



UNIT 9: Geometry

Perimeter, Volume & Surface Area

Note: All key terms are based on the Math Standards for Alaska and reflect terms vital to academic achievement in math.



INTRODUCTION OF MATH VOCABULARY

Process Skills

Concrete Introduction of Key Vocabulary

Note: A vocabulary graphic is provided in this unit for each of the key words.

Definitions for all of the key words can be found in the glossary at the back of this program.

circle

Explain the definition of a circle and ask students to draw their most perfect circle on a sheet of paper. Who actually came close to drawing a real circle?

surface area

Show the students a flat piece of paper then show them a car's air filter. Ask which one has more surface area. Explain that the air filter has greater surface area. Some parts of the body like the mitochondria in our DNA utilize increased surface area to function more efficiently!

circumference

Pass a cross section from a small tree around the classroom. Using a sting and a ruler, ask the students to measure the circumference of the smallest and largest circles in the wood. How about the circle corresponding to three years ago?

Process Skills

Concrete Introduction of Key Vocabulary

Note: A vocabulary graphic is provided in this unit for each of the key words.

Definitions for all of the key words can be found in the glossary at the back of this program.

area

Show the students of the vast area on page 647. Explain that areas can be large or quite small. Where is the prettiest area that the students have visited?

mid-point

Wrap a gift in front of the classroom. When you go to put on the bow with ribbon, ask the students where it is typically located. When they answer that it is the center, explain the center can be thought of as the mid-point of a line down the middle of the box. The knot on the ribbon now represents a mid-point.

perimeter

Hand out a square cracker to each student. Explain the definition of perimeter and have them find it for the cracker. Were they all the same size?

Process Skills

Concrete Introduction of Key Vocabulary

Note: A vocabulary graphic is provided in this unit for each of the key words.

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distance

Have each student roll a pencil or pen from the right side of his or her table to the left without having it roll off the table. Whoever comes closest to the edge without rolling over wins. Measure the distances from the edge to see for sure who won!



VOCABULARY PICTURES





CIRCLE





SURFACE AREA



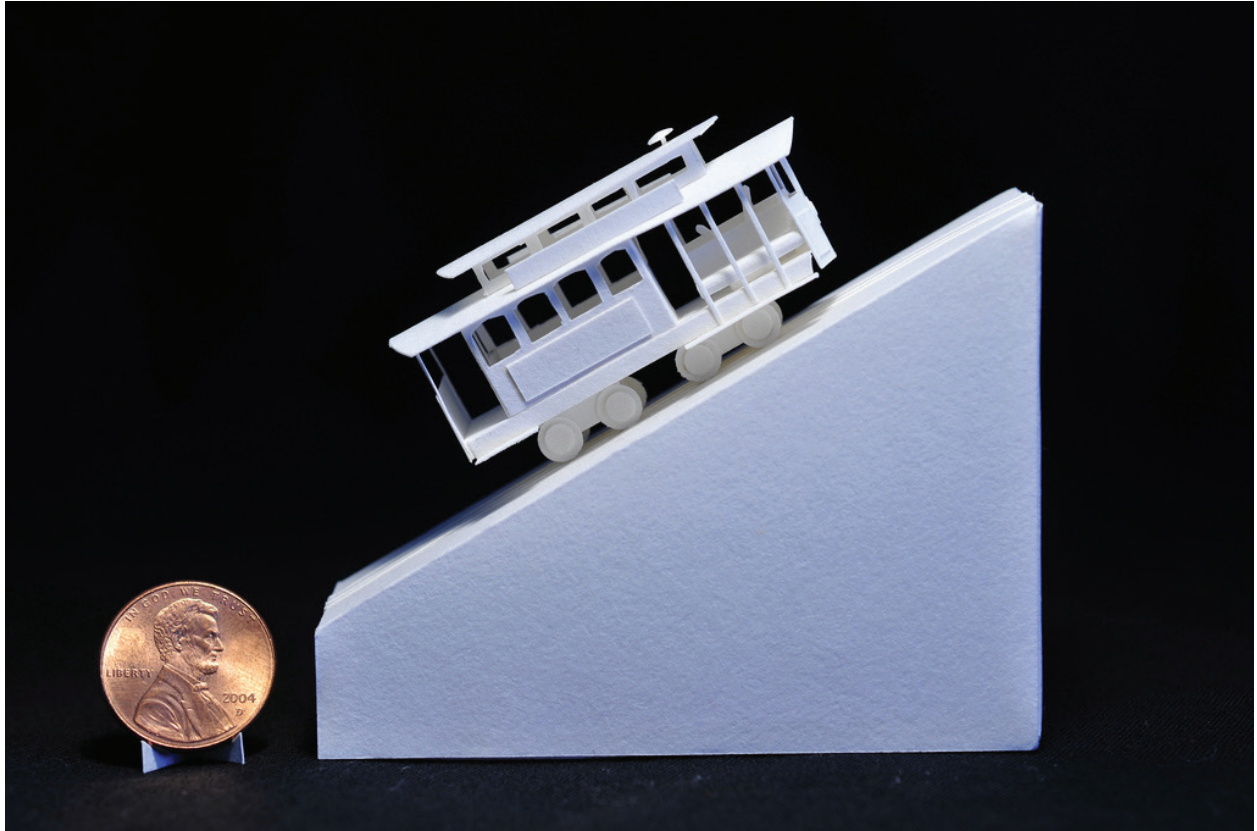


CIRCUMFERENCE





AREA





MID-POINT





PERIMETER





DISTANCE



LANGUAGE ACTIVITIES

Language and Skills Development

LISTENING

Review the key math words introduced in this unit. If the vocabulary pictures were not presented during the introduction, show them to the students at this time.



Whisper

Mount the vocabulary illustrations on the chalkboard. Group the students into two teams. Whisper a vocabulary word to the first player in each team. When you say “Go,” the first player in each team must then whisper the same word to the next player in his/her team. The players should continue whispering the vocabulary word in this way until the last player in a team hears the word. When the last player in a team hears the word, he/she must rush to the chalkboard and point to the illustration for the word. The first player to do this correctly wins the round. Repeat until all players have had an opportunity to identify a vocabulary illustration in this way. When a player has identified a vocabulary illustration, he/she should rejoin the front of his/her team.

Modification: Make it more like tele-pictionary: Whisper a definition to a player, who then must decide what word it is, and whisper the word to the next player, who then translates it into the definition again when they whisper it to the next player. Thus, it would be repeated as word, then definition, then word, then definition, and so forth.

Student Support Materials

Have the students work on the activity pages from the Student Support Materials from this unit. Afterward, review their work.

Language and Skills Development

SPEAKING



Half Match

Before the lesson begins, prepare a photocopy of each of the vocabulary pictures. Cut each of the photocopied pictures in half. Give the picture halves to the students (a student may have more than one picture half). Say one of the vocabulary words. The two students who have the halves of the picture for that word must show their halves and repeat the word orally. Continue in this way until all of the vocabulary words have been reviewed. This activity may be repeated more than once by collecting, mixing, and redistributing the picture halves to the students. This activity may also be adapted for team form. To do this, cut each of the vocabulary pictures in half. Place half of the pictures in one pile and the other halves in another pile (one pile for each team). Say a vocabulary word. When you say “Go,” the first player from each team must rush to his/her pile of picture halves. Each player must find the half of the picture for the vocabulary word you said. The first player to correctly identify the picture half and to repeat the vocabulary word for it wins the round. Repeat until all players have played.

Numbered Boxes

Before the activity begins, prepare a page that contains twenty (or more) boxes. Number each of the boxes. Provide each student with a copy of the numbered boxes. Each student should then shade in half of the boxes with a pencil (any ten boxes). When the students are ready, mount the vocabulary pictures on the board and say the number of a box (between one and twenty) to one of the students. The student should look on his/her form to see if that box number is shaded in. If that box is shaded in, the student may “pass” to another player. However, if the box is not shaded in, he/she should say a complete sentence about a vocabulary picture you point to. The students may exchange pages periodically during this activity. Repeat until many students have responded in this way.

High Card Draw

Give each student in the class a card from a deck of playing cards. Mount the vocabulary pictures on the board and number each one. Call two students’ names. Those two students should show their cards. The student who has the highest card (aces can be high or low) should then say a complete sentence about a vocabulary picture you point to. The students may exchange playing cards periodically during the activity. Repeat until many students have responded.

Language and Skills Development

READING

Introduce the math sight words to the students — match the sight words with the vocabulary graphics. The sight words are included in the Student Support Materials, attached to these lesson plans.



Circle of Words

Before the activity begins, prepare a page that contains the sight words. Provide each student with a copy of the page. The students should cut the sight words from their pages. When a student has cut out the sight words, he/she should lay them on his/her desk in a circle. Then, each student should place a pen or pencil in the center of the circle of sight word cards. Each student should spin the pen/pencil. Say a sight word. Any student or students whose pens/pencils are pointing to the sight word you said, should call “Bingo.” The student or students should then remove those sight words from their desks. Continue in this way until a student or students have no sight words left on their desks.

Letter Encode

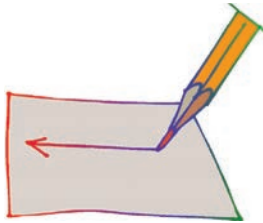
Give each student his/her envelope that contains the alphabet letters. Show a picture from this unit. The students must use the cut-out letters to spell the word for the picture. Review the students’ work. Repeat, until all of the words have been spelled.

Student Support Materials

Have the students work on the activity pages from the Student Support Materials from this unit. Afterward, review their work.

Language and Skills Development

WRITING



Yarn Spell

Group the students into two teams. Give the first player in each team lengths of yarn or string. Say a vocabulary word. When you say “Go,” the first player in each team must then use the yarn or string to “write” the word on the floor. The first player to complete his/her word wins the round. Repeat this process until all players in each team have played. If pipe cleaners are available, they may be used in place of the yarn or string (have both long and short lengths of the pipe cleaners ready for the activity).

Overhead Configurations

Before the activity begins, write the sight words on an overhead transparency sheet. Place an overhead projector on the floor, facing the board. Lay the overhead transparency sheet on the screen of the projector and turn the projector on. The sight words should be projected onto the board. Then, use chalk to draw configurations around each of the sight words. When a configuration has been drawn for each sight word, turn the overhead projector off. Call upon a student to use chalk to fill in one of the configurations with its sight word. You may wish to have more than one student participating in this process at the same time.

This activity may also be conducted in team form. In this case, when you say “Go,” the first player in each team must rush to the configurations. Each player must attempt to fill in one of the configurations with its correct sight word. The first player to do this correctly wins the round. Repeat until all configurations have been filled in in this way.

Student Support Materials

Have the students work on the activity pages from the Student Support Materials from this unit. Afterward, review their work.

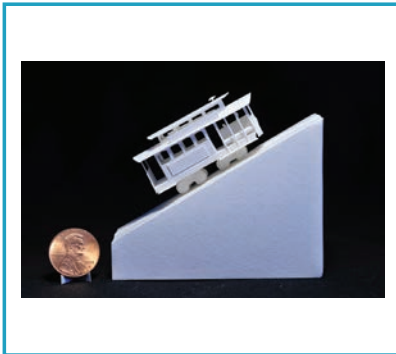
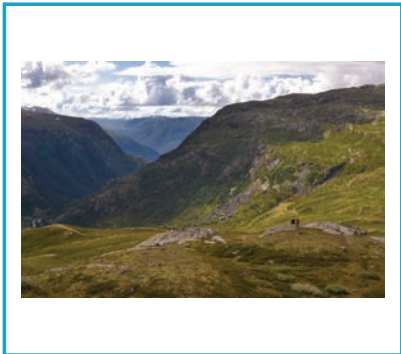
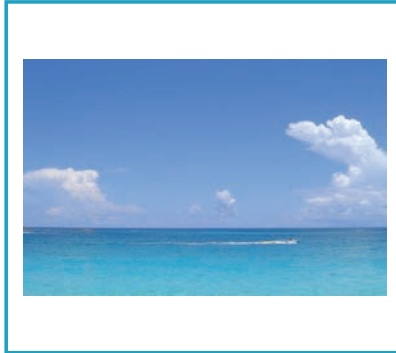


STUDENT SUPPORT MATERIALS

Listening • Mini Pictures

Listening: Mini Pictures

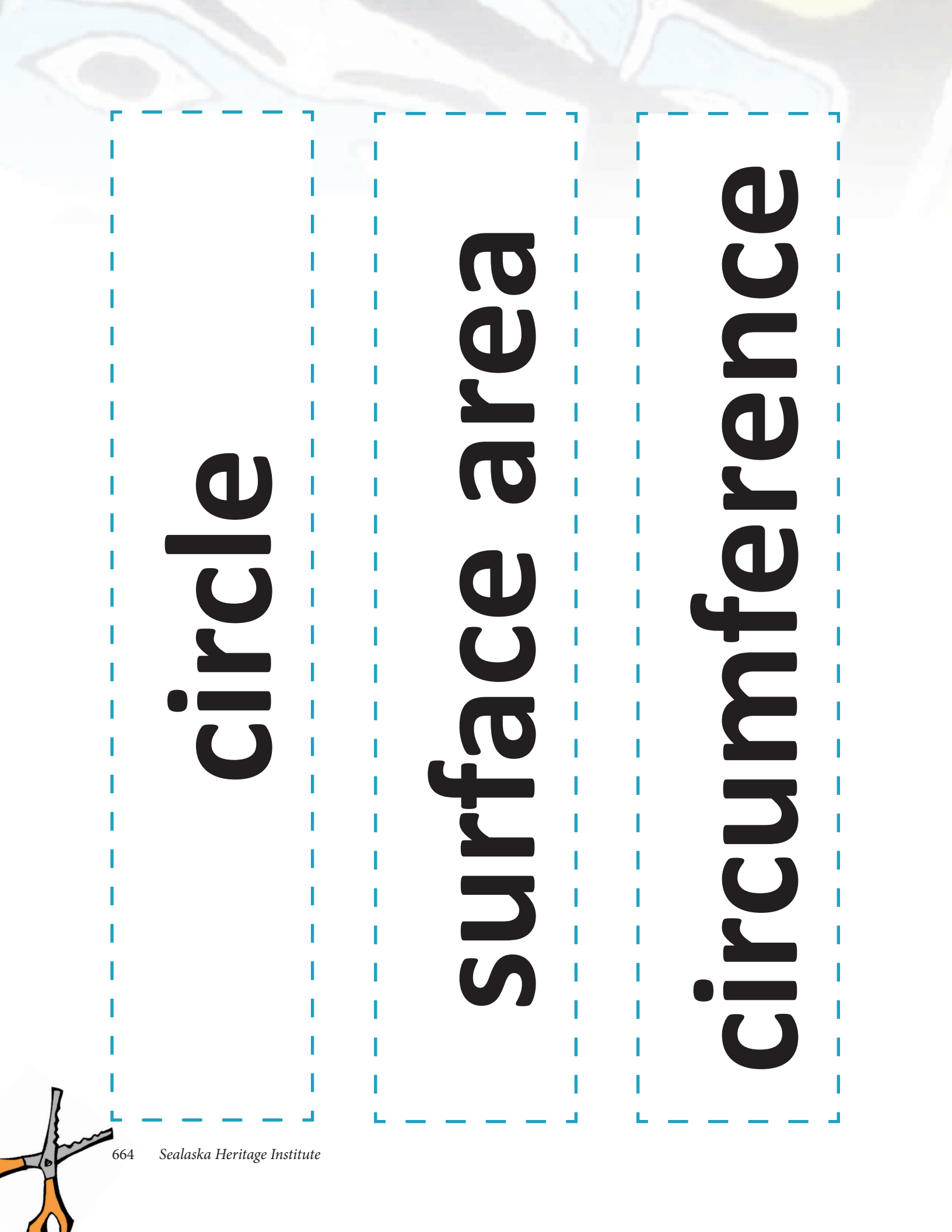
Have the students cut out the pictures. Say the key math words from this unit, and the students should hold up the pictures for them.





STUDENT SUPPORT MATERIALS

Sight Words



circle

surface area

circumference





area

mid-point

perimeter



distance





STUDENT SUPPORT MATERIALS

Reading • Sight Recognition

Sight Words Activity Page



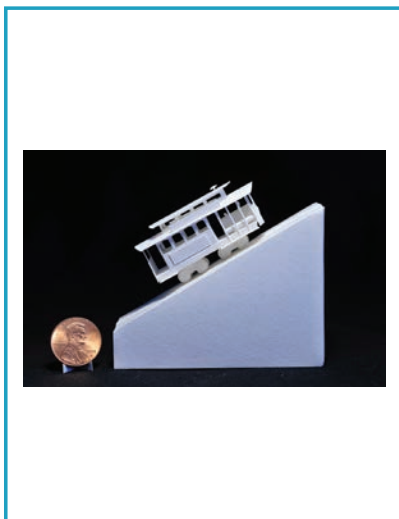
Have the students circle the word for each picture.



circle
surface area
circumference
area
mid-point
perimeter
distance



circle
surface area
circumference
area
mid-point
perimeter
distance



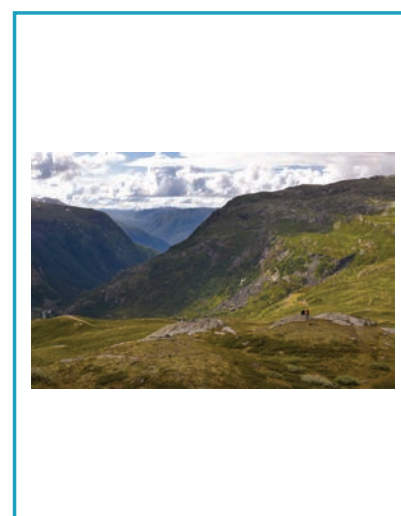
circle
surface area
circumference
area
mid-point
perimeter
distance



circle
surface area
circumference
area
mid-point
perimeter
distance

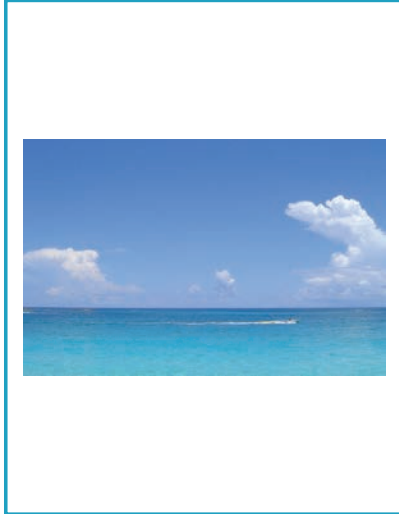


circle
surface area
circumference
area
mid-point
perimeter
distance



circle
surface area
circumference
area
mid-point
perimeter
distance

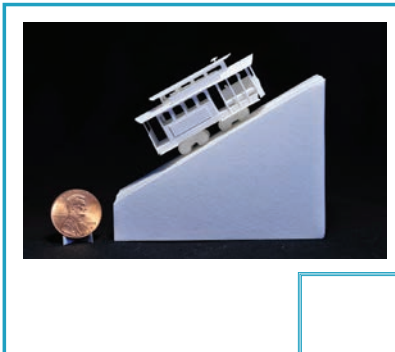
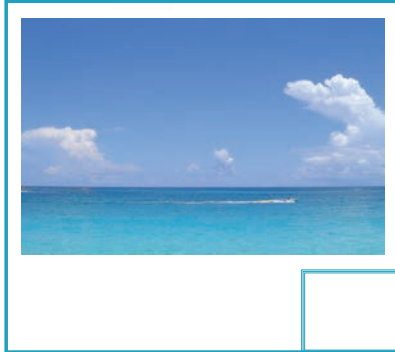
Sight Words Activity Page



circle
surface area
circumference
area
mid-point
perimeter
distance

Sight Words Activity Page

Write the numbers on their correct vocabulary graphics.



1. circle
2. surface area
3. circumference
4. area
5. mid-point
6. perimeter
7. distance

Sight Words Activity Page



Highlight or circle the words in this word find.

area
midpoint
circumference

surface area
circle
perimeter

distance

n o r c m e n t f c d i s t a n c e e e d d r e r
e a a e i a i r i a r a l d c a a c e r e u a d e
i t i e c i r f u a c i r c u m f e r e n c e n t
i e i a m c e i r e c e d c m i d p o i n t p e n
c e u e r u e r s u r f a c e a r e r r c a p e e
d i e u c r e d f r e s o r i e n e r r r i r n p
a r e a c p r c e r c c a p n a d o f m u e r r r
c a c r n c l p d i c c n e u m s c i i e s e r m
i m p e r i m e t e r i r m c e c a e i c a c i s
m c n i i m n c o s d e c m e e i c c u f e s e e
n s a r i c a o d s e i e n e e e m a l a m d t c
s i a n s u r f a c e a r e a a i d n c i r e d n n
i r c s r e e t n u c r c s m e m r o s o e m r s
d o e m n e i e d i s t a n c m r r f c c i t n e
e e d c c e r i c r l r e p i i c m c n c i e r c
e c f r n i i i c r t d a e l a e n m c i m u m p
e c f i f e r e e r t s c c m a r e t m l c a n a
c p m l a a f d i a o c i r c l e r r c r p e n f
t a l e a f s a i i e f i u u e r i i c d e e n e
m s f e r t u a t n r d i r m a c a c e r t e i u
m r t i m r d c u c r i c c a t s p a d r t c r f
a r a a e u m m t n u t n e e i i r e c e f f a c
e c r m i d p o p e e r a c a a i c t u s s i c f
l f c p e r i m e t i p o a i c c i n n i r c r t
r e e c i c a r l e e m a p i s a c n r s i a e a
e i c i r c u m f e r e n c d c c e r r e e e r c
m c a r p e c f e c u e c a r e c c m i r m e m c
c o m r a e a p i f a e m m r a r i r a a u i c e
f i s e a a c p r a t r f e d n t n i m i c e n e
f a r a e e e e m e n i e i a s r r m r t d e u c

Sight Words Activity Page



ANSWER KEY

area
midpoint
circumference

surface area
circle
perimeter

distance

n o r c m e n t f c **d i s t a n c e** e e d d r e r
e a a e i a i r i a r a l d c a a c e r e u a d e
i t i e c i r f u a **c i r c u m f e r e n c e** n t
i e i a m c e i r e c e d c **m i d p o i n t** p e n
c e u e r u e r s u r f a c e a r e r r c a p e e
d i e u c r e d f r e s o r i e n e r r r i r n p
a r e a c p r c e r c c a p n a d o f m u e r r r
c a c r n c l p d i c c n e u m s c i i e s e r m
i m **p e r i m e t e r** i r m c e c a e i c a c i s
m c n i i m n c o s d e c m e e i c c u f e s e e
n s a r i c a o d s e i e n e e e m a l a m d t c
s i a n **s u r f a c e a r e a** i d n c i r e d n n
i r c s r e e t n u c r c s m e m r o s o e m r s
d o e m n e i e d i s t a n c m r r f c c i t n e
e e d c c e r i c r l r e p i i c m c n c i e r c
e c f r n i i i c r t d a e l a e n m c i m u m p
e c f i f e r e e e r t s c c m a r e t m l c a n a
c p m l a a f d i a o **c i r c l e** r r c r p e n f
t a l e a f s a i i e f i u u e r i i c d e e n e
m s f e r t u a t n r d i r m a c a c e r t e i u
m r t i m r d c u c r i c c a t s p a d r t c r f
a r a a e u m m t n u t n e e i i r e c e f f a c
e c r m i d p o p e e r a c a a i c t u s s i c f
l f c p e r i m e t i p o a i c c i n n i r c r t
r e e c i c a r l e e m a p i s a c n r s i a e a
e i c i r c u m f e r e n c d c c e r r e e e r c
m c a r p e c f e c u e c a r e c c m i r m e m c
c o m r a e a p i f a e m m r a r i r a a u i c e
f i s e a a c p r a t r f e d n t n i m i c e n e
f a r a e e e e m e n i e i a s r r m r t d e u c



STUDENT SUPPORT MATERIALS

Reading • Encoding

Encoding Activity Page

Have the students cut out the word parts and glue them into their correct words.



c _____ **e**

s _____ **ce area**

ci _____ **erance**

a _____

mi _____ **int**

rea	ircl	d-po
------------	-------------	-------------

urfa	erim
-------------	-------------



Encoding Activity Page



p_____eter

di_____e

stanc	rcumf
-------	-------

Encoding Activity Page



Have the students cut out the word halves and glue them together to create the key words for this unit.

ci

rface area

su

ference

circum

rcle

ar

tance

mid-

meter



Encoding Activity Page



peri

ea

dis

point

Encoding Activity Page



Cut out and encode the syllables of the words OR number the syllables in their correct sequence.

cle || cir

re || sur || face || a || a

cum || cir || fe || rence

Encoding Activity Page



a a re

mid point

ri pe me ter

Encoding Activity Page



tance || dis



STUDENT SUPPORT MATERIALS

Reading Comprehension

What's the Answer?



Read the text and then select the correct answer for it. Fill in the bullet beside the answer of your choice.

- ① All circles have
 - Corners
 - Sharp Edges
 - Center Points
 - Cross-Sections

- ② The surface area of a muskeg is its
 - area on top
 - volume of dirt
 - volume of water
 - abundance of wildlife

- ③ The circumference of a basketball is its
 - Distance around the edge
 - Weight
 - Shape
 - Condition

- ④ The area open for salmon fishing on a given river is the:
 - Extent of space open
 - Depth that one can fish in
 - Bag limit for the day
 - Best lure to use

- ⑤ The mid-point of a given line is its
 - Far Left End
 - Far Right End
 - Upper Edge
 - Exact Center

What's the Answer?



- ⑥ The perimeter of someone's property is the property's
- Area
 - Value
 - Boundary
 - Security System
- ⑦ The distance travelled on the Alaska Marine Highway System from Hoonah to Juneau is the amount of _____ between two places.
- Space
 - Wildlife
 - Passengers
 - Weather

What's the Answer?

ANSWER KEY



- ① All circles have
 - Corners
 - Sharp Edges
 - Center Points
 - Cross-Sections

- ② The surface area of a muskeg is its
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- ⑦ The distance travelled on the Alaska Marine Highway System from Hoonah to Juneau is the amount of _____ between two places.
- Space
 - Wildlife
 - Passengers
 - Weather

Reading Comprehension Activity Page

Write the numbers/letters for sentence halves that match.



- | | |
|---|--|
| ① When drawn on paper, the sun is often | ① can be enormous! |
| ② The surface area of a brown bear is much | ② can be relatively small. |
| ③ The circumference of a Sitka Spruce | ③ depicted in the shape of a circle. |
| ④ The area required for a tick to survive on a wolf | ④ greater than that of a squirrel. |
| ⑤ The mid-point of the Earth is | ⑤ is relatively short. |
| ⑥ The perimeter of ancient cities | ⑥ at the planet's center. |
| ⑦ The distance from Alaska to Canada | ⑦ was often guarded to prevent attack. |

1→ _____ 2→ _____ 3→ _____ 4→ _____
5→ _____ 6→ _____ 7→ _____

Reading Comprehension Activity Page

ANSWER KEY



- | | |
|---|--|
| ① When drawn on paper, the sun is often | ① can be enormous! |
| ② The surface area of a brown bear is much | ② can be relatively small. |
| ③ The circumference of a Sitka Spruce | ③ depicted in the shape of a circle. |
| ④ The area required for a tick to survive on a wolf | ④ greater than that of a squirrel. |
| ⑤ The mid-point of the Earth is | ⑤ is relatively short. |
| ⑥ The perimeter of ancient cities | ⑥ at the planet's center. |
| ⑦ The distance from Alaska to Canada | ⑦ was often guarded to prevent attack. |

1 → C 2 → D 3 → A 4 → B
5 → F 6 → G 7 → E

Reading Comprehension Activity Page

Cut out the words and glue them under their definitions.



Center

Space between two things

Extent

Extent of surface within a boundary

Distance around a circle

Boundary

Round plane figure

circle	surface area	circumference	area
mid-point	perimeter	distance	



Reading Comprehension Activity Page

ANSWER KEY



Center

mid-point

Space between two things

distance

Extent

area

Extent of surface within a boundary

surface area

Distance around a circle

circumference

Boundary

perimeter

Round plane figure

circle

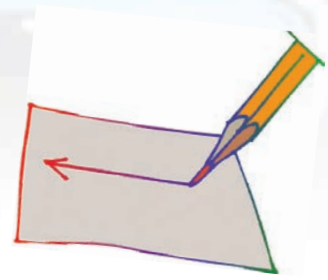


STUDENT SUPPORT MATERIALS

Writing

Writing Activity Page

Have the students complete the writing of the key math words.



ci _____ le

s _____ face a _____ a

ci _____ ference

a _____ a

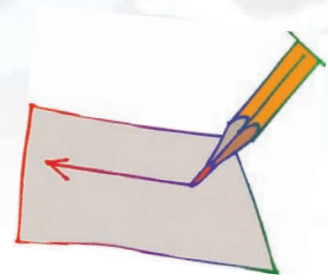
mi _____ -po _____

per _____ eter

dis _____ ce

Writing Activity Page

Have the students complete the writing of the key math words.



c _____ **e**

s _____ **a** _____ **a**

c _____ **f** _____ **e**

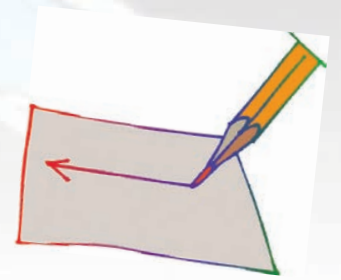
a _____ **a**

m _____ **-** _____ **t**

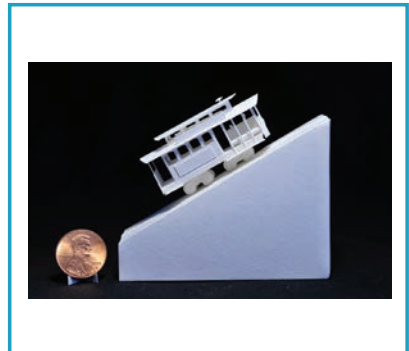
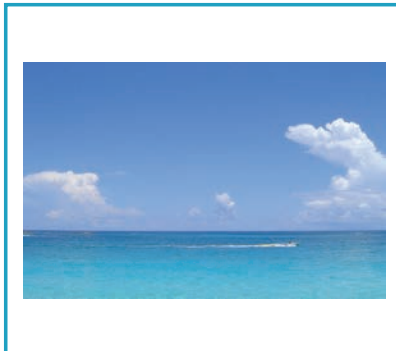
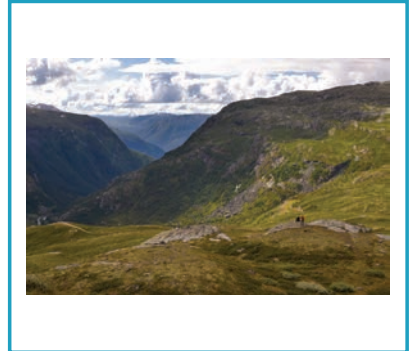
p _____ **r**

d _____ **e**

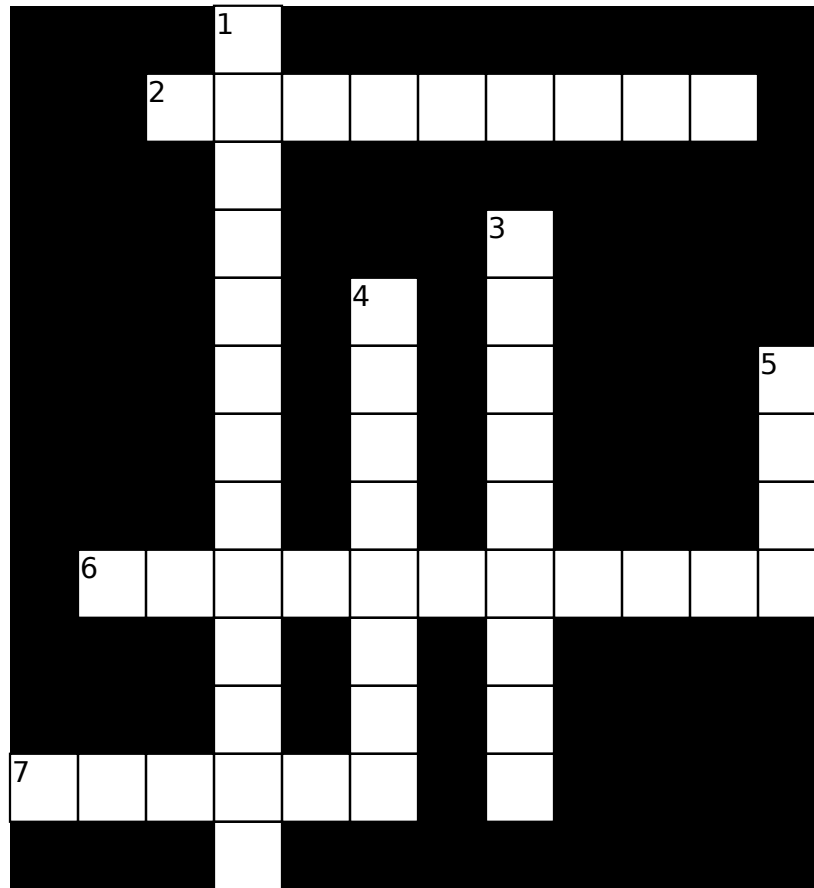
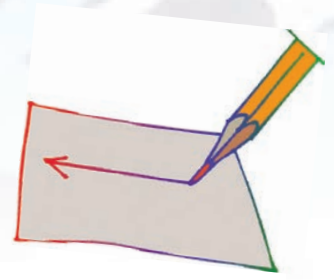
Basic Writing Activity Page



Have the students write the word for each picture.

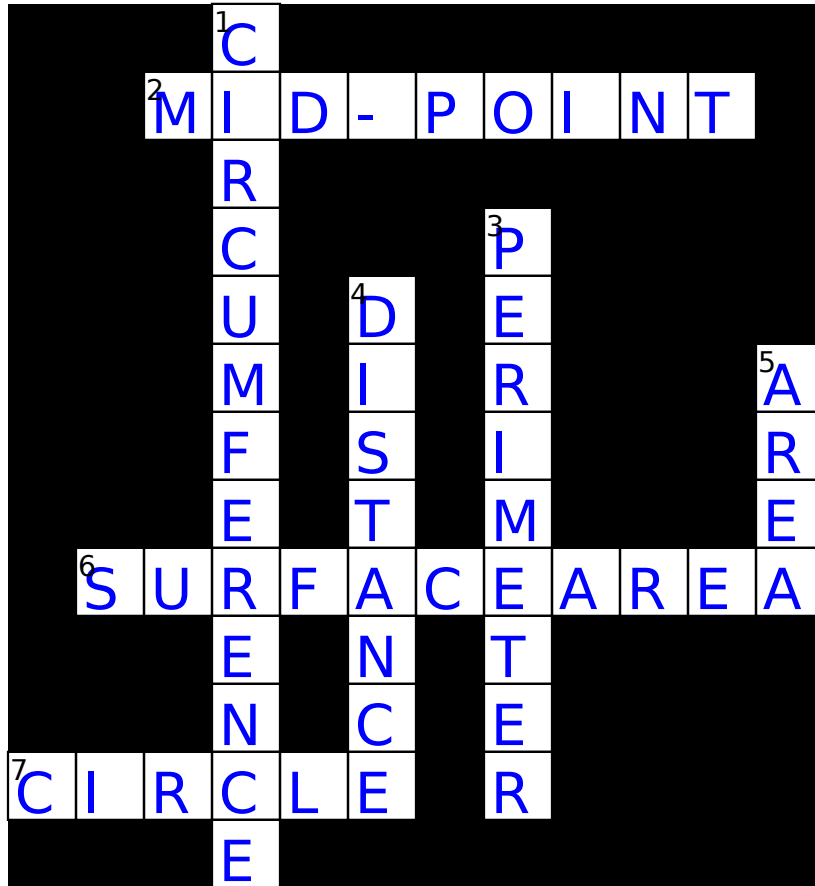


Crossword Puzzle



- | | | | |
|---|---|---|--------------------------|
| | Across | | Down |
| 2 | Center | 1 | Distance around a circle |
| 6 | Extent of surface within a boundary (2 Words) | 3 | Boundary |
| | | 4 | Space between two things |
| 7 | Round plane figure | 5 | Extent |

Crossword Puzzle Answers



- | | | | |
|---|-----------|---|-------------|
| 2 | Across | 1 | Down |
| 6 | Center | 1 | Distance |
| | Extent of | | around a |
| | surface | | circle |
| | within a | 3 | Boundary |
| | boundary | 4 | Space |
| | (2 Words) | | between two |
| 7 | Round | | things |
| | plane | 5 | Extent |
| | figure | | |



UNIT ASSESSMENT



Perimeter, Volume & Surface Area

Unit Assessment Teacher's Notes
Grade 8 • Unit 9

Date: _____

Unit Assessment

Provide each student with a copy of the students' pages. Read the following instructions aloud. The students should answer the questions on their copies of the assessment.

BASIC LISTENING

Turn to page 1 in your test. Look at the pictures in the boxes.

1. Write the number 1 by the picture for **CIRCLE**.
2. Write the number 2 by the picture for **SURFACE AREA**.
3. Write the number 3 by the picture for **CIRCUMFERENCE**.
4. Write the number 4 by the picture for **AREA**.
5. Write the number 5 by the picture for **MID-POINT**.
6. Write the number 6 by the picture for **PERIMETER**.
7. Write the number 7 by the picture for **DISTANCE**.

SIGHT RECOGNITION

Turn to page 2 in your test. Look at the pictures in the boxes. Circle the word for each picture.

DECODING/ENCODING

Turn to page 3 in your test. Look at the word parts in the boxes. Circle the other half or part of each word.

READING COMPREHENSION

Turn to page 4 in your test. Write each word under its definition.

Refer to Student Support Materials for answer key.

BASIC WRITING

Turn to page 5 in your test. Look at the pictures in the boxes. Write the word for each picture.



Teacher: To get a percentage for this student's assessment, divide the total number of questions correct by the total number of questions, then multiply this answer by 100 to determine the percentage of questions answered correctly.



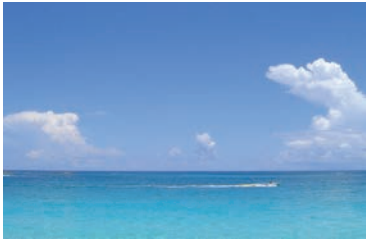
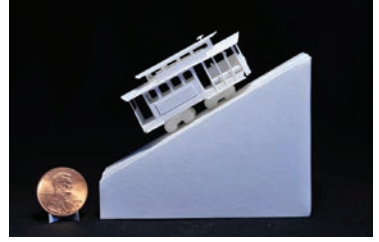


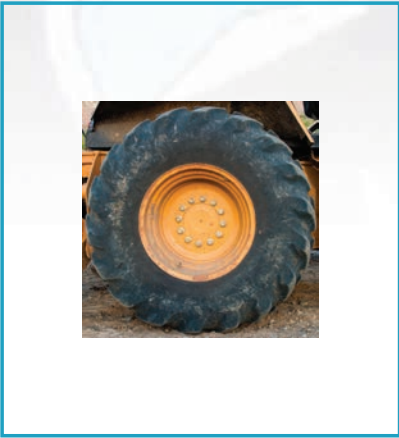
MATH PROGRAM

Unit Assessment Student Pages
Grade 8 • Unit 9

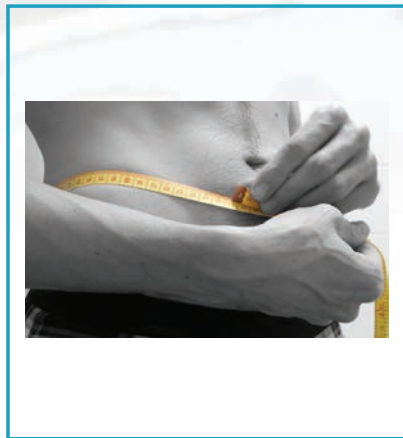
Date: _____ Student's Name: _____

Number Correct: _____ Percent Correct: _____

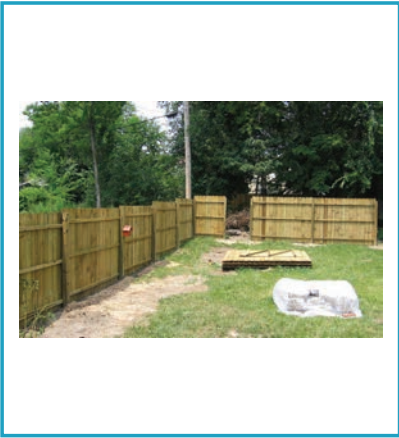




circle
 surface area
 circumference
 area
 mid-point
 perimeter
 distance



circle
 surface area
 circumference
 area
 mid-point
 perimeter
 distance



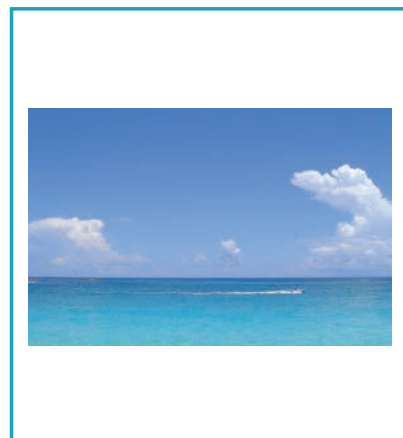
circle
 surface area
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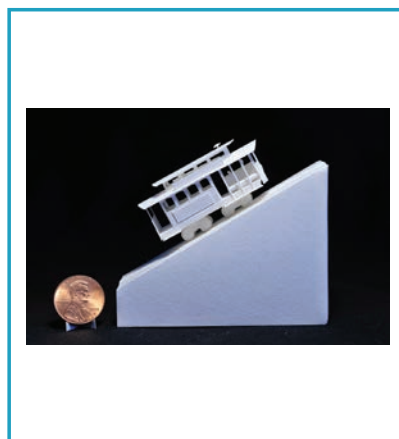
circle
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circle
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circle
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 perimeter
 distance



circle
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sur_____

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Center

Space between two things

Extent

Extent of surface within a boundary

Distance around a circle

Boundary

Round plane figure

circle

surface area

circumference

area

mid-point

perimeter

distance

