Jaclyn Shantler
I2T2 Final Project
December 1, 2003

Methods of Geometric Measuring

Grade: 6
Time: 5 consecutive days
Tools: Geoboards
  TI-73 Graphing Calculator
  Base-Ten Blocks
  Plastic Sphere and Cone Manipulatives
  Plastic Geometric Shapes

Overall Objective:

Students will gain a basic understanding of the areas of geometric measurement including perimeter, area, circumference, pi, and surface area. They will work both individually and in groups to complete a variety of learning activities in which they will apply and practice these concepts of measurement.

NCTM Standards Addressed in Unit:

Numbers and Operations-
-Understand numbers, ways of representing numbers, relationships among numbers, and number systems

Algebra-
-Represent and analyze mathematical situations and structures using algebraic symbols

Geometry-
-Analyze characteristics and properties of two- and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships
-Use visualization, spatial reasoning, and geometric modeling to solve problems

Measurement-
-Understand measurable attributes of objects and the units, systems, and processes of measurement
-Apply appropriate techniques, tools, and formulas to determine measurements

Data Analysis and Probability-
-Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them
-Select and use appropriate statistical methods to analyze data
-Develop and evaluate inferences and predictions that are based on data

Problem Solving-
-Build new mathematical knowledge through problem solving
-Apply and adapt a variety of appropriate strategies to solve problems

Communication-
-Organize and consolidate their mathematical thinking through communication
-Communicate their mathematical thinking coherently and clearly to peers, teachers, and others
-Analyze and evaluate the mathematical thinking and strategies of others
-Use the language of mathematics to express mathematical ideas precisely

Connections-
-Recognize and use connections among mathematical ideas
-Understand how mathematical ideas interconnect and build on one another to produce a coherent whole
-Recognize and apply mathematics in contexts outside of mathematics

Representation-
-Create and use representations to organize, record, and communicate mathematical ideas
-Select, apply, and translate among mathematical representations to solve problems
-Use representations to model and interpret physical, social, and mathematical phenomena

New York State Learning Standards Addressed in Unit:
        Mathematics, Science, and Technology

Standard 1: Analysis, Inquiry and Design
        Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.
Standard 2: Information Systems
        Students will access, generate, process, and transfer information using appropriate technologies.
Standard 3: Mathematics
        Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry.
Standard 5: Technology
        Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.

Standard 6: Interconnectedness: Common Themes
Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.

Standard 7: Interdisciplinary Problem Solving
Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.

Resources Used:

Charles, R.I., Dossey, J.A., Leinwand, S.J. Math. (2000). Addison Wesley Longman, Inc. Pages 211-212.

Dolan, D., Williamson, J. & Muri, Mari. Mathematics Activities for Elementary School Teachers: A Problem-Solving Approach. Fourth Edition. (2000). Addison Wesley Longman, Inc. Pages A-46 & A-49.

Easy Warm-Ups in Pre-Algebra/TI-73. Pencil Point Press. Page 17.

Math: Teacher's Toolkit. (1999). Addison Wesley Longman, Inc. Teaching Tool Transparency 1.

Middle Grades Math. (1999). Prentice-Hall, Inc. Page 79.

Neuschwander, Cindy. Sir Cumference and the Dragon of Pi. (2000). New York: Scholastic Inc.

Neuschwander, Cindy. Sir Cumference and the Sword in the Cone. (2003). New York: Scholastic Inc.

Unit Outline

The entire unit will cover perimeter, area, circumference, pi, and surface area.

Day 1:

Students will learn about perimeter and they will complete a geoboard activity that will be shared with the class.

Day 2:
Students will learn about the area of certain geometric shapes, and they will complete a demonstration and a geoboard activity.

Day 3:
Students will have the opportunity to construct a house plan that follows the rules of the given perimeter and area limitations.

Day 4:
Students will learn about the circumference, area, radius, and diameter of a circle along with pi using cooperative group work in which different circular objects are measured and analyzed.

Day 5:
Students will learn about surface area by completing and measuring the surface areas of various objects and recording their data.

Jaclyn Shantler   December 1, 2003
Geometric Measurement-Lesson #1 Perimeter   Grade 6
22 Students   45 Minutes

Instructional Goals:
Students will learn the purpose of perimeter as well as the many uses of it.

Performance Objectives:
Students will gain a basic understanding of perimeter and the ways in which to calculate it. Students will individually complete an activity to later be compared as a class.

NCTM Standards:

Numbers and Operations-
-Understand numbers, ways of representing numbers, relationships among numbers, and number systems

Geometry-
-Use visualization, spatial reasoning, and geometric modeling to solve problems

Measurement-
-Understand measurable attributes of objects and the units, systems, and processes of measurement
-Apply appropriate techniques, tools, and formulas to determine measurements

Problem Solving-
-Build new mathematical knowledge through problem solving
-Apply and adapt a variety of appropriate strategies to solve problems

Connections-
-Recognize and apply mathematics in contexts outside of mathematics

New York State Learning Standards:

Standard 1: Analysis, Inquiry and Design
          Students will use mathematical analysis, scientific inquiry, and engineering
          design, as appropriate, to pose questions, seek answers, and develop
          solutions.
Standard 2: Information Systems
          Students will access, generate, process, and transfer information using
          appropriate technologies.

Standard 3: Mathematics
Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry.

Materials:
Geoboards
Rubber bands
Geoboard Paper
Pencil
Paper

Books Used:
Charles, R.I., Dossey, J.A., Leinwand, S.J. <u>Math</u>. (2000). Addison Wesley Longman, Inc. Pages 211-212.

Instructional Procedure:
  A. Initiating Strategy
  Students will be given a short set of notes to copy from the overhead projector regarding the definition, uses of, and examples of perimeter.
  B. Teaching Procedure Instructional Event:
  1. Students will be introduced to perimeter using a brief set of notes.
  2. Students will be given geoboards, rubber bands, geoboard paper, and a handout.
  3. Students will work in groups to create shapes with geoboards and rubber bands that equal the perimeters given on the worksheet.
  4. Students will record found shapes on geoboard paper.
  5. Students will then have 5 minutes to go the chalkboard and share results with the class.
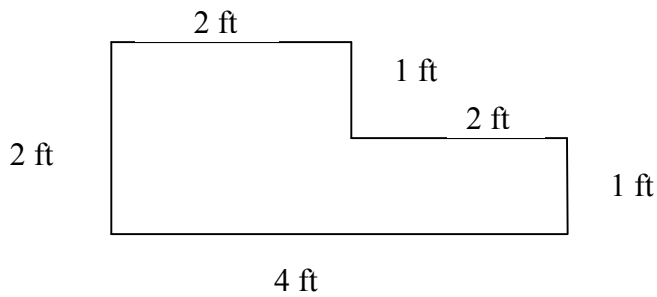
Assessment:
Students will be graded based upon their group participation and completed worksheet. Each worksheet will be graded out of 10 points.
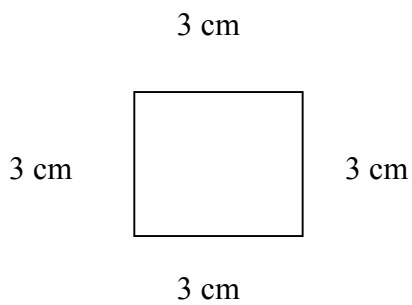
Class Notes

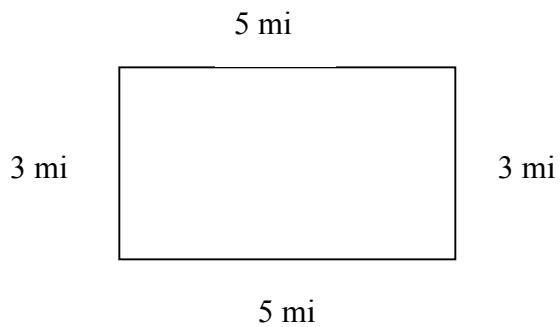Perimeter- The distance around the outside of a figure.

Example:

2 ft + 2 ft + 1 ft + 2 ft + 1ft + 4 ft = 12 ft

3 cm + 3 cm + 3 cm + 3 cm = 12 cm
OR
3 cm x 4 sides = 12 cm

3 mi + 5 mi + 3 mi + 5 mi = 16 mi
OR
(3 mi x 2 sides) + (5 mi + 2 sides)
6 mi + 10 mi
= 16 mi

Class Notes Cont…

Problem:
A triangle has one side that measures 6 inches, and a second side that measures 4 inches. If the total perimeter is 15 inches, how long is the third side?
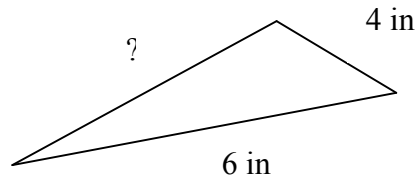
Answer:

$$15 \text{ in} - 6 \text{ in} - 4 \text{ in} = \textbf{5 in}$$
$$\text{OR}$$
$$6 \text{ in} + 4 \text{ in} = 10 \text{ in} \quad \text{so} \quad 15 \text{ in} - 10 \text{ in} = \textbf{5 in}$$

Directions: Using your geoboard and rubber bands, create as many shapes as you can which have perimeters equal to the values given below. Make sure to record all shapes on your geoboard paper.

How many shapes can you find that have a perimeter of:

4 cm _____

5 cm _____

6 cm _____

7 cm _____

8 cm _____

9 cm _____

10 cm _____

Were there any perimeter totals from above that you were not able to make shapes for with your geoboard?

Why do think this happened? Explain below.

Jaclyn Shantler   December 2, 2003
Geometric Measurement- Lesson #2 Area   Grade 6
22 Students   45 minutes

Instructional Goals:
Students will learn about the area of different polygons and different ways to calculate it.

Performance Objectives:
Students will gain a basic understanding of the area of different polygons and different ways in which area can be calculated. Students will work together to complete area demonstrations as well as a geoboard activity.

NCTM Standards:

Numbers and Operations-
-Understand numbers, ways of representing numbers, relationships among numbers, and number systems

Geometry-
-Analyze characteristics and properties of two- and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships
-Use visualization, spatial reasoning, and geometric modeling to solve problems

Measurement-
-Understand measurable attributes of objects and the units, systems, and processes of measurement
-Apply appropriate techniques, tools, and formulas to determine measurements

Data Analysis and Probability-
-Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them

Problem Solving-
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Representation-
-Use representations to model and interpret physical, social, and mathematical phenomena

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Standard 3: Mathematics
> Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry.

Standard 6: Interconnectedness: Common Themes
> Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.

Materials:
Tape Measure
String
Geoboards
Rubber bands
Geoboard Paper

Instructional Procedure:
   A. Initiating Strategy
   Students will be given a short set of notes to copy from the overhead projector that review perimeter from yesterday's lesson and adds new material regarding area that includes formulas and examples.
   **B. Teacher Procedure Instructional Event:**
1. Students will be introduced to area using a brief set of notes.
2. Students will be chosen to demonstrate area in front of the class.
   a) Students will be chosen to hold the ends of different pieces of string, and all will connect to form a polygon.
   b) Another student will use a tape measure to measure each of the polygon from one student to another.
   c) Another student will record the results on the chalkboard.
   d) As a class, students will use given area formulas to calculate area of the polygon formed by students and string.
   e) Examples will be done for a square, rectangle, triangle, parallelogram, and trapezoid.
3. Students will work in assigned groups of three and use geoboards and rubbber bands to find shapes with areas given on a worksheet.
4. Students will record all findings on geoboard paper to be turned in and graded.

Assessment:
Students will be graded based upon their group participation and completed worksheet. Each worksheet will be graded out of 10 points.

Class Notes

Perimeter- The distance around the outside of a figure.
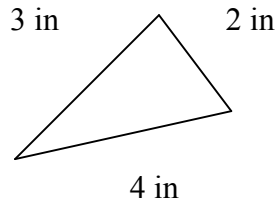
$$3 \text{ in} + 2 \text{ in} + 4 \text{ in} = 9 \text{ in}$$
Perimeter = 9 inches

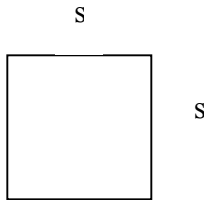**Area** – The amount of surface that a shape covers
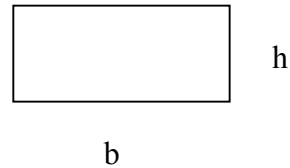　　　*Area is measured in square units
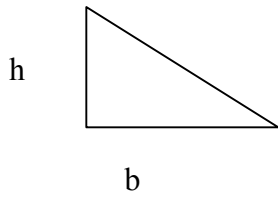　　　example:
　　　in^2, cm^2, yd^2, m^2

Area Formulas:

square = side^2　　　　　　　　　　　　　rectangle = base x height

triangle = _ (base x height)

parallelogram = base x height

h

b

h

b
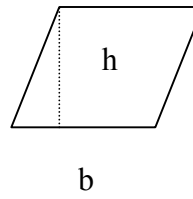
trapezoid = _ (base$_1$ + base$_2$) height

b$_1$

h

b$_2$
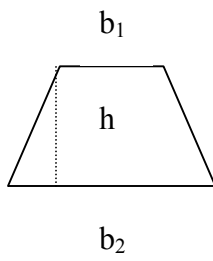
Directions:

Using your geoboards and rubber bands, create as many shapes as you can which have areas equal to the values given below. Make sure to record all shapes on your geoboard paper.

How many shapes can you find that have an area of:

1 cm^2 _____
2 cm^2 _____
2 _ cm^2 _____
3 cm^2 _____
3 _ cm^2 _____
4 cm^2 _____
4 _ cm^2 _____
5 cm^2 _____

Were you able to make at least one shape for each area?

If you could not find a shape for an area, explain why you think this happened below.

Jaclyn Shantler   December 3, 2003
Geometric Measurement- Lesson #3 Perimeter & Area   Grade 6
22 Students   45 minutes

Instructional Goals:
Students will create a house plan by using perimeter and area.

Performance Objectives:
Students will gain a further understanding of perimeter and area by individually creating a house plan that meets given perimeter and area requirements.

NCTM Standards:

Numbers and Operations-
-Understand numbers, ways of representing numbers, relationships among numbers, and number systems

Geometry-
-Use visualization, spatial reasoning, and geometric modeling to solve problems

Measurement-
-Understand measurable attributes of objects and the units, systems, and processes of measurement
-Apply appropriate techniques, tools, and formulas to determine measurements

Data Analysis and Probability-
-Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them

Problem Solving-
-Build new mathematical knowledge through problem solving
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-Recognize and use connections among mathematical ideas
-Understand how mathematical ideas interconnect and build on one another to produce a coherent whole
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Standard 5: Technology
Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.

Standard 7: Interdisciplinary Problem Solving
Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.

Materials:
TI-73 Calculator
Base-Ten Blocks
Graph Paper
Colored Pencils
Ruler
Pen/Pencil

Books Used:
Dolan, D., Williamson, J. & Muri, Mari. Mathematics Activities for Elementary School Teachers: A Problem-Solving Approach. Fourth Edition. (2000). Addison Wesley Longman, Inc. Pages A-46 & A-49.
Easy Warm-Ups in Pre-Algebra/TI-73. Pencil Point Press. Page 17.

Instructional Procedure:

A. Initiating Strategy

Students will receive a brief review of area by using their TI-73 Calculators to complete Warm Up 17 from Easy Warm Ups in Pre-Algebra.

B. Teacher Procedure Instructional Event:

1. After completing the warm up exercise using the TI-73 Calculator, students will be asked to design a house using specified perimeters and areas.
2. Students will first use base-ten blocks to map out the maximum and minimum area that their plans can cover.
3. Students will then receive colored pencils, graph paper, and a ruler.
4. Students will begin drawing and designing a house plan according to given directions on worksheet.
5. Students will attach completed worksheet to their house design to be turned in and graded.

Assessment:

Students will be graded on their house plans according to the point values listed on worksheet. (Out of 20 points).

Design a House

Directions:
You are to design a one-story house plan using the graph paper provided.
Your house should include:
-2 bedrooms
-1 bathroom
-1 kitchen
-1 living room
-1 garage
-2 exits
-at least 1 window in each room

Note: Your graph is measured in square centimeters. Use the scale **1cm^2 = 1 m^2** when planning your house.

The total area of your house must be between 200-250 square meters.

Please use the checklist below when planning your house (hint: This is also the rubric that will be used when grading this assignment. Follow it carefully.)

_____ Perimeter of Bedroom 1 (1 pt)
_____ Area of Bedroom 1 (1 pt)
_____ Perimeter of Bedroom 2 (1 pt)
_____ Area of Bedroom 2 (1 pt)
_____ Perimeter of Bathroom (1 pt)
_____ Area of Bathroom (1 pt)
_____ Perimeter of Kitchen (1 pt)
_____ Area of Kitchen (1pt)
_____ Perimeter of Living Room (1 pt)
_____ Area of Living Room (1 pt)
_____ Perimeter of Garage (1 pt)
_____ Area of Garage (1 pt)
_____ 2 exits (1 pt)
_____ 1 window in each room (2 pts)
_____ Perimeter of house (2 pts)
_____ Total Area of House (3 pts)

Jaclyn Shantler   December 4, 2003
Geometric Measurement- Lesson #4 Circles and Pi   Grade 6
22 Students   45 minutes

Instructional Goals:
Students will learn about the circumference, area diameter, and radius of a circle along with the role of pi.

Performance Objectives:
Students will gain an understanding of the area and circumference of a circle by working together to complete a learning activity in which circles of different sizes are measured and pi is compared.

NCTM Standards:

Numbers and Operations-
-Understand numbers, ways of representing numbers, relationships among numbers, and number systems

Algebra-
-Represent and analyze mathematical situations and structures using algebraic symbols

Geometry-
-Analyze characteristics and properties of two- and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships

Measurement-
-Understand measurable attributes of objects and the units, systems, and processes of measurement
-Apply appropriate techniques, tools, and formulas to determine measurements

Data Analysis and Probability-
-Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them
-Develop and evaluate inferences and predictions that are based on data

Problem Solving-
-Build new mathematical knowledge through problem solving
-Apply and adapt a variety of appropriate strategies to solve problems

Communication-
-Communicate their mathematical thinking coherently and clearly to peers, teachers, and others
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Standard 2: Information Systems
> Students will access, generate, process, and transfer information using appropriate technologies.

Standard 3: Mathematics
> Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry.

Materials:
Plastic sphere and cone manipulatives
Juice can
Soup can
Oatmeal canister
Coffee can
Measuring Tape
Ruler
Pencil

Books Used:
Middle Grades Math. (1999). Prentice-Hall, Inc. Page 79.

Neuschwander, Cindy. Sir Cumference and the Dragon of Pi. (2000). New York: Scholastic Inc.

Instructional Procedure:

A. Initiating Strategy

Students will be read a book entitled <u>Sir Cumference and the Dragon of Pi</u> by Cindy Neuschwander.

B. Teaching Procedure Instructional Event:

    1. After reading the story, students will discuss and share thoughts and reactions.

    2. Students will receive a brief set of notes which include the area and circumference formulas for circles and the value of pi.

    3. Students will work in pairs to complete a worksheet by measuring different circular objects including sphere and cone manipulatives, and recording data.

    4. The worksheet will be handed in for grading.

Assessment:

Students will be graded on their completed worksheet with all data filled in and calculated. There are 23 possible points.

Class Notes

Circumference and Area of a Circle

Circumference (c)- The distance around the circle

Diameter (d)- Any line that is drawn from one point on the circle to another point on the circle and passes through the center.

Radius (r)- Any line drawn from the center of a circle to any point on the circle.
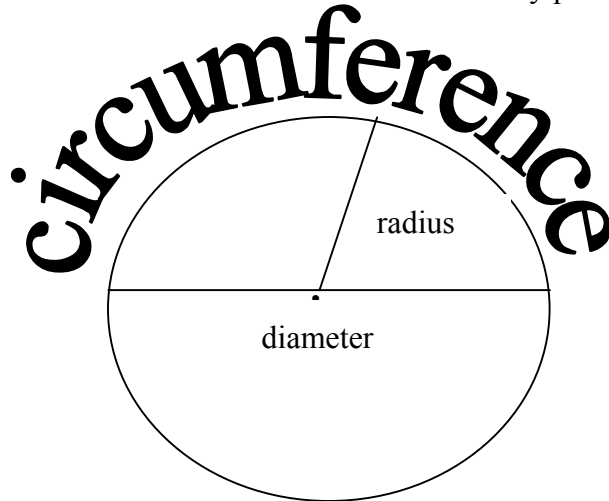
Pi (π) – The numerical value of the circumference divided by the diameter

$$\frac{\text{circumference}}{\text{diameter}}$$

*This number will always be approximately 3.14
*Pi actually goes on forever, so it is rounded

Formulas:

Circumference of a circle = πd
Area of a circle = πr^2

class notes cont...

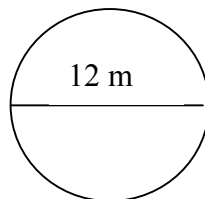Examples:

Find the circumference of the circle
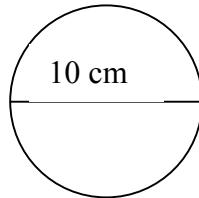
c = ππd
c = 3.14 x 10 cm
c = 31.4 cm

Find the area of the circle
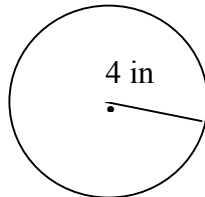
$A = \pi r^2$
$A = 3.14 \text{ cm } (4 \text{ in})^2$
$A = 3.14 \text{ cm } (16)$
$A = 50.24 \text{ cm}^2$

Find the area of the circle

$A = \pi r^2$
$A = 3.14 (12 \text{ m}/2)^2$
$A = 3.14 (6 \text{ m})^2$
$A = 3.14 (36 \text{ m})$
$A = 113.04 \text{ m}$

■■■■ *Practice 9-4* Gathering Data to Explore Pi

Use 3 for π to estimate the circumference of a circle with the given radius or diameter.

1. $d = 4$ in. _____

2. $d = 8$ cm _____

3. $r = 6$ m _____

4. $r = 10$ ft _____

5. $r = 3$ in. _____

6. $d = 20$ cm _____

Use a calculator to find the circumference of a circle with the given radius or diameter. Round to the nearest unit.

7. $r = 18$ cm _____

8. $d = 44$ ft _____

9. $r = 28$ in. _____

10. $r = 24$ m _____

11. $d = 34$ in. _____

12. $d = 42$ cm _____

Use a calculator to find the diameter of a circle with the given circumference. Round to the nearest unit.

13. $C = 128$ ft _____

14. $C = 36$ cm _____

15. $C = 200$ m _____

16. $C = 85$ in. _____

17. $C = 57$ cm _____

18. $C = 132$ in. _____

Complete the table. Use a string and metric ruler to measure the circumference and the diameter of four different circular objects. Then check to see if the ratio $\frac{C}{d}$ ⇌ about 3.14.

Object	Circumference, C	Diameter, d	$\frac{C}{d}$
19.			
20.			
21.			
22.			

23. Use the table you have just completed. What can you conclude about the ratio $\frac{C}{d}$?

_____

Jaclyn Shantler   December 5, 2003
Geometric Measurement- Lesson #5 Surface Area   Grade 6
22 Students   45 minutes

Instructional Goals:
Students will learn about surface area by completing measuring and calculating activities
at six different stations of various geometric figures.

Performance Objectives:
Students will gain a basic understanding of surface area by working cooperatively in
groups to calculate the surface area of various objects.

NCTM Standards:
Numbers and Operations-
-Understand numbers, ways of representing numbers, relationships among numbers, and
number systems

Geometry-
-Analyze characteristics and properties of two- and three- dimensional geometric shapes
and develop mathematical arguments about geometric relationships

Measurement-
-Understand measurable attributes of objects and the units, systems, and processes of
measurement
-Apply appropriate techniques, tools, and formulas to determine measurements

Data Analysis and Probability-
-Formulate questions that can be addressed with data and collect, organize, and display
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Standard 3: Mathematics
>   Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry.

Materials:
Plastic Geometric Shapes
Cereal Box
Oatmeal Canister
Square Kleenex Box
Measuring Tape/Ruler
Pencil

Books Used:
Neuschwander, Cindy. Sir Cumference and the Sword in the Cone. (2003). New York: Scholastic Inc.

Instructional Procedure:
A. Initiating Strategy
   Students will be read a book entitled Sir Cumference and the Sword in the Cone by Cindy Neuschwander.
B. Teaching Procedure Instructional Event
   1. After being read the book, students will discuss and share any thoughts or ideas that came from the book.
   2. Students will recieve a brief set of notes which include the definition of surface area and formulas for calculating surface area.
   3. Students will work in groups of 4, and they will move around the room to different stations that are set up with objects that are to be measured for surface area.
   4. As groups move around the room, they will be completing a worksheet that will be turned in for a grade.
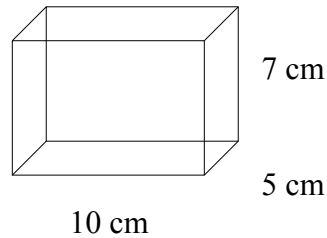
Assessment:
Students will be graded based upon their completed worksheets. The worksheet is out of a total of 18 points.
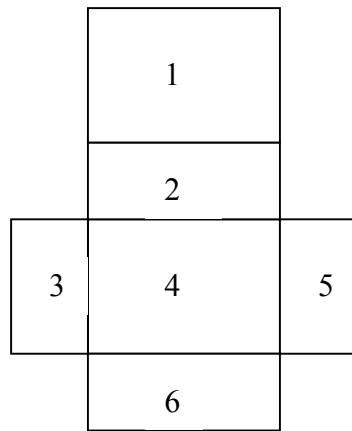
Class Notes

Surface Area: The sum of the area of all faces of an object.

Prism-

length (L)= 10 cm
width (W)= 5 cm
height (H)= 7 cm

7 cm

5 cm

10 cm

	1	
	2	
3	4	5
	6	

A_1 = L x H = 10 cm x 7 cm = 70 cm^2
A_2 = L x W = 10 cm x 5 cm = 50 cm^2
A_3 = H x W = 7 cm x 5 cm = 35 cm^2
A_4 = L x H = 10 cm x 7 cm = 70cm^2
A_5 = H x W = 7 cm x 5 cm = 35cm^2
A_6 = L x W = 10 cm x 5 cm = 50cm^2

Surface Area = $A_1+A_2+A_3+A_4+A_5+A_6$
= 70 cm^2 + 50 cm^2 + 35 cm^2 + 70cm^2 + 35cm^2 + 50cm^2
= 310 cm^2

OR
Surface Area = 2 (70cm^2) + 2 (50 cm^2) + 2 (35 cm^2)
= 140 cm^2 + 100 cm^2 + 70 cm^2
= 310 cm^2
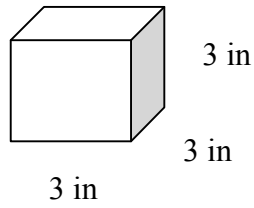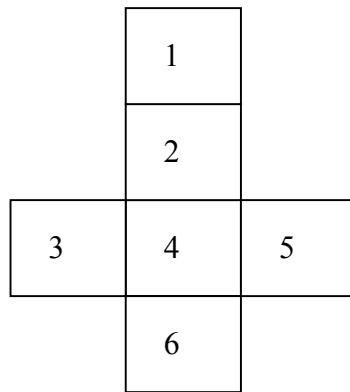
Cube-

3 in

3 in

3 in

3 in

L = 3 in
W = 3 in
H = 3 in

| 1 |
| 2 |

| 3 | 4 | 5 |

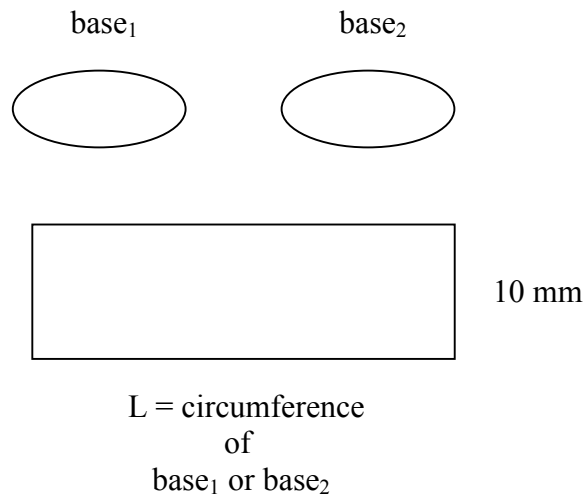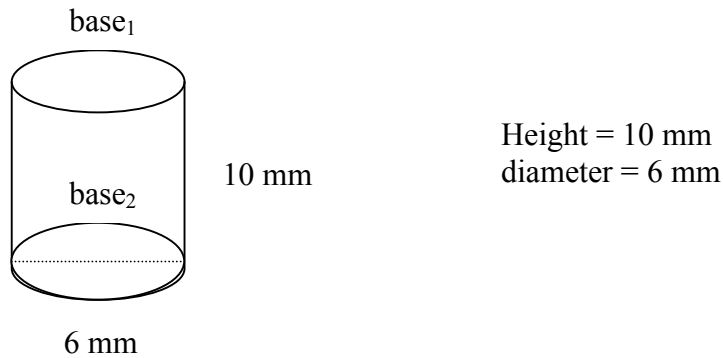| 6 |

$A_1 = L \times H = 3 \text{ in} \times 3 \text{ in} = 9 \text{ in}^2$
$A_2 = L \times W = 3 \text{ in} \times 3 \text{ in} = 9 \text{ in}^2$
$A_3 = H \times W = 3 \text{ in} \times 3 \text{ in} = 9 \text{ in}^2$
$A_4 = L \times H = 3 \text{ in} \times 3 \text{ in} = 9 \text{ in}^2$
$A_5 = H \times W = 3 \text{ in} \times 3 \text{ in} = 9 \text{ in}^2$
$A_6 = L \times W = 3 \text{ in} \times 3 \text{ in} = 9 \text{ in}^2$

$$\text{Surface Area} = A_1 + A_2 + A_3 + A_4 + A_5 + A_6$$
$$= 9 \text{ in}^2 + 9 \text{ in}^2 + 9 \text{ in}^2 + 9 \text{ in}^2 + 9 \text{ in}^2 + 9 \text{ in}^2$$
$$= 54 \text{ in}^2$$

OR

$$\text{Surface Area} = 6 \, (9 \text{ in}^2)$$
$$= 54 \text{ in}^2$$

Cylinder-

base$_1$

base$_2$

10 mm

6 mm

Height = 10 mm
diameter = 6 mm

base$_1$ base$_2$

10 mm

L = circumference
of
base$_1$ or base$_2$

Surface Area = Area$_{rec}$ + Area$_{b1}$ + Area$_{b2}$

L = circumference of base$_1$ or base$_2$
L = πd
L = 3.14 x 6 mm
L = 18.84 mm

Area$_{rec}$ = L x H
        = 18.84 mm x 10 mm
        = 188.4 mm^2

Area base$_1$ = Area base$_2$

Area $_{b1}$ = πr^2

      = 3.14 x (3 mm)^2

      = 3.14 x 9 mm

      = 28.26 mm^2

Area$_{b2}$ = πr^2

      = 3.14 x (3 mm)^2

      = 3.14 x 9 mm

      = 28.26 mm^2

Surface Area = Area$_{rec}$ + Area$_{b1}$ + Area$_{b2}$

Surface Area = 188.4 mm^2 + 28.26 mm^2 + 28.26 mm^2

      = 244.92 mm^2

OR

Surface Area = 188.4 mm^2 + 2 (28.26 mm^2)

     = 188.4 mm^2 + 56.52 mm^2

     = 244.92 mm^2

Name _____

Date _____

Surface Area

Directions:

You will be moving with your group around the room to differenet stations where there are objects set up. You are to measure the faces of the objects and calculate the surface area of each. Show your work and list all answers below.

Station 1: Prism

Number of faces _____

Total Surface Area _____

Show work below

Station 2: Cube

Number of faces _____

Total Surface Area _____

Show work below

Station 3: Cylinder
Number of faces _____
Total Surface Area _____

Show work below

Station 4: Cereal Box
Number of faces _____
Total Surface Area _____

Show work below

Station 5: Oatmeal Canister
Number of faces _____
Total Surface Area _____

Show work below

Station 6: Square Kleenex Box
Number of faces _____
Total Surface Area _____

Show work below