m.]
6. [Diagram of a cylinder with dimensions 3.5 m and 0.6 m.]
7. [Diagram of a cylinder with dimensions 9 mm and 6 mm.]
8. [Diagram of a rectangular prism with dimensions 1.5 yd, 1 yd, and 2.5 yd.]
9. [Diagram of a cylinder with dimensions 5 in. and 18 in.]
10. rectangular prism: length 17 yd, width 4.5 yd, height 3 yd
11. cylinder: radius 16 ft, height 42 ft
12. cylinder: diameter 20.2 cm, height 43 cm
11-4 Word Problem Practice
Surface Area: Prisms and Cylinders

1. **DECORATING** Ms. Frank is going to wallpaper a living room with dimensions 24 feet long, 18 feet wide, and 8 feet high. What surface area does Ms. Frank plan to wallpaper?

2. **MANUFACTURING** The Acme Canning Company produces cans for chicken soup. If each can has a diameter of 2 inches and a height of $3\frac{1}{4}$ inches, how much aluminum is needed to make one can? Round to the nearest hundredth.

3. **MUSEUM** A museum curator needs to order a display case for a small artifact. The case needs to be a rectangular prism and made entirely of clear plastic. The bases must each measure $1\frac{1}{2}$ feet by $1\frac{3}{4}$ feet and the sides each 3 feet high. Find the cost of the case if the clear plastic costs $10 per square foot.

4. **SIDING** The Ramirez family is going to put vinyl siding on a shed. They will cover all four walls completely, except for the door. The siding costs $3 per square foot. How much will the siding cost for their shed?

   ![Diagram of a shed]

5. What is the surface area of the FPS box?

6. What is the surface area of the Packages-R-US box?

7. If each company buys 100 of these packages, which company will spend less money per package? Explain.
Skills Practice

Surface Area: Pyramids and Cones

Find the surface area of each solid. If necessary, round to the nearest tenth.

1. 
2. 
3. 

4. 
5. 
6. 

7. 
8. 
9. 

10. square pyramid: base side length 6.3 m, slant height 4 m

11. cone: diameter 16 yd, slant height 10 yd

12. cone: radius 14 cm, slant height 33 cm
1. **PARTY HATS** The Goodtime Company needs to make paper hats to use for special events. The paper hats are in the shape of a cone. The radius of the cone is 8 centimeters and the slant height is 20 centimeters. How many square centimeters of paper are needed to make each hat? Round our answer to the nearest tenth.

2. **TEEPEES** Ryan is trying to build a teepee for a school project on Native Americans. Teepees are approximately the shape of a cone. Ryan has 290 square feet of canvas to make the teepee. If the diameter is to be 12 feet, what will the slant height be if he uses all the canvas?

3. **SCOOPS** Audrey uses a metal scoop to measure the correct amount of food to give to her horse. The scoop is shaped like a cone and is shown below. How much metal was used to make the scoop? Round your answer to the nearest tenth.

4. **STORAGE TANKS** A water storage tank has a roof that is shaped like a square pyramid. What is the surface area of the water tank?

5. **ICE CREAM** For Exercises 5–7, use the following information.

The SmileTime Ice Cream Co. is going to begin selling their ice cream in cardboard cones instead of cylindrically-shaped cups. (Note: There is no top on either container.)

6. If the paper costs 90¢ per square foot, how much does SmileTime Ice Cream Company save for every 100 cups they buy?
Skills Practice
Similar Solids

Determine whether each pair of solids is similar.

1.

2.

3.

4.

5.

6.

Find the missing measure for each pair of similar solids.

7.

8.

9.

10.
11-6 Word Problem Practice

**Similar Solids**

1. **PACKAGING**  The Homemade Soup Company sells two sizes of soup cans. One can has a diameter of 3 inches and a height of 5 inches. The larger can has a diameter of 4 inches and a height of 6 inches. Are the two cans similar? Explain.

2. **WATER TANKS**  Morgan Plumbers installed a cylindrical water tank that is 5.4 feet tall, has a radius of 2.1 feet and holds about 540 gallons of water. A similarly shaped water tank has a radius of 1.5 feet. How much water will the smaller tank hold?

3. **CEREAL BOXES**  Tom is given three cereal boxes, as shown below. He needs to determine which two are similar. Which boxes are similar, and what is the scale factor from the small box to the large?

4. **ICE SCULPTURE**  Larry is carving an ice swan for a wedding. His model is one-sixth the size of the actual carving. If his model weighs 3 pounds, how much will the actual carving weigh?

5. **PACKAGING**  For Exercises 5-7, use the following information.

Lisa was at the movies and wanted to buy some popcorn. The popcorn was sold in two similarly shaped cylindrical containers. The small container cost $4.50 and the large container cost $6.00. The small container is 8 inches tall and has a diameter of 5 inches. The large container is 10 inches tall.

6. What is the diameter of the large container?

7. What are the volumes of the large and small containers?

7. **CEREAL BOXES**  Which size popcorn is the better deal? Explain.