



UNIT 3: Measurement, Estimation & Computation

Measurable Attributes & Techniques

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.

measurements

Pass out a dead leaf to each student as well as a ruler and scale (if available). Have them measure the widest point on the leaf, the shortest point, and the mid-vein. Now have them weigh the leaf. Explain that there are many different types of measurements. Ask them to brainstorm other measurements that could be done on the leaf.

dimensions

Point to a window in the classroom and ask the students how they would describe the object. Ask them what the dimensions are. Hand out a ruler to a volunteer and have them tell you the dimensions. Explain that dimensions describe the size of something.

plane figure

Ask the students to draw a series of shapes on a piece of paper. Now explain that a plane figure is a closed shape that lies entirely in one plane. Explain that shapes drawn on a page are inherently two-dimensional but that not all of their shapes may be closed. Have them label which ones are plane figures and which are not.

Process Skills

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geometric figure

Allow the students to look through a kaleidoscope. Explain that geometric figures are those that have the same rectilinear or curvilinear shapes used in geometry. Which geometric figures can they see in the kaleidoscope?

indirect measurement

Show the students an orange and a ruler. Have them tell you how you can use the ruler to find the circumference of the orange at its widest point. Suggest that an indirect measurement might be easier. Use a piece of string to measure the orange then line the string up along the ruler.

rate

Have all students tap their finger on the table for 30 seconds and count how many taps they are doing. Now have the students tell you how many taps they were able to count. Explain that the person with the most taps had a higher rate than the other students.

Process Skills

Concrete Introduction of Key Vocabulary

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scale factor

Have the students draw concentric circles on the board. Explain that larger and smaller circles are similar to each other but have different size scales. A scale factor for a circle $1/2$ the size of a larger one is $1/2$. What's the smallest circle they can draw?



VOCABULARY PICTURES



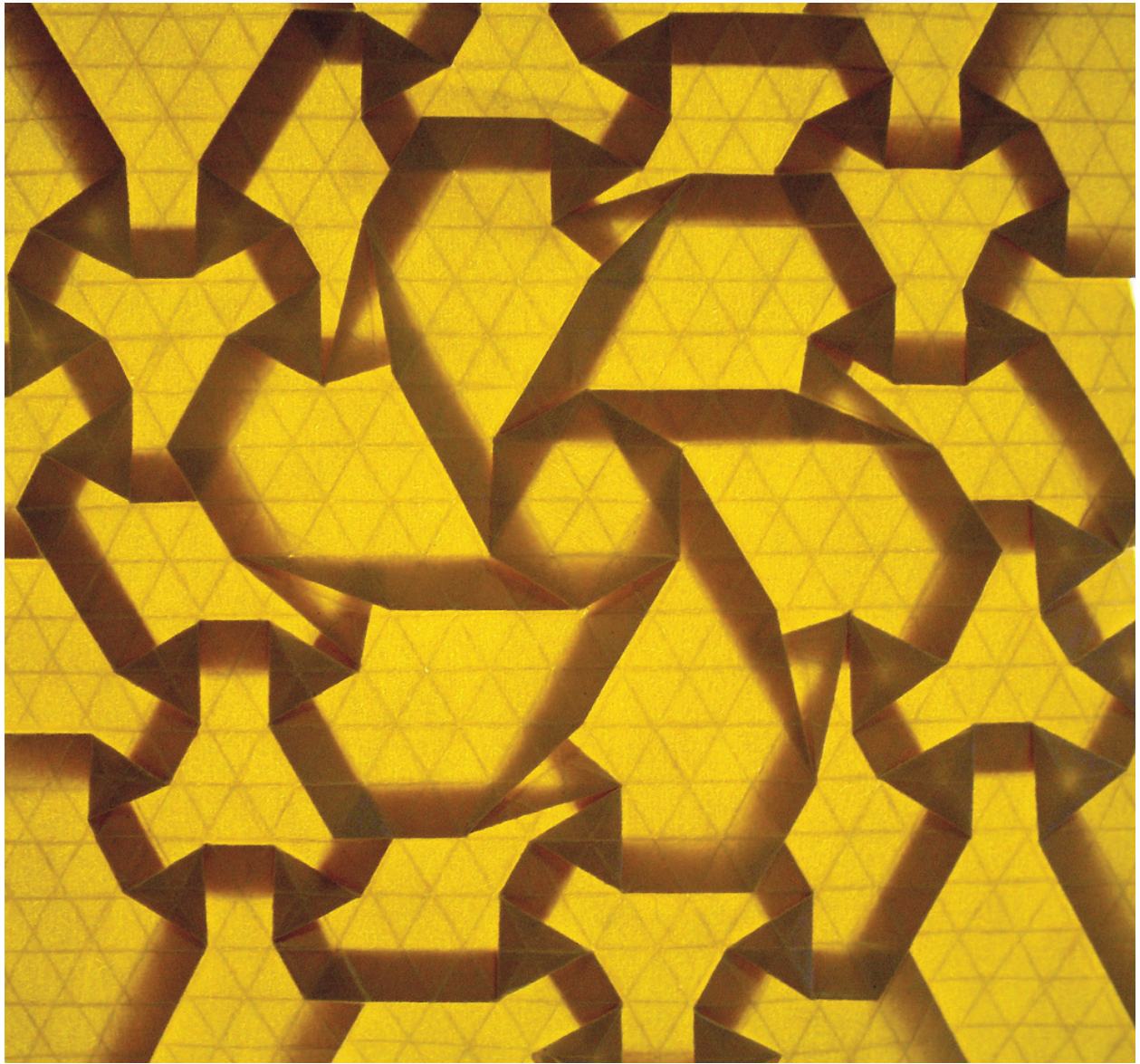


MEASUREMENTS





DIMENSIONS





PLANE FIGURE





GEOMETRIC FIGURE





INDIRECT MEASUREMENT





RATE





SCALE FACTOR



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.



Toothpick Pass

Mount the vocabulary graphics on the board and number each graphic. Group the students in a circle. Give each student a toothpick. Place a lifesaver over one or more of the toothpicks. When you say “Go,” the students should pass the lifesaver(s) around the circle in a clockwise direction. When you clap your hands, the students should stop passing the lifesaver(s). Say a vocabulary word. The student or students who have the lifesavers must identify the NUMBER of a graphic that describes the word you named. Repeat until many students have responded in this way.

Let’s Move

Identify an appropriate body movement for each vocabulary word. This may involve movements of hands, arms, legs, etc. Practice the body movements with the students. When the students are able to perform the body movements well, say a vocabulary word. The students should respond with the appropriate body movement. You may wish to say the vocabulary words in a running story. When a vocabulary word is heard, the students should perform the appropriate body movement. Repeat, until the students have responded to each word a number of times.

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



Actions!

Group the students together in front of you. Perform an action which represents one of the key vocabulary words. The students should say the vocabulary word for the action you perform. Repeat, using a different action for each vocabulary word.

Colander

Before the activity begins, obtain a sheet of construction paper equal in size to the size of your vocabulary pictures. Use a single hole punch to punch holes in the sheet. Place the sheet over one of the vocabulary pictures. Hold the sheet and vocabulary picture up so that the students can see them. The students should attempt to identify the vocabulary picture from the parts they can see through the holes in the construction paper. The first student to do this correctly wins the round. This activity may also be done in team form. In this case, the first player to correctly identify the vocabulary picture wins the round.

One to Six

Provide each student with two blank flashcards. Each student should then write a number between one and six on each of his flashcards (one number per card). When the students' number cards are ready, toss two dice and call the numbers showing. Any student or students who have those two numbers must then identify a vocabulary picture you show. The students may exchange number cards periodically during this activity.

Picture Bingo

Give the students the mini pictures used earlier. Each student should place them face down on his/her desk. Then, have each student turn one picture face up. Say a vocabulary word. Any student or students who have the picture for that word face up must say a complete sentence using that vocabulary word. Those pictures should then be put to the side and other pictures turned over. Continue in this way until a student or students have no pictures left on their desks.

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.



Face

Mount the sight words around the classroom on the walls, board, and windows. Group the students into two teams. Give the first player in each team a flashlight. Darken the classroom, if possible. Say one of the sight words. When you say “Go,” the students should turn their flashlights on and attempt to locate the sight word you said. The first player to do this correctly wins the round. Repeat until all players in each team have participated.

String Along

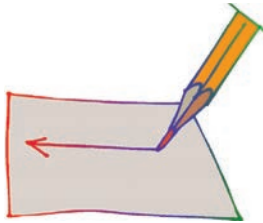
Join all of the students together with string (the students do not need to move from their seats). Before tying the ends of the string together, insert a roll of tape over one of the ends of the string. Tie the ends of the string together. Turn your back to the students. The students should pass the roll of tape along the string as quickly as possible. When you clap your hands, the student left holding the tape must then identify a sight word you show him. Repeat this process until many students have responded and until all of the sight words have been correctly identified a number of times.

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.

Language and Skills Development

WRITING



Let's Write

Provide the students with a copy of the creative writing page from the Student Support Materials. The students should write as much as they can about the graphic. Later, have each student read his/her writing to the class.

Flashlight Writing

If possible, darken the classroom. Give a student a flashlight. Say one of the vocabulary words and the student should write that word with the light of the flashlight on a wall or on the board. Repeat until many students have had a chance to participate. An alternative is to provide each student with writing paper and a pen. Darken the classroom, if possible. Use the light of a flashlight to write one of the sight words on the wall or board. When you have completed the writing of the word, each student should then write the same word on his/her sheet of paper. Repeat until all sight words have been written in this way.

This activity may also be done in team form. In this case, group the students into two teams. Darken the classroom. Use the light of a flashlight to write one of the sight words on the board. When you say "Go," the first player in each team should rush to the board and use chalk to write the same word on the board. The first player to do this correctly wins the round. Repeat until all players have played.

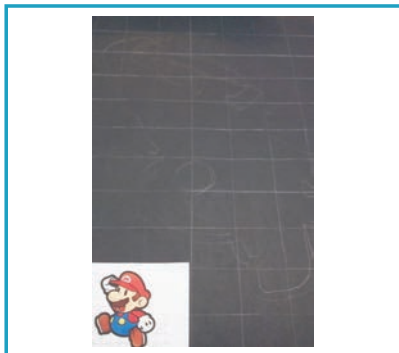
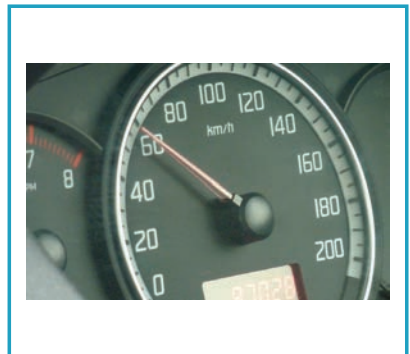
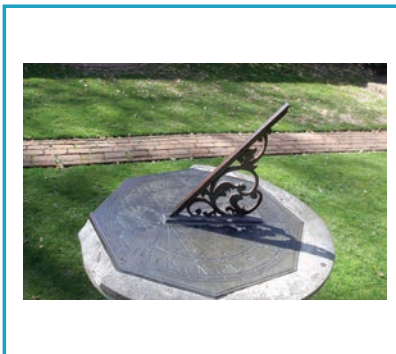
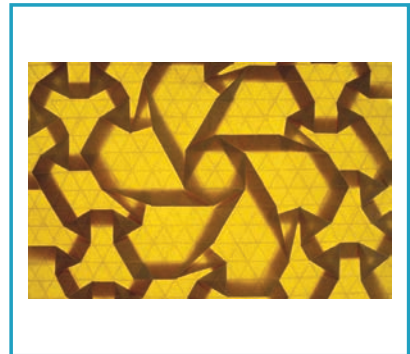


STUDENT SUPPORT MATERIALS

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

measurements

dimensions

plane figure



geometric figure

indirect measurement

rate



scale factor



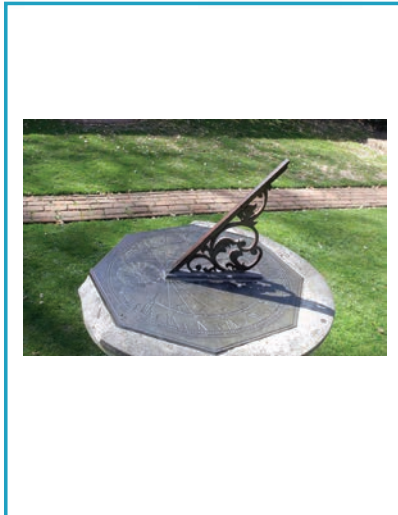
STUDENT SUPPORT MATERIALS

Reading • Sight Recognition

Sight Words Activity Page



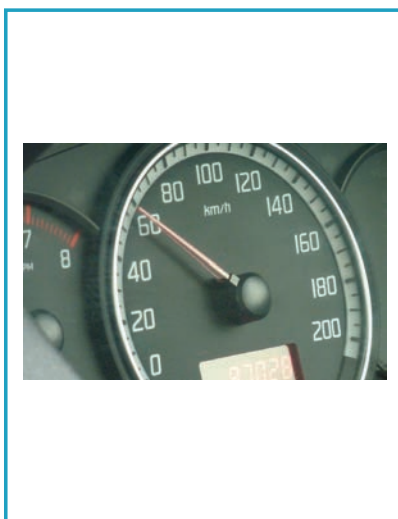
Have the students circle the word for each picture.



measurements
dimensions
plane figure
geometric figure
indirect measurement
rate
scale factor



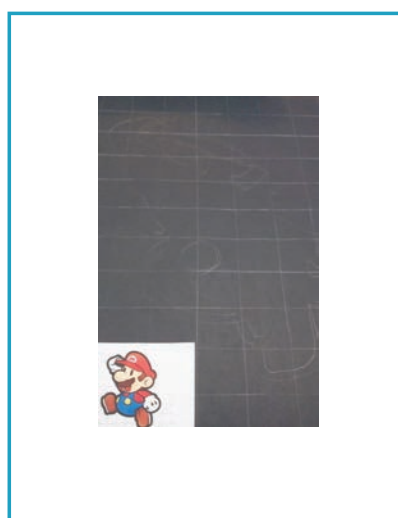
measurements
dimensions
plane figure
geometric figure
indirect measurement
rate
scale factor



measurements
dimensions
plane figure
geometric figure
indirect measurement
rate
scale factor



measurements
dimensions
plane figure
geometric figure
indirect measurement
rate
scale factor

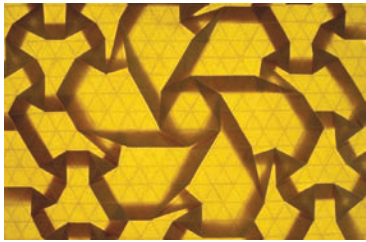


measurements
dimensions
plane figure
geometric figure
indirect measurement
rate
scale factor



measurements
dimensions
plane figure
geometric figure
indirect measurement
rate
scale factor

Sight Words Activity Page

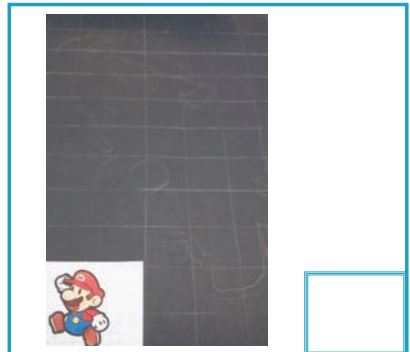
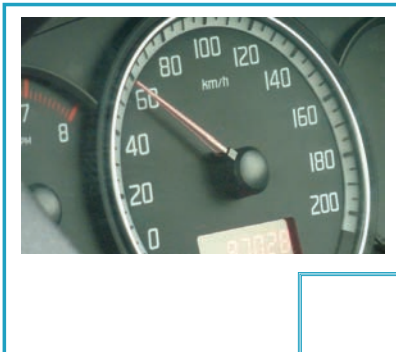
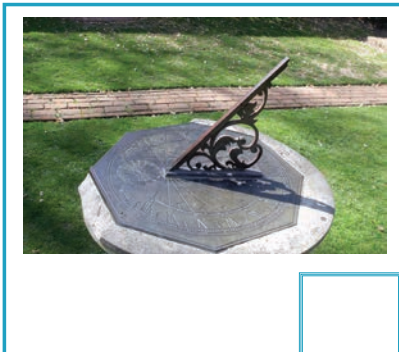
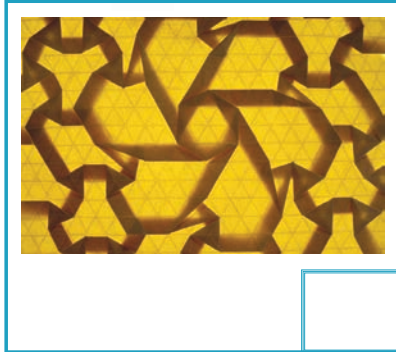


measurements
dimensions
plane figure
geometric
figure
indirect
measurement
rate
scale factor

Sight Words Activity Page



Write the numbers on their correct vocabulary graphics.



1. measurements
2. dimensions
3. plane figure
4. geometric figure
5. indirect measurement
6. rate
7. scale factor

Sight Words Activity Page

Write the key words from this unit horizontally in the boxes (more than one copy of each word can be written). Fill in all other boxes with any letters. Exchange page with another student. Find key words and circle.



Sight Words Activity Page



Highlight or circle the words in this word find.

geometric figure
scale factor
measurements
indirect measurement

rate
dimensions
plane figure

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

Sight Words Activity Page

ANSWER KEY



geometric figure
scale factor
measurements
indirect measurement

rate
dimensions
plane figure

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



STUDENT SUPPORT MATERIALS

Reading • Encoding

Encoding Activity Page

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



meas_____ents

d_____sions

plane f_____

ge_____ric figure

i_____ect measurement

igure	ndir	imen
-------	------	------

ate	urem
-----	------



Encoding Activity Page



r _____

s _____ **e factor**

omet	cal
------	-----

Encoding Activity Page



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

measure

nsions

dime

ate

plane f

ments

geo

igures

indi

rect measurement



Encoding Activity Page



r

ale factor

sc

metric figure

Encoding Activity Page



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

sure || mea || ments

sions || di || men

plane

gure || fi

Encoding Activity Page



o ge tric me

fi gure

in rect di

sure mea ment

Encoding Activity Page



rate

scale

tor || **fac**



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 If one records the length of a Boreal Toad, he/she is taking
 - Precautions
 - Measurements
 - Slime
 - Warts

- ② The height, width, and length of a Tlingit long house are considered it's:
 - Dimensions
 - Value
 - Spiritual Character
 - Range

- ③ A plane figure is one that is closed, two-dimensional and lies entirely in how many planes?
 - One
 - Two
 - Three
 - Four

- ④ A _____ figure represents or uses the same rectilinear or curvilinear figures used in geometry.
 - Scary
 - Large
 - Minute
 - Geometric

- ⑤ Measuring a tree's circumference by wrapping a string around it then measuring the string's length is considered what type of measurement?
 - Direct
 - False
 - Indirect
 - Random

What's the Answer?



- ⑥ The number of salmon caught in a given hour can be expressed in terms of capture _____.
- Rate
 - Failure
 - Loss
 - Assistance
- ⑦ A _____ factor is a ratio of a distance on a drawing to the corresponding distance on an actual object.
- Number
 - Graph
 - Caffeine
 - Scale

What's the Answer?



ANSWER KEY

- ① If one records the length of a Boreal Toad, he/she is taking
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 - Measurements
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 - Graph
 - Caffeine
 - Scale

Reading Comprehension Activity Page

Write the numbers/letters for sentence halves that match.



- | | |
|--|---|
| ① A biologist studying a given fish species may take several | ① that lies entirely in one plane. |
| ② The length, width and height of a long house are | ② of indirect measurement. |
| ③ A plane figure is a closed two-dimension figure | ③ is different depending on the species. |
| ④ Squares and triangles are examples of | ④ measurements when that species is captured. |
| ⑤ Using a string to measure a round object is an example | ⑤ geometric figures. |
| ⑥ The rate at which birds migrate to warmer climates | ⑥ and making the design a reality. |
| ⑦ The scale factor is important for taking a blue print | ⑦ its dimensions. |

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

Reading Comprehension Activity Page

ANSWER KEY



- | | |
|--|---|
| ① A biologist studying a given fish species may take several | ① that lies entirely in one plane. |
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| ⑥ The rate at which birds migrate to warmer climates | ⑥ and making the design a reality. |
| ⑦ The scale factor is important for taking a blue print | ⑦ its dimensions. |

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

Reading Comprehension Activity Page

Cut out the words and glue them under their definitions.



**Resembling figures
in geometry**

**Ratio of
measurements**

**Closed,
2-dimensional and
in one plane**

**Measurements of
object size**

**Determining
magnitude or
quantity**

**Quotient comparing
two measures of
different units**

**Measurement not
obtained by direct
reading of tool**

measurements **dimensions** **plane figure** **geometric figure**
indirect measurement **rate** **scale factor**



Reading Comprehension Activity Page

ANSWER KEY



Resembling figures in geometry

geometric figure

Ratio of measurements

scale factor

Closed, 2-dimensional and in one plane

plane figure

Measurements of object size

dimensions

Determining magnitude or quantity

measurements

Quotient comparing two measures of different units

rate

Measurement not obtained by direct reading of tool

indirect measurement

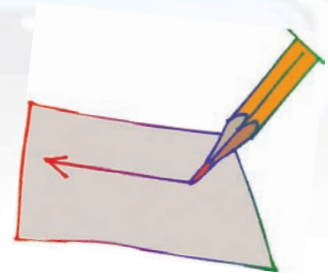


STUDENT SUPPORT MATERIALS

Writing

Writing Activity Page

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



mea _____ ments

dim _____ ons

pl _____ fig _____ e

geo _____ ic fi _____ e

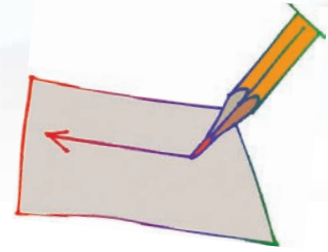
in _____ ct mea _____ ment

ra _____ e

sc _____ e f _____ tor

Writing Activity Page

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



m _____ **s**

d _____ **s**

p _____ **f** _____ **e**

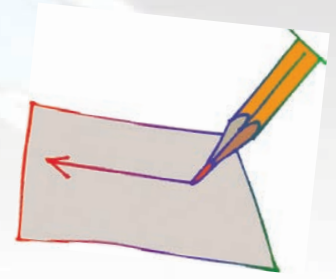
g _____ **f** _____ **e**

i _____ **m** _____ **t**

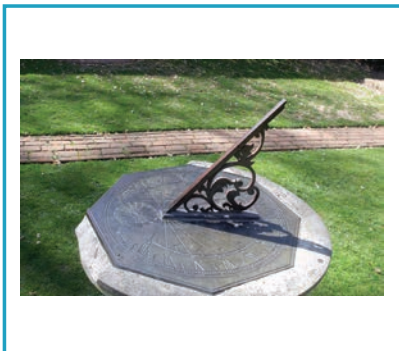
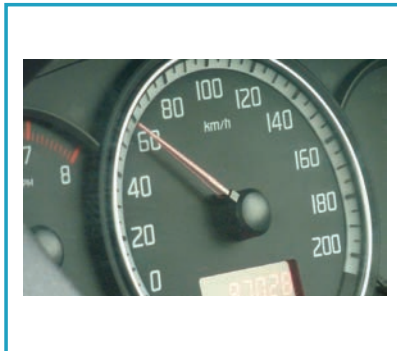
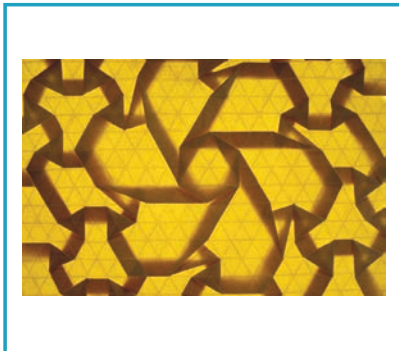
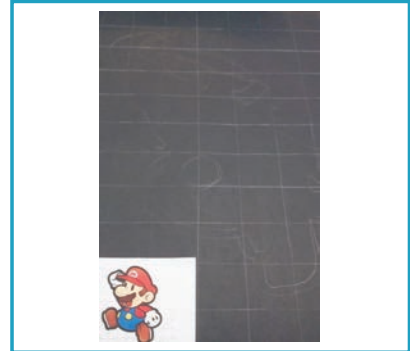
r _____ **e**

s _____ **f** _____ **r**

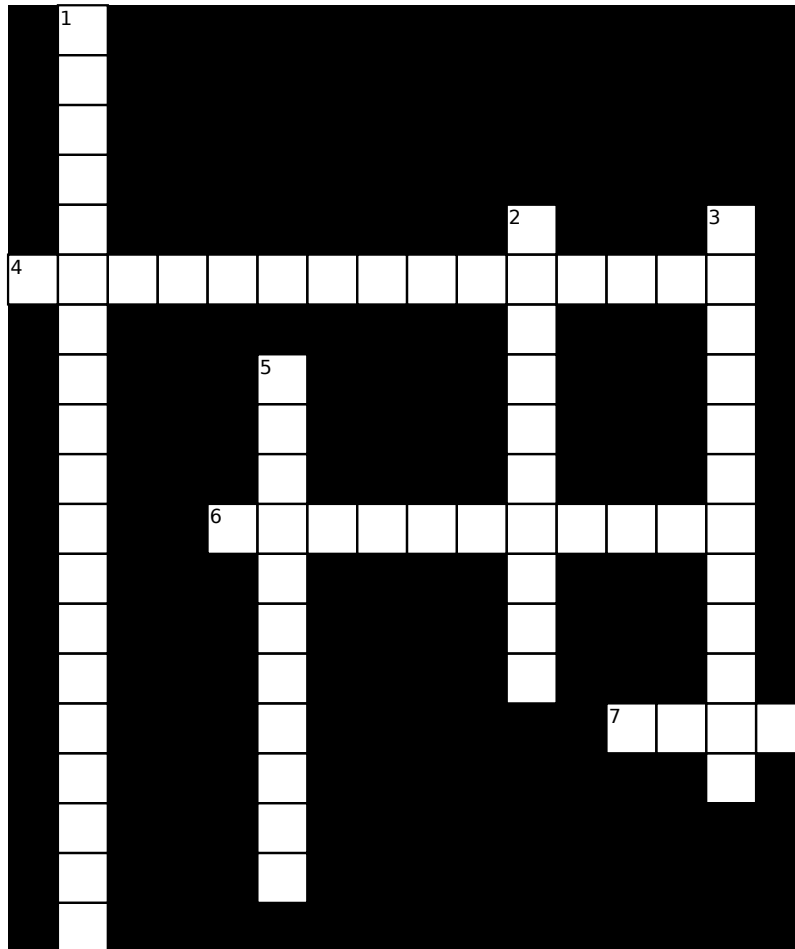
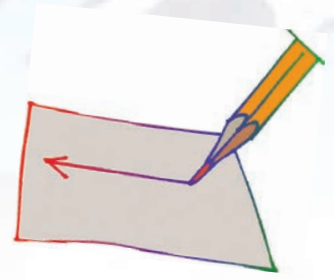
Basic Writing Activity Page



Have the students write the word for each picture.



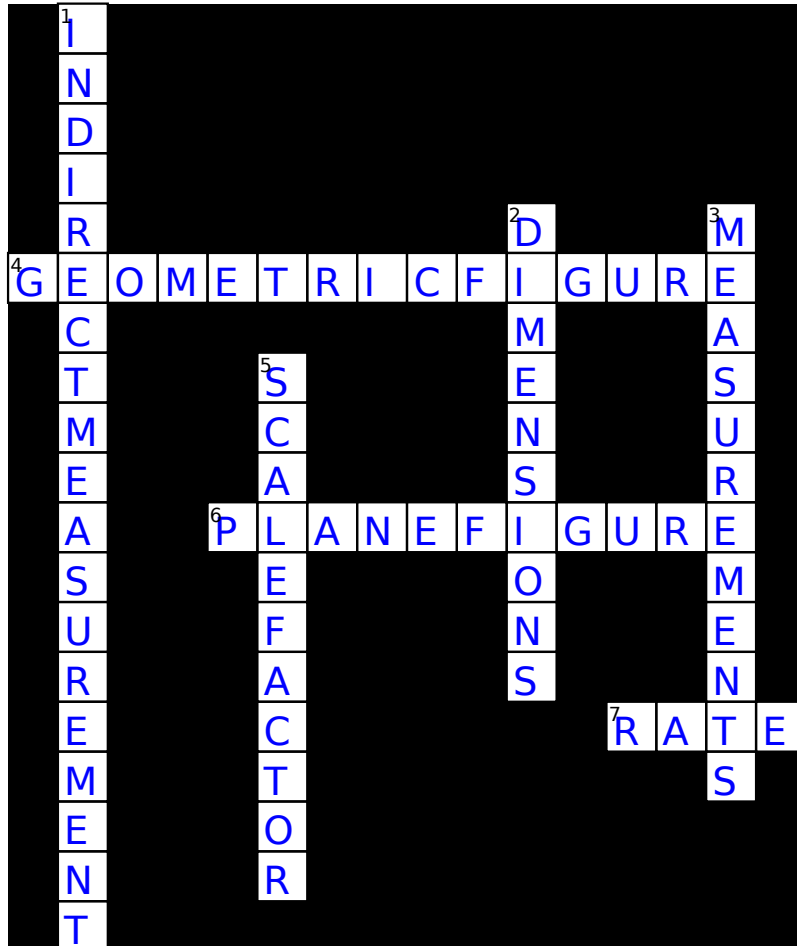
Crossword Puzzle



- Across
- 4 Resembling figures in geometry (2 Words)
 - 6 Closed, 2-dimensional and in one plane (2 Words)
 - 7 Quotient comparing two measures of different units

- Down
- 1 Measurement not obtained by direct reading of measurement tool (2 Words)
 - 2 Measurements of object size
 - 3 Determining magnitude or quantity
 - 5 Ratio of measurements (2 Words)

Crossword Puzzle Answers



- Across
- 4 Resembling figures in geometry (2 Words)
 - 6 Closed, 2-dimensional and in one plane (2 Words)
 - 7 Quotient comparing two measures of different units

- Down
- 1 Measurement not obtained by direct reading of measurement tool (2 Words)
 - 2 Measurements of object size
 - 3 Determining magnitude or quantity
 - 5 Ratio of measurements (2 Words)



UNIT ASSESSMENT



Measurable Attributes & Techniques

Unit Assessment Teacher's Notes

Grade 8 • Unit 3

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 **MEASUREMENTS**.
2. Write the number 2 by the picture for **DIMENSIONS**.
3. Write the number 3 by the picture for **PLANE FIGURE**.
4. Write the number 4 by the picture for **GEOMETRIC FIGURE**.
5. Write the number 5 by the picture for **INDIRECT MEASUREMENT**
6. Write the number 6 by the picture for **RATE**
7. Write the number 7 by the picture for **SCALE FACTOR**.

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.



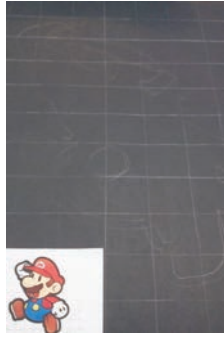
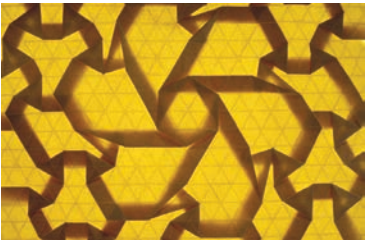
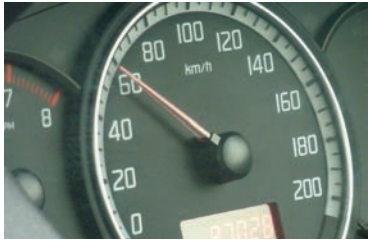


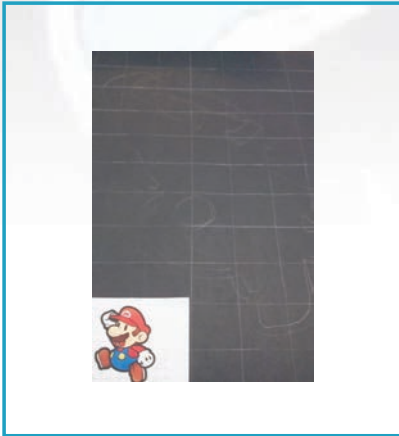
MATH PROGRAM

Unit Assessment Student Pages
Grade 8 • Unit 3

Date: _____ Student's Name: _____

Number Correct: _____ Percent Correct: _____

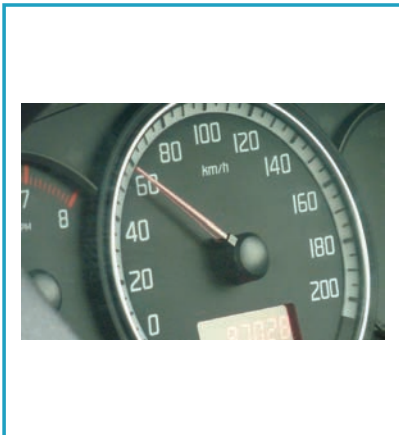




measurements
 dimensions
 plane figure
 geometric figure
 indirect
 measurement
 rate
 scale factor



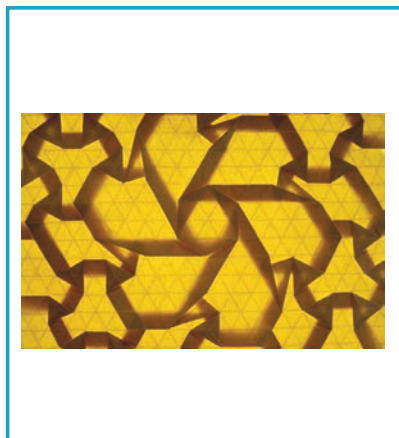
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 geometric figure
 indirect
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 rate
 scale factor



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**Resembling figures
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