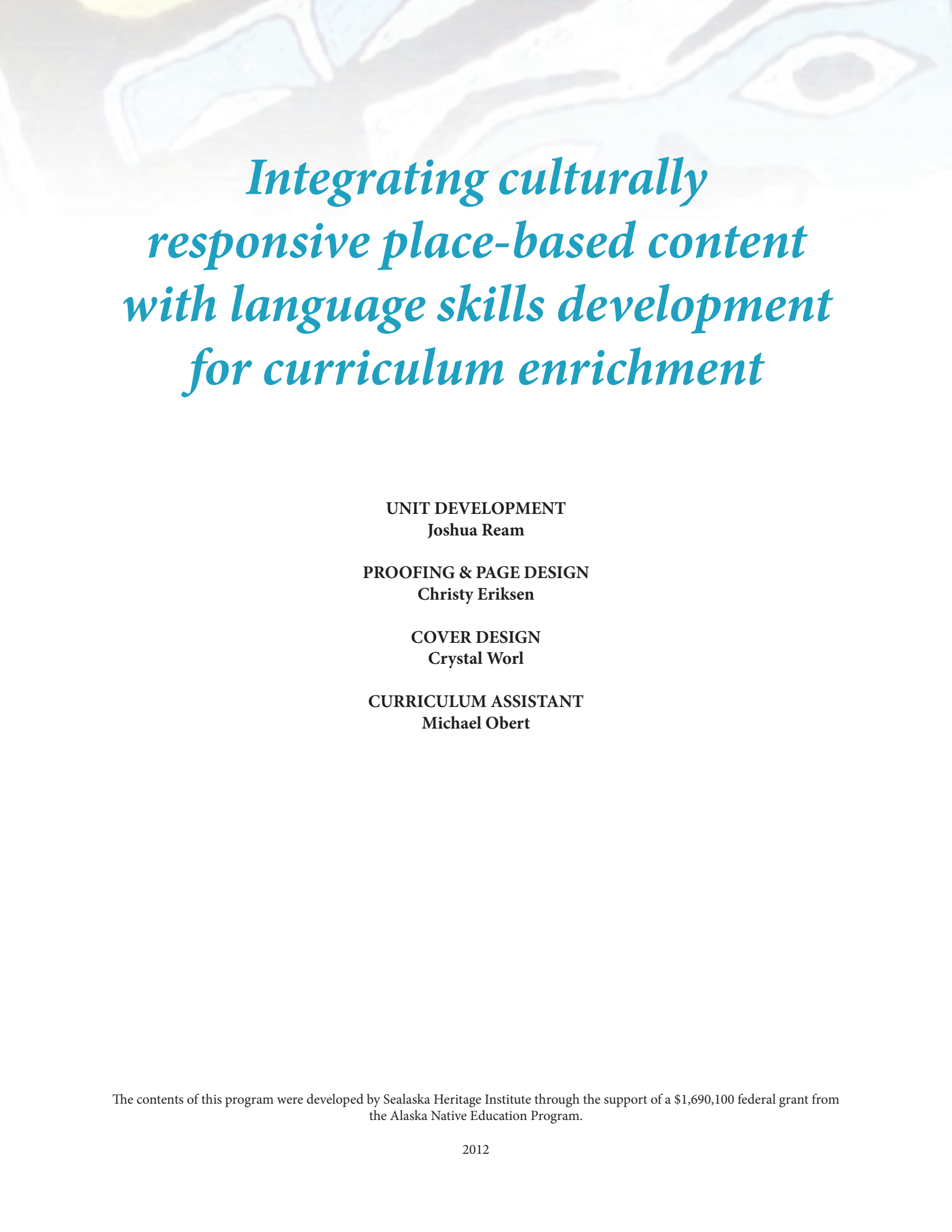# MATH FOR LANGUAGE DEVELOPMENT
BASED ON ALASKA MATH STANDARDS
GRADE 8 • BOOK 1

Sealaska Heritage Institute

Integrating culturally responsive place-based content with language skills development for curriculum enrichment

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Contents

Introduction to the Developmental Language Process in Math

OVER THE YEARS, much has been written about the successes and failures of students in schools. There is no end to the solutions offered, particularly for those students who are struggling with academics. For example, there have been efforts to bring local cultures into the classroom, thus providing the students with familiar points of departure for learning.

While the inclusion of Native concepts, values,and traditions into a curriculum provide a valuable foundation for self-identity and cultural pride, they may not, on their own, fully address improved academic achievement.

Through math lessons, students are exposed to new information and to the key vocabulary that represents that information. While the students may acquire, through various processes, the scientific information, the vocabulary is often left at an exposure level and not internalized by the students. Over time, this leads to language delay that impacts negatively on a student's ongoing achievement.

Due to weak language bases, many Native Alaskan high school students struggle with texts that are beyond their comprehension levels and writing assignments that call for language they do not have.
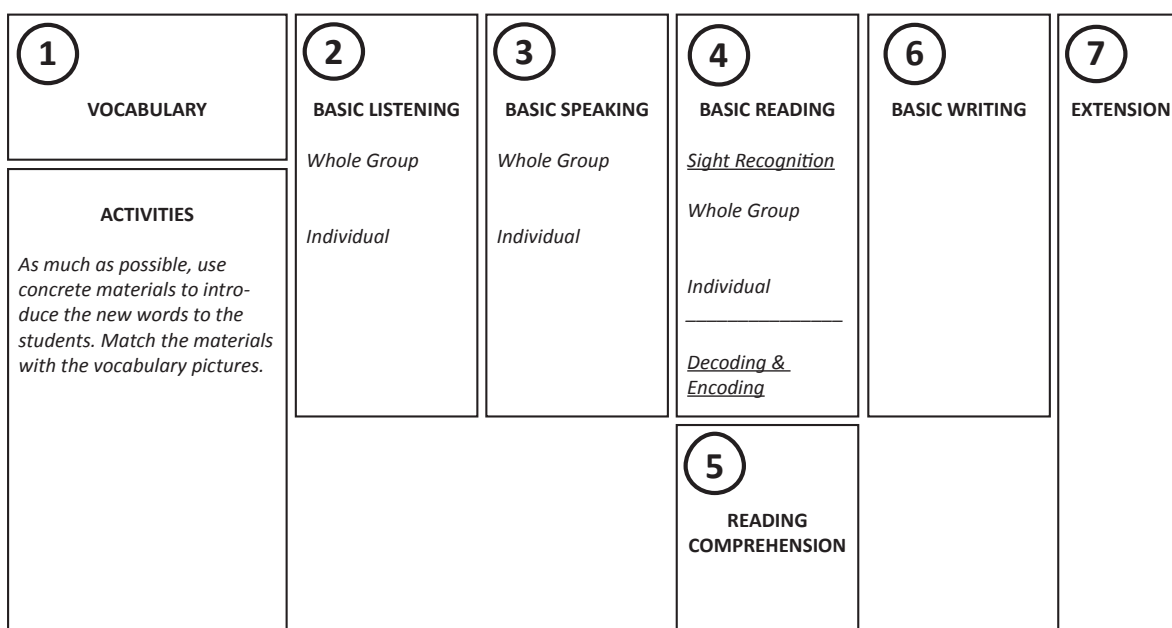
This program is designed to meet the academic realities faced by high school students every day, using a developmental process that integrates culture with skills development.

To this end, each key vocabulary word, in math, is viewed as a concept. The words are introduced concretely, using place-based information and contexts. Whenever possible, the concept is viewed through the Native heritage cultural perspectives. Using this approach, the students have the opportunity to acquire new information in manageable chunks, the sum total of which represent the body of information to be learned in the math program.

When the key vocabulary/concepts have been introduced, the students are then taken through a sequence of listening, speaking, reading, and writing activities designed to instill the vocabulary into their long-term memories.

This is the schema for the Developmental Language Process:

The Developmental Language Process—Math

① VOCABULARY	**② BASIC LISTENING**	**③ BASIC SPEAKING**	**④ BASIC READING**	**⑥ BASIC WRITING**	**⑦ EXTENSION**
ACTIVITIES *As much as possible, use concrete materials to introduce the new words to the students. Match the materials with the vocabulary pictures.*	*Whole Group* *Individual*	*Whole Group* *Individual*	*Sight Recognition* *Whole Group* *Individual* _____ *Decoding & Encoding*		

⑤ READING COMPREHENSION

Introduction to the Developmental Language Process in Math

Finally, at the end of each unit, the students will participate in enrichment activities based on recognized and research-based best practices. By this time, the math information and vocabulary will be familiar, adding to the students' feelings of confidence and success. These activities will include place-based and heritage culture perspectives of the information learned.

This approach is radically different from current practices in most math classes. Historically, little or no formal vocabulary development takes place. It is assumed that the vocabulary is being internalized during the learning process, which is most often an erroneous assumption.

Increasing the language bases of the students will lead to improved comprehension in listening and reading, and higher levels of production in creative speaking and writing.

This, coupled with the place-based and culturally-responsive content, will provide the students with the foundations necessary for ongoing confidence and achievement.

The Integration of Math Content and Language Development

Introduction of Key Math Vocabulary

↓

Math Vocabulary Development
Listening, Speaking, Reading, & Writing

↓

Math Application
Teacher-Directed, Group, & Individual Activities

UNIT 1: Numeration
Understanding Numbers

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.

REAL NUMBER

Have the students line up in a row and call out numbers sequentially starting at a negative number and ending on a positive in ascending order. Explain that the row represents a number line of real numbers and tht any number along it can be represented as a fraction.

WHOLE NUMBER

Show the students a box of cereal. Explain that while there are many parts to the box and its contents, the box itself makes up a whole single unit. Whole numbers too are integers representing a number that does not contain a fraction. They are zero or positive!

SCIENTIFIC NOTATION

Ask the students how many stars they believe exist in the universe (recent estimates are 300 sextillian). Have them write the highest number that they come up with on the board. Explain that large numbers are hard to work with and take up a lot of space. For this reason scientific notation gives us shorter representations of these gigantic numbers!

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.

STANDARD

Go around the room and ask each student to state his or her shoe size. Now explain that shoe sizes are different from country to country and that this can make things very confusing when traveling! A "standard form" can help to make life easier and more consistent. In math, an equation for a line, Ax+By=C, helps everyone to be able to interpret the equation the same way!

EXPANDED NOTATION

Ask for a volunteer to write his or her name on the board. Explain that the name represents the whole person but that there are many things that make up the student (clothes, physical attributes, personality etc). Have the students list these, then explain that this is the expanded version of the volunteer. Numbers can be expanded too to show their components!

RATIONAL NUMBER

Ask the students how many times they have been fishing in their lives. Explain that these numbers are rational and can be represented as fractions. They can be negative too! We might jokingly think of fishing trips where nothing was caught as being negative!

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.

INTEGER

Pass out several goldfish crackers to the students. Have them make two lists, one with how many crackers are left and one with how many were eaten. Tell them to eat them one at a time or two at a time but not in parts. Explain that these negative and positive whole numbers are integers. Enjoy!
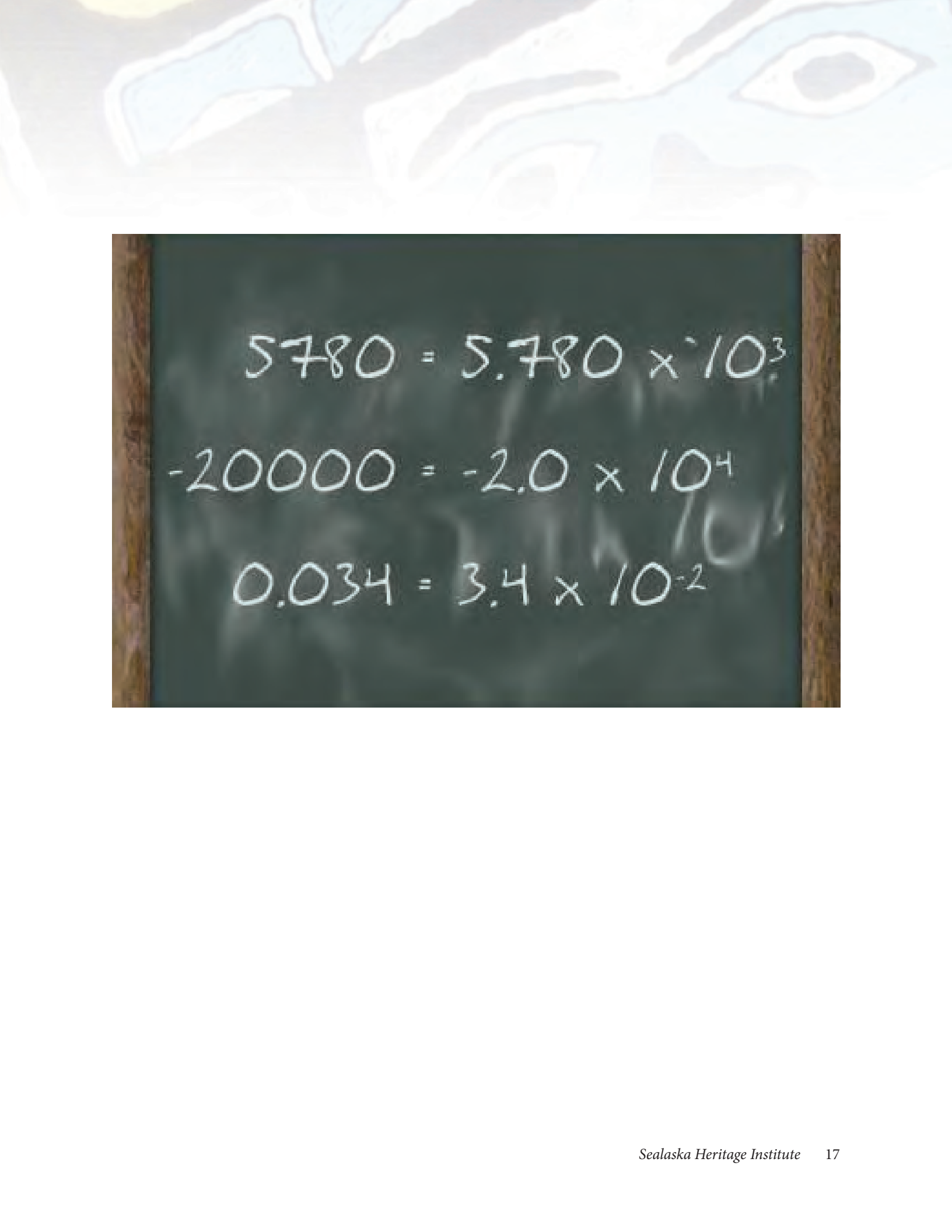
VOCABULARY PICTURES

REAL NUMBER

WHOLE NUMBER

$$5780 = 5.780 \times 10^3$$

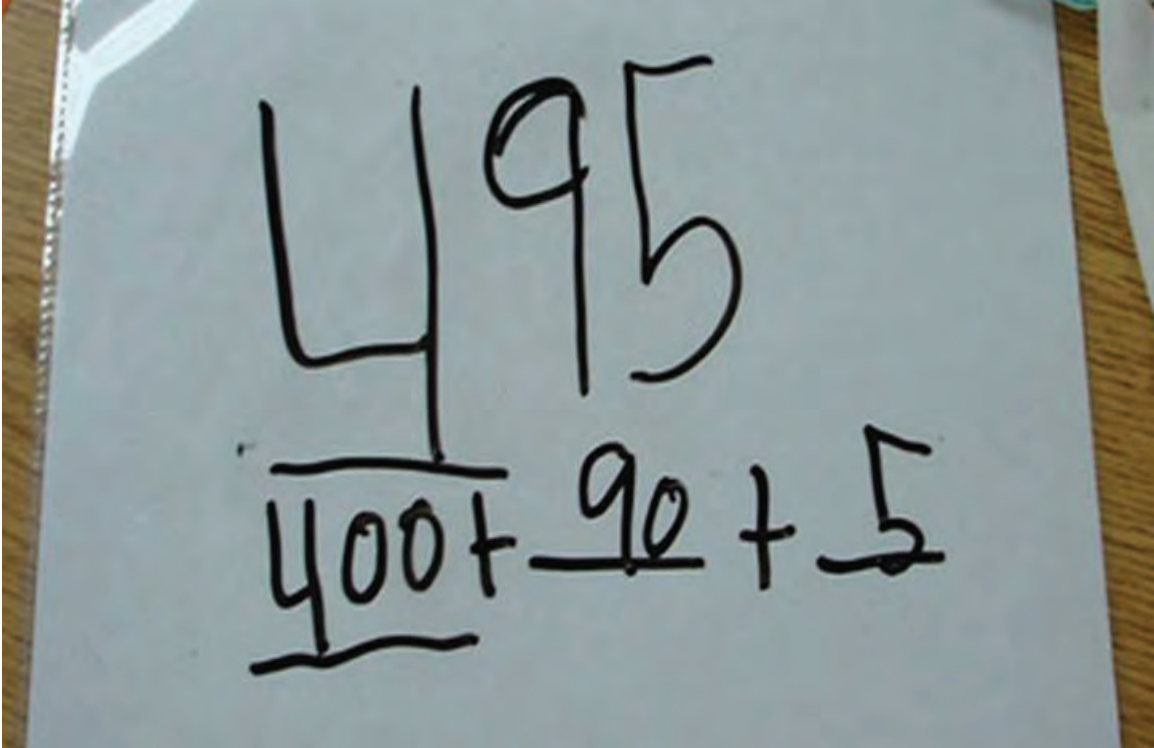$$-20000 = -2.0 \times 10^4$$

$$0.034 = 3.4 \times 10^{-2}$$

SCIENTIFIC NOTATION

STANDARD FORM

EXPANDED NOTATION

RATIONAL NUMBER

INTEGER

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.

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.

Tissue Drop

Group the students in a circle. Stand in the center of the circle with a small piece of tissue paper or an inflated balloon. Give the vocabulary illustration to the students. The students should pass the illustration around the circle in a clockwise direction until you clap your hands. Then, the students should stop passing around the illustration. Toss something like a tissue paper or ball into the center and say a vocabulary word. The student who has the illustration for that word must rush into the circle to catch the object before it hits the floor.

What's the Answer?

Before the activity begins, develop questions related to the concept being studied. For each question, prepare three answers—only one of which in each set is correct for the question asked. Ask the students the question and then read the three answers to them. The students should show you (using their fingers or prepared number cards) which answer is correct for the question asked. Repeat this process with other questions and answers.

Language and Skills Development

SPEAKING

Right or Wrong?

Mount the vocabulary pictures on the board. Point to one of the pictures and say its vocabulary word. The students should repeat the vocabulary word for that picture. However, when you point to a picture and say an incorrect vocabulary word for it, the students should remain silent. Repeat this process until the students have responded a number of times to the different vocabulary pictures.

Hand Tag

Group the students in a circle on the floor. Have the students place their hands on the floor, palms down. Stand in the center of the circle with the vocabulary picture and a flashlight. The object of the activity is to attempt to tag a student's hand or hands with the light of the flashlight. The students must pull their hands from the circle when they think they are about to be tagged. When you eventually tag a student's hand or hands, he/she must then say a complete sentence using the word for a vocabulary picture that you show. Repeat this process 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.

Sight Recognition

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.

Sight Word Bingo
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 out the sight words. When the students have cut out their sight words, each student should lay all of the sight words, but one, face down on his/her desk. Show a vocabulary picture. Any student or students who have the sight word for that picture face-up on their desks should show the sight word to you. Then, those sight words should be placed to the side and other sight words turned over in their place. Continue in this way until a student or students have no sight words left on their desks.
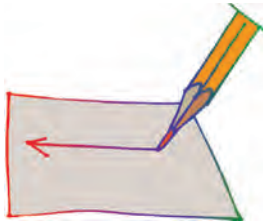
Letter Encode
Provide each student with four copies of the Alphabet Page, found on page 72 in the Student Support Materials. The students should cut out their letters and place them in individual envelopes. These cut-out letters will be used throughout the program for letter encode activities. You may wish to have the students write their names on their envelopes. Then, 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 complete the sight recognition and encoding activities in the Student Support Materials. When finished, review their work.

Language and Skills Development

WRITING

Watch Your Half

Prepare a photocopy of each of the vocabulary pictures. Cut the photocopied pictures in half. Keep the picture halves in separate piles. Group the students into two teams. Give all of the picture halves from one pile to the players in Team One. Give the picture halves from the other pile to the players in Team Two. Say a vocabulary word. When you say "Go," the student from each team who has the picture half for the vocabulary word you said should rush to the board and write the word on the board. The first player to do this correctly wins the round. Repeat until all players have participated. This activity may be played more than once by collecting, mixing, and redistributing the picture halves to the two teams.

Sentence Completion

Write a number of sentence halves on individual sentence strips. These should include both the beginning and ending halves of sentences. Mount the sentence halves on the board and number each one. Provide the students with writing paper and pencils/pens. Each student should then complete ONE of the sentence halves in his/her own words, writing his/her part of the sentence on the sheet of paper. When the students have completed their sentence halves, have a student read ONLY the sentence half he/she wrote. The other students must then attempt to identify the "other half" of the sentence on the board (by its number). Repeat until all of the students have shared their sentence halves in this way.

Student Support Materials

Have the students complete the sight recognition and encoding activities in the Student Support Materials. When finished, review their work.
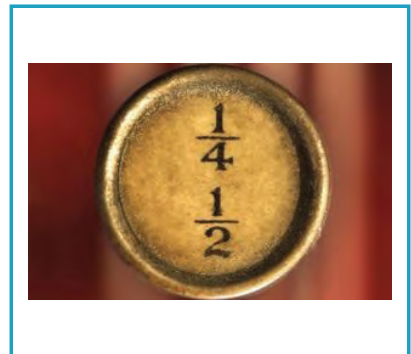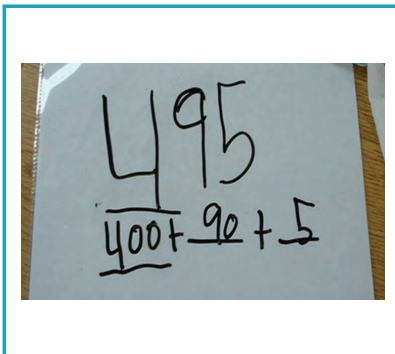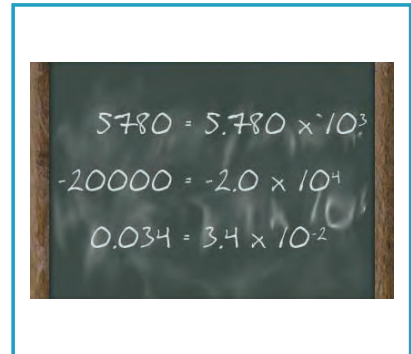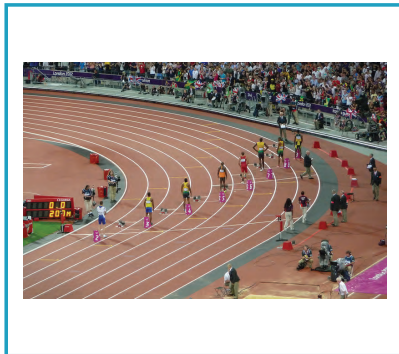
STUDENT SUPPORT MATERIALS

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

real number

whole number

scientific notation

standard form

expanded notation

rational number

integer

STUDENT SUPPORT MATERIALS

Reading • Sight Recognition
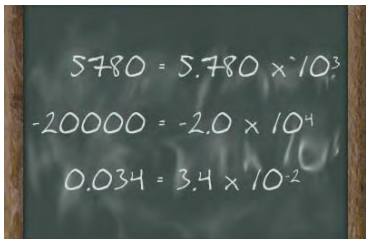
Sight Words Activity Page

Have the students circle the word for each picture.

real number
whole number
scientific notation
standard form
expanded notation
rational number
integer

real number
whole number
scientific notation
standard form
expanded notation
rational number
integer

real number
whole number
scientific notation
standard form
expanded notation
rational number
integer

real number
whole number
scientific notation
standard form
expanded notation
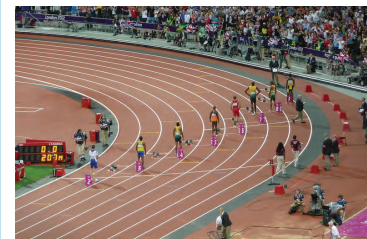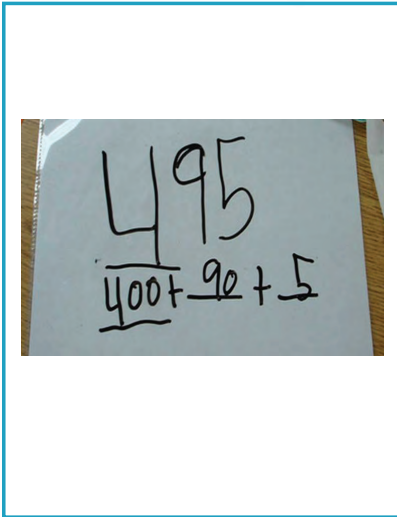rational number
integer

real number
whole number
scientific notation
standard form
expanded notation
rational number
integer

real number
whole number
scientific notation
standard form
expanded notation
rational number
integer

Sight Words Activity Page

real number

whole number

scientific notation

standard form

expanded notation

rational number

integer

Sight Words Activity Page

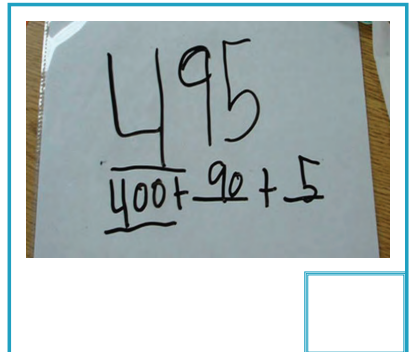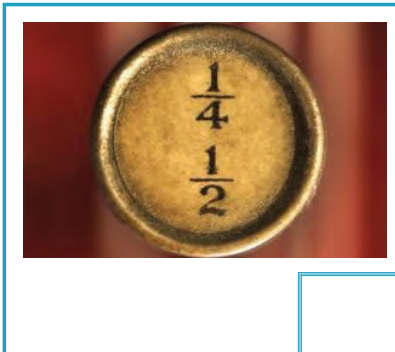*Write the numbers on their correct vocabulary graphics.*
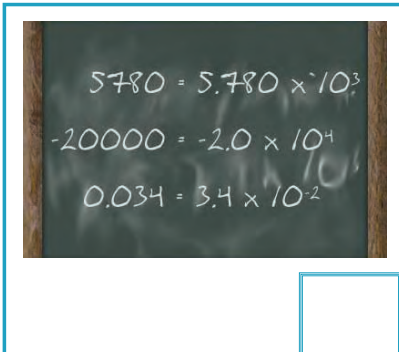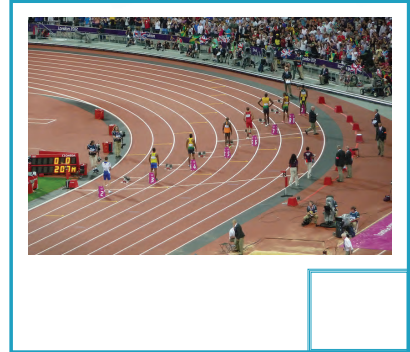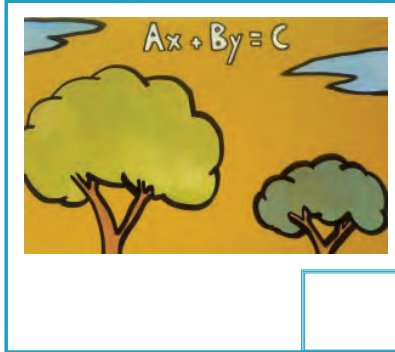

1. real number
2. whole number
3. scientific notation
4. standard form
5. expanded notation
6. rational number
7. integer

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.

standard form   expanded notation   scientific notation
real number   whole number
rational number   integer

```
n o b n a a c a e t w h o l e n u m b a c d u a n
a n u t o i r t t t x a l a n g i w n n e i a r u
n h t r l o f o t i t a m c u e t i b o m n l n r
m o d a n b r r n d n a o r x x b d n e b o a r r
i m e r c s e a e o a s t a n d a r d f o f a e a
e f n a n i i r t a i n e n n l r x x f a c b i a
s m e u o d n r n r n t m t e n d f n s t b n f n
o o n t t o i r o b d h e n n u d t i i n t e g m
r h r t r f o c r a t i o n a l n u m b e o g g o
n a b b i l s c i e n t i f i c n o t a t i o n a
n o e o n l d a r t i n t e g e r h o b f u r l h
g n s c i e n t i f i c n o t a t a t m i t a n n
s t a n d a r d f o r m i i i r r w m e n o e u h
r n a e o m s r n e a r m p s a r s b l i x i r t
u n r r c o a a i o s t i c n i n a u n h r a o n
e n n n l a n r e x p a n d e d n o t a t i m x r
o n e m b c d n o n n b d t n i e e r r e c r o c
i x n r t a t i e a i i b n d d o r a e o t g b u
i a b u f d r x r a t i o n a l n u m b e r d e d
o t l i n d l t a r u a i n n e r r d d e e n d t
o o u n i a r r e w n r n t g t n i a a e p s a e
m l t i t g s i l i n t r d d i a d e d o r o i h
r e a l n u m b e r r o n e a a l e r n e d c a t
e n o u w h o l e n u m b e r r a h i l a f e c a
r r t e a t n r e o i o b a r e a l n u m b i n n
n n i t i n u h s a u r s t r a n n i o t e o e n
t n e m i d b c r e x p a n d e d n o t a t i o n
c d n e s e p e l e a n t f l r n e e n n t l b n
g n i e o e r e a o x o e u m r m o s e e b d r l
o a n a u d l n c a n u n t t c e f x a f u f n e
```

Sight Words Activity Page

standard form   expanded notation   scientific notation
real number   whole number
rational number   integer

```
n o b n a a c a e t w h o l e n u m b a c d u a n
a n u t o i r t t x a l a n g i w n n e i a r u
n h t r l o f o t i t a m c u e t i b o m n l n r
m o d a n b r r n d n a o r x x b d n e b o a r r
i m e r c s e a e o a s t a n d a r d f o f a e a
e f n a n i i r t a i n e n n l r x x f a c b i a
s m e u o d n r n r n t m t e n d f n s t b n f n
o o n t t o i r o b d h e n n u d t i i n t e g m
r h r t r f o c r a t i o n a l n u m b e o g g o
n a b b i l s c i e n t i f i c n o t a t i o n a
n o e o n l d a r t i n t e g e r h o b f u r l h
g n s c i e n t i f i c n o t a t a t m i t a n n
s t a n d a r d f o r m i i i r r w m e n o e u h
r n a e o m s r n e a r m p s a r s b l i x i r t
u n r r c o a a i o s t i c n i n a u n h r a o n
e n n n l a n r e x p a n d e d n o t a t i m x r
o n e m b c d n o n n b d t n i e e r r e c r o c
i x n r t a t i e a i i b n d d o r a e o t g b u
i a b u f d r x r a t i o n a l n u m b e r d e d
o t l i n d l t a r u a i n n e r r d d e e n d t
o o u n i a r r e w n r n t g t n i a a e p s a e
m l t i t g s i l i n t r d d i a d e d o r o i h
r e a l n u m b e r r o n e a a l e r n e d c a t
e n o u w h o l e n u m b e r r a h i l a f e c a
r r t e a t n r e o i o b a r e a l n u m b i n n
n n i t i n u h s a u r s t r a n n i o t e o e n
t n e m i d b c r e x p a n d e d n o t a t i o n
c d n e s e p e l e a n t f l r n e e n n t l b n
g n i e o e r e a o x o e u m r m o s e e b d r l
o a n a u d l n c a n u n t t c e f x a f u f n e
```

STUDENT SUPPORT MATERIALS

Reading ● **Encoding**

Encoding Activity Page

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

real n_____er

w_____ number

scien_____ notation

sta_____ form

ex_____ed notation

ndard	atio	hole

tific	pand

r_____nal number

in_____r

tege

umb

Encoding Activity Page

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

real nu	**tific notation**
wh	**tation**
scien	**al number**
sta	**mber**
expanded no	**ole number**

ration

ndard form

in

teger

Encoding Activity Page

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

ber **num** **real**

_____ _____ _____

whole **ber** **num**

_____ _____ _____

dard **stan** **form**

_____ _____ _____

Encoding Activity Page

sci	en	fic

_____   _____   _____

ta	ti	no	tion

_____   _____   _____   _____

tion	pan	ta

_____   _____   _____

ded	ex	no

_____   _____   _____

ber | num | tio

_____ _____ _____

ra | nal

_____ _____

Alphabet Page Letter Encode

a b c d e f

g h i j k l

m n o p q r

s t u v w x

y z

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 A rational number or the limit of a sequence of rational numbers is a
- ○ Falsehood
- ○ Complex Number
- ○ Real Number
- ○ Infinite Number

2 A _____ doesn't contain a fraction and is an integer which has one or more unit and can be positive or negative.
- ○ Whole Number
- ○ Triangle
- ○ Standard Form
- ○ Rate

3 Scientific Notation is written using a number between 1 and 10 and the appropriate power of:
- ○ One
- ○ Ten
- ○ Hundred
- ○ Thousand

4 Which of the following is the standard form of a line?
- ○ Ax+By=C
- ○ Ax-By=C
- ○ Ax+B=C
- ○ B=C

5 _____ notation shows the place value by multiplying each digit in a number by the appropriate power of 10.
- ○ Logical
- ○ Illogical
- ○ Rational
- ○ Expanded

What's the Answer?

6 A rational number is one that can be written in the form a/b where a and b are integers and:

- ○ b>0
- ○ b<0
- ○ b=0
- ○ b≠0

7 An integer is a _____ number that is not a fraction.

- ○ Random
- ○ Whole
- ○ Continuous
- ○ Negative

What's the Answer?

1 A rational number or the limit of a sequence of rational numbers is a
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- ○ Complex Number
- ● Real Number
- ○ Infinite Number

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- ● b≠0

7 An integer is a _____ number that is not a fraction.

- ○ Random
- ● Whole
- ○ Continuous
- ○ Negative

Reading Comprehension Activity Page

Write the numbers/letters for sentence halves that match.

1 Real numbers are rational numbers or

2 A whole number doesn't

3 Large numbers can sometime be easier to

4 Ax + By = C is the

5 Expanded notation multiplies each digit in a

6 A rational number is any number that can be written as

7 An integer is a

A contain a fraction.

B standard form of a line.

C number by the power of 10.

D whole number that does not contain a fraction.

E the limit of a sequence of rational numbers.

F a/b where a & b are integers and b ≠ 0.

G read in scientific notation.

1→ _____ 2→ _____ 3→ _____ 4→ _____

5→ _____ 6→ _____ 7→ _____

Reading Comprehension Activity Page

1. Real numbers are rational numbers or

2. A whole number doesn't

3. Large numbers can sometime be easier to

4. Ax + By = C is the

5. Expanded notation multiplies each digit in a

6. A rational number is any number that can be written as

7. An integer is a

A. contain a fraction.

B. standard form of a line.

C. number by the power of 10.

D. whole number that does not contain a fraction.

E. the limit of a sequence of rational numbers.

F. a/b where a & b are integers and b ≠ 0.

G. read in scientific notation.

1→ E   2→ A   3→ G   4→ B

5→ C   6→ F   7→ D

Reading Comprehension Activity Page

Cut out the words and glue them under their definitions.

Written as a/b where a and b are integers and b≠0	**Longer version of a given number**	**A whole number that is not a fraction**
An integer with no fractions	**Rational number or limit of sequence of rational numbers**	**Ax+By=C**
Shortened version of a large number		

real number	whole number	scientific notation	standard form
expanded notation	rational number	integer	

Reading Comprehension Activity Page

Written as a/b where a and b are integers and b≠0 rational number	**Longer version of a given number** expanded notation	**A whole number that is not a fraction** integer
An integer with no fractions whole number	**Rational number or limit of sequence of rational numbers** real number	**Ax+By=C** standard form
Shortened version of a large number scientific notation		

STUDENT SUPPORT MATERIALS

Writing

Writing Activity Page

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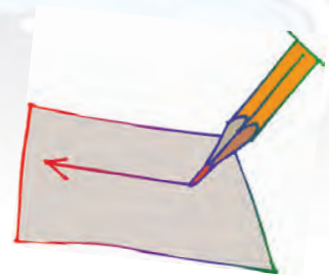
re_____ nu_____r

who_____ num_____

scien_____ not_____n

stan_____ fo_____

expan_____ no_____ion

rat_____ numb____r

int_____r

Writing Activity Page

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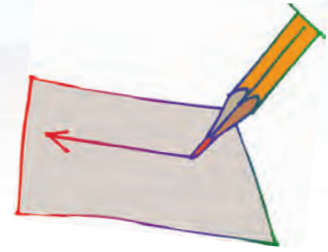
r_____ n_____r

w_____ n_____r

s_____ n_____n

s_____ f_____m

e_____ n_____n

r_____ n_____r

i_____r
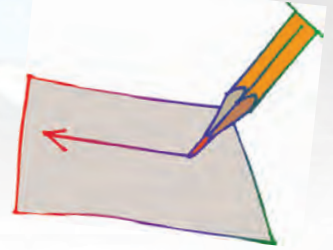
Basic Writing Activity Page

Have the students write the word for each picture.

_____

_____

_____

_____

_____

_____

_____

Crossword Puzzle

Across

2 Rational number or limit of sequence of rational numbers (2 Words)

5 Longer version of a given number (2 Words)

6 Ax+By=C (2 Words)

Down

1 Shortened version of a large number (2 Words)

2 Written as a/b where a and b are integers and b≠0 (2 Words)

3 An integer with no fractions (2 Words)

4 A whole number that is not a fraction

Crossword Puzzle Answers

The crossword grid contains the following answers:

- 1 Down: SCIENTIFICNOTATION
- 2 Across: REALNUMBER
- 2 Down: RATIONALNUMBER
- 3 Down: WHOLENUMBER
- 4 Down: INTEGER
- 5 Across: EXPANDEDNOTATION
- 6 Across: STANDARDFORM

Across

2 Rational number or limit of sequence of rational numbers (2 Words)

5 Longer version of a given number (2 Words)

6 Ax+By=C (2 Words)

Down

1 Shortened version of a large number (2 Words)

2 Written as a/b where a and b are integers and b≠0 (2 Words)

3 An integer with no fractions (2 Words)

4 A whole number that is not a fraction

UNIT ASSESSMENT

Understanding Numbers

Unit Assessment Teacher's Notes
Grade 8   ●   Unit 1

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 **REAL NUMBER**.

2. Write the number 2 by the picture for **WHOLE NUMBER**.

3. Write the number 3 by the picture for **SCIENTIFIC NOTATION**.

4. Write the number 4 by the picture for **STANDARD FORM**.

5. Write the number 5 by the picture for **EXPANDED NOTATION**.

6. Write the number 6 by the picture for **RATIONAL NUMBER**.

7. Write the number 7 by the picture for **INTEGER**.

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.
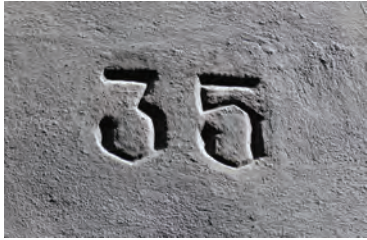
MATH PROGRAM

Unit Assessment Student Pages
Grade 8 ● Unit 1

Date:_____   Student's Name:_____
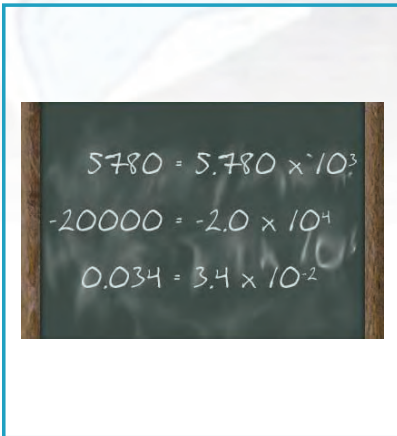
Number Correct:_____   Percent Correct:_____

$$5780 = 5.780 \times 10^3$$
$$-20000 = -2.0 \times 10^4$$
$$0.034 = 3.4 \times 10^{-2}$$

$$Ax + By = C$$

$$5780 = 5.780 \times 10^3$$
$$-20000 = -2.0 \times 10^4$$
$$0.034 = 3.4 \times 10^{-2}$$

- real number
- whole number
- scientific notation
- standard form
- expanded notation
- rational number
- integer

35

- real number
- whole number
- scientific notation
- standard form
- expanded notation
- rational number
- integer

$\frac{1}{4}$
$1\frac{1}{2}$

- real number
- whole number
- scientific notation
- standard form
- expanded notation
- rational number
- integer

$Ax + By = C$

- real number
- whole number
- scientific notation
- standard form
- expanded notation
- rational number
- integer

3

- real number
- whole number
- scientific notation
- standard form
- expanded notation
- rational number
- integer

495
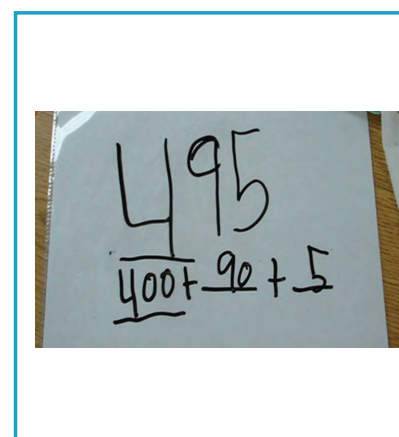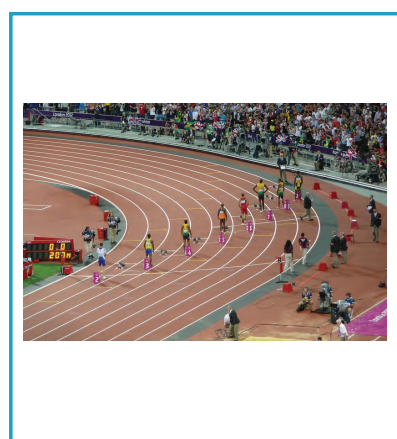$400 + 90 + 5$

- real number
- whole number
- scientific notation
- standard form
- expanded notation
- rational number
- integer

- real number
- whole number
- scientific notation
- standard form
- expanded notation
- rational number
- integer

2

real
nu____

nber
mber
rnber
rmber
nbar
mbar
rnbar
rmbar
nbir

w____
number

hale
hele
hile
hole
hule
hyle
hal
hel
hil

scientific
nota____

chin
chen
chan
chon
chun
tian
tien
tion
tiun

standard
____

farn
fern
firn
forn
furn
farm
ferm
firm
form

expa____
notation

ndade
ndede
ndide
ndode
ndude
ndad
nded
ndid
ndod

rati____
number

onal
onel
onil
onol
onul
omal
omel
omil
omol

int____

agar
egar
igar
ogar
ugar
ager
eger
egir
egor

|		
Written as a/b where a and b are integers and b≠0	A whole number that is not a fraction	Longer version of a given number
Ax+By=C	Rational number or limit of sequence of rational numbers	Shortened version of a large number
An integer with no fractions		

real number

whole number

scientific notation

standard form

expanded notation

rational number

integer

4

5780 = 5.780 x 10³
-20000 = -2.0 x 10⁴
0.034 = 3.4 x 10⁻²

$\frac{1}{4}$
$\frac{1}{2}$

Ax + By = C

3

495
400 + 90 + 5

35
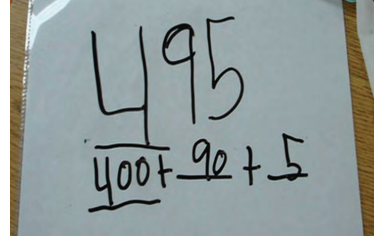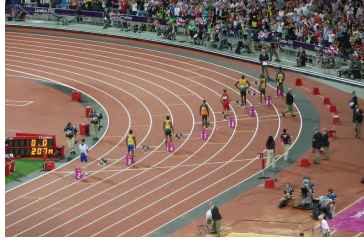
UNIT 2: Numeration
Understanding Meaning of Operations & Number Theory

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.

inverse operations

Hand out short lengths of string to each student. Tell them to tie a knot and to pass it to their neighbor. Now have them try to untie the knots. Explain that this undoing of the knot is the inverse of having done it in the first place! In math, the inverse operation undoes another operation.

order of operations

Put on a wig or a mask and act in a funny manner in front of the class. Tell the students that your name is Sally and you're their long lost Aunt. Explain that the phrase "Please Excuse My Dear Aunt Sally" stands for a set of rules or "order of operations" used to solve mathematical problems. Let the students create their own Aunt Sally scenarios!

prime factorization

Have the students draw several generations of their family tree on a piece of paper, in tree format with the student at the top and ancestors below. Explain that prime factorization also utilizes a tree, breaking a number into smaller and smaller prime units. In the family tree (drawn upside down), each ancestral generation makes up a smaller portion of the students DNA!

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.

commutative property

Place three carrots then three beans in a row. Ask the students how many pieces of food there are with the two types combined (added). Now rearrange them so that they are alternating. Ask again how many pieces of food there are. It's the same no matter what order they are in! This is the commutative property.

identity property

Show the students a potted plant and explain that it is unique. It would not be the same exact plant if you forgot to water it, if you cut off its leaves or if you put it out in the snow. Explain that the identity property preserves the uniqueness of a number. If you multiply any number by 1, you get that number. If you add zero to any number, you still have that number!

associative property

Put three m&ms, three peanut butter cups and three cheese goldfish in a row. Ask the students to count the food items added together in that order. Now rearrange the food items and ask them to count the total food items in the new order. Explain that the associative property allows numbers to be added or multiplied in any order and still yield the same value.

Process Skills

distributive property

Put 10 cheese goldfish on a table in three groups (2, 3 and 5). Ask the students to add the first two groups then multiply by the third. Place an equal sign on the table and put the resulting number of goldfish on the other side (25). Now below that row duplicate the original piles of gold fish (2, 3, 5). Ask the students to multiply the last group by the first then the last group by the second followed by adding these two numbers together (25). Place an equal sign on the table and the resulting number of goldfish. Explain that these two methods resulted in the same number of gold fish and is the concept behind the distributive property.
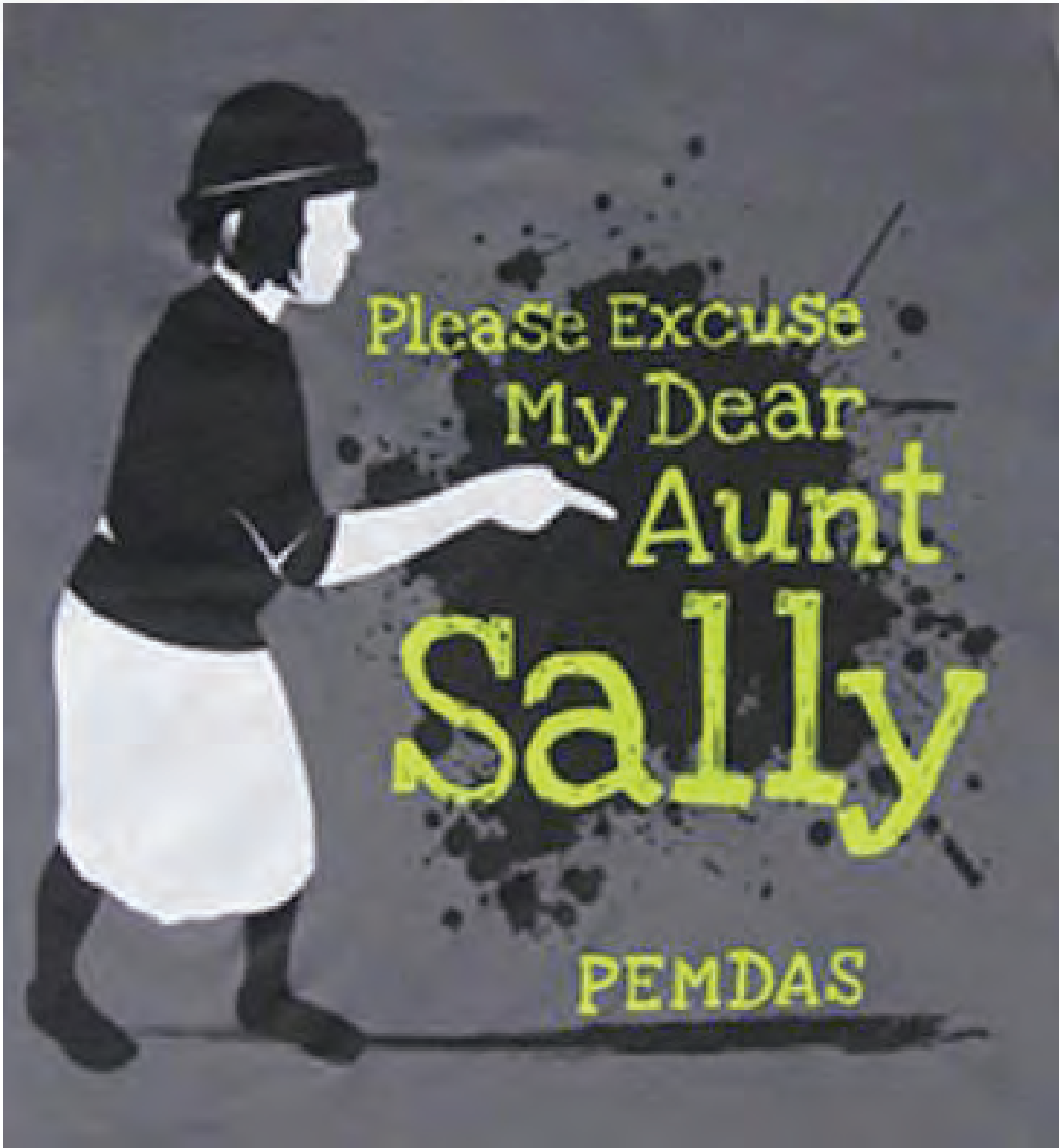
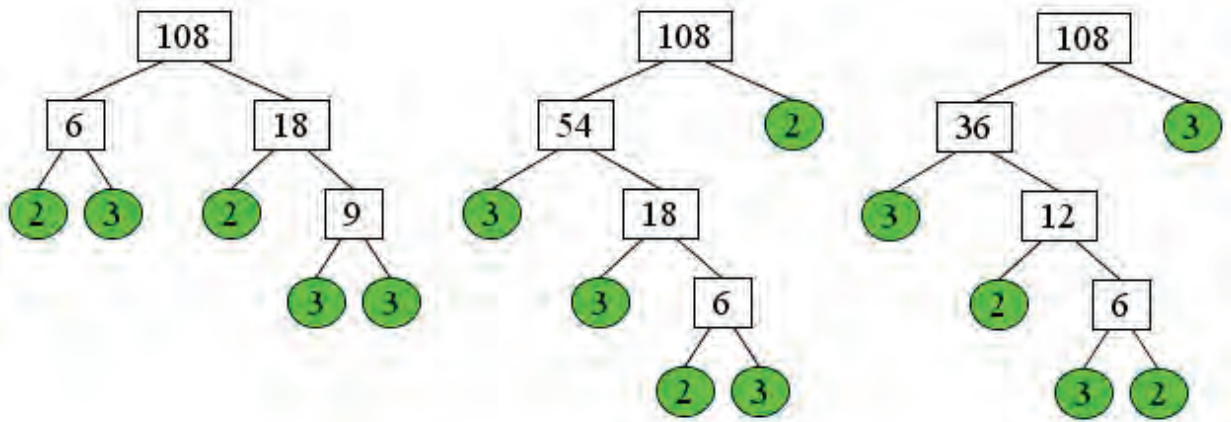# VOCABULARY PICTURES

$$5 + 3 = 8$$

$$8 - 3 = 5$$

INVERSE OPERATIONS

Please Excuse
My Dear
Aunt
Sally

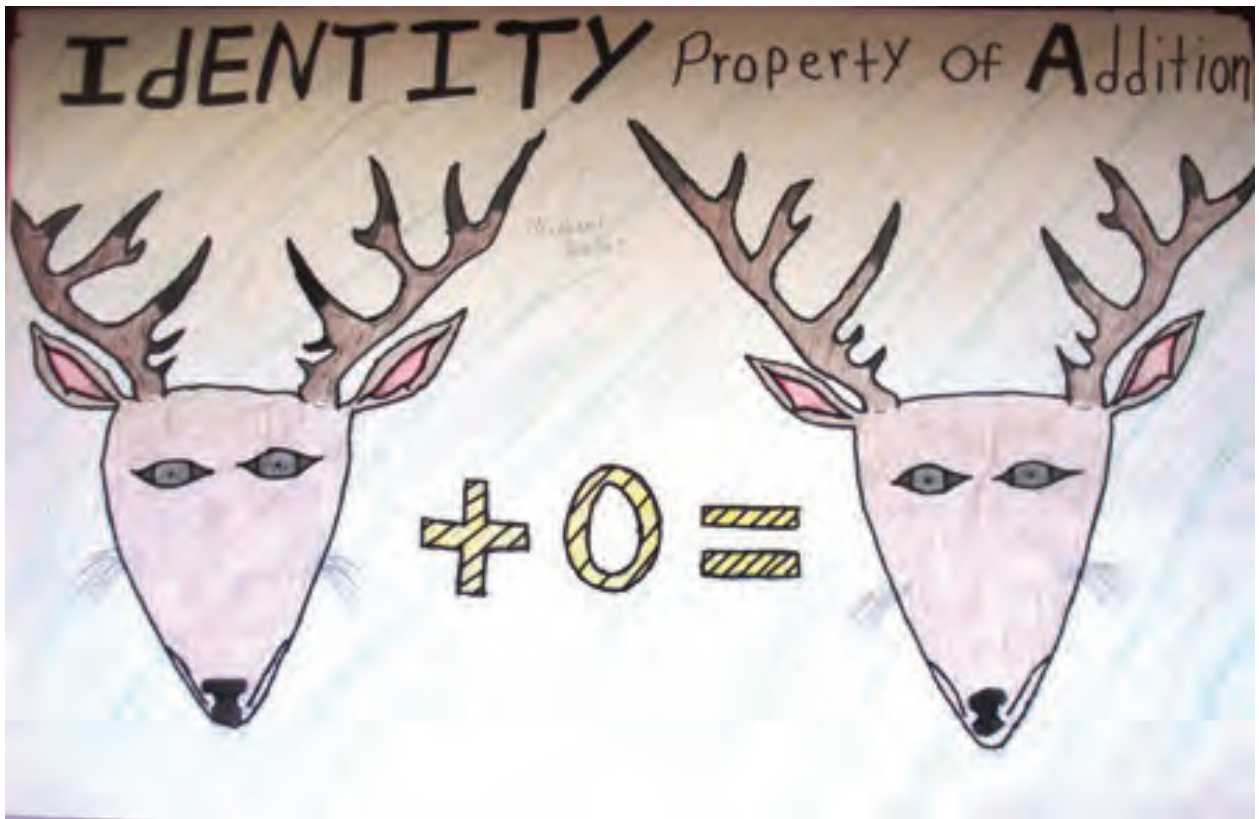PEMDAS

ORDER OF OPERATIONS

PRIME FACTORIZATION

$$3+2=5$$
$$2+3=5$$

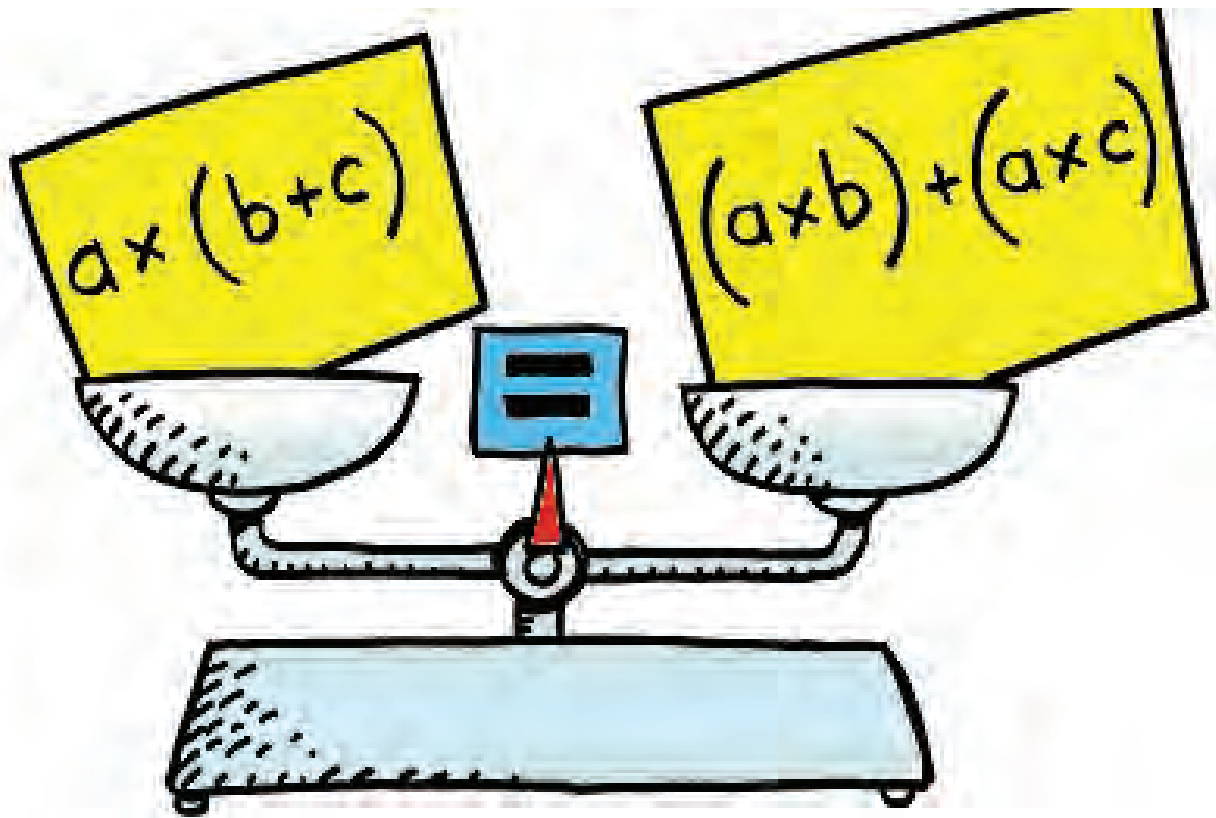$$2+3 = 3+2$$

COMMUTATIVE PROPERTY

IDENTITY PROPERTY

ASSOCIATIVE PROPERTY

DISTRIBUTIVE PROPERTY

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.

Mini Pictures

Provide each student with a copy of the mini-pictures page from the Student Support Materials. When you say the key words, the students must find the pictures for them. Then, have the students cut out the pictures. Say the keywords and the students should hold up the pictures for them.

Locomotive

Have the students stand in a straight line in the center of the room. Each student should place his hands on the shoulders of the student in front of him/her. Mount a picture on each of the four walls in the classroom. Tell the students that when they hear one of the four vocabulary words (for the four pictures on the walls), they should step in that direction while still holding onto the shoulders of the players in front of them. Say the four words a number of times; the students should step toward the pictures as they are named.

Funnel Vision

Before the activity begins, collect a large funnel. Have a student stand at the front of the classroom with his/her back to the other students. Give the student the funnel. Give the vocabulary pictures to the other students in the class. The students should hold their pictures up, facing the front of the classroom. Say a vocabulary word. When you say "Go," the student with the funnel should place the funnel over his/her eyes and turn to face the other students. The student must then look through the funnel to find the picture for the vocabulary word you said. This activity may be conducted with two players (each player having a funnel). The winner of each round is the student who locates the correct picture first. Have the students in the class exchange pictures for each new round of the activity. Repeat.

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

Flip of the Coin
Provide each student with a penny. Keep one penny for yourself. Mount the vocabulary pictures on the board. Have the students (gently) toss their pennies into the air. Each student should look to see which side of his/her penny is face-up. Toss your penny into the air in the same way. Call the side of your penny that is face-up. The students who have the same side of coin face up must then identify (orally) a vocabulary picture you point to. For example, if the heads side of your coin is face up, the students who have heads showing on their coins must then orally identify the vocabulary picture you point to. Repeat this process a number of times.

High Roller
Give a die to each of two students. When you say "Go," the students should roll their dice. The student who rolls the highest number on his/her die must then say a complete sentence about a vocabulary picture that you show. Repeat this process until many students have responded with sentences of their own.

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.

What's Your Sequence?

Provide each student with four blank flashcards. Write four sight words on the board. Each student should write the same sight words on each of his cards (one word per card). When the students' cards are ready, have them arrange their sight word cards in a specific sequence on their desks (each student should determine his/her own sequence of words). Then, say a sequence of the four words. Any student or students who have their sight words in the same sequence as you said win the round. The winner or winners of this activity are those students who collect the greatest number of wins. The students may change the sequence of their sight word cards after each round of the activity.
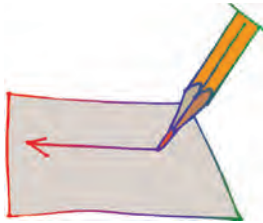
Word Length

Before the activity begins, cut a number of sight word cards into different lengths (e.g., 5 in., 15 cm., etc.). Place the sight word cards on the floor at one end of the classroom. Group the students into two teams at the other end of the classroom. Place two rulers on the floor beside the sight words. Say a different measurement to the first player in each team. When you say "Go," the first player in each team must rush to the sight word cards. Each player must then use the ruler to locate a sight word card that is the same length as the measurement you said. When a player has done this successfully, he/she should read the sight word on that card. Repeat until all players in each team have participated.

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

Back Writing

Group the students into two teams. Have the first player from each team stand in front of the board. Use the index finger of your writing hand to "write" the first letter of a sight word on the two players' backs. When you have done this, say "Go." Each of the players should then write a sight word on the board that begins with that letter. Repeat with other pairs of players until all players in each team have played and until all sight words have been written a number of times.

Word Completion

Before the activity begins, prepare clozure cards for the sight words; omit letters and syllables. Provide each student with a clozure card. Call upon the students to complete their words on the clozure cards by writing in the missing parts. Afterward, review the students' responses.

Student Support Materials

Have the students complete the sight recognition and encoding activities in the Student Support Materials. When finished, review their work.
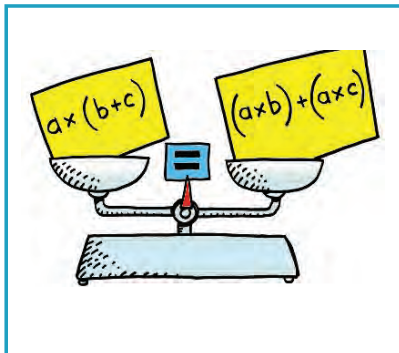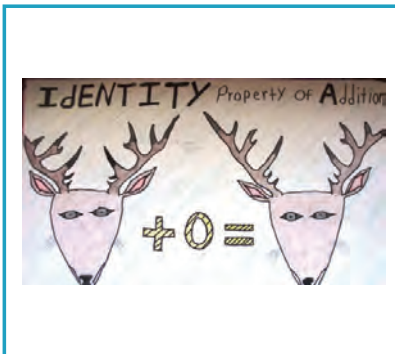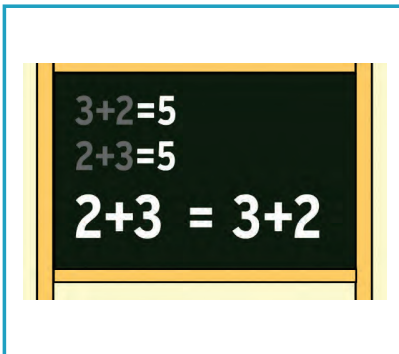
STUDENT SUPPORT MATERIALS
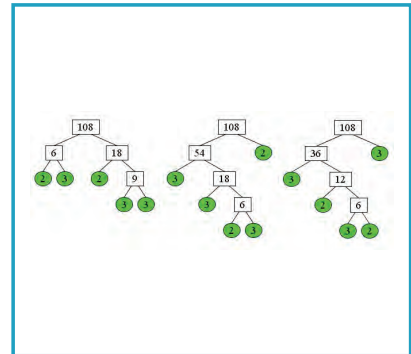
Listening • Mini Pictures

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.
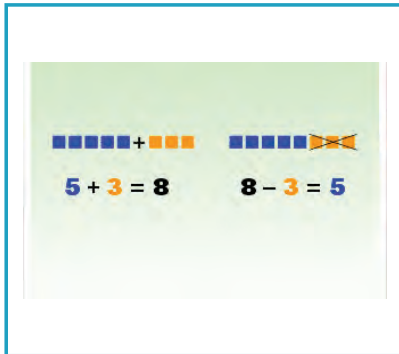
STUDENT SUPPORT MATERIALS

MATERIALS

Sight Words

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

STUDENT SUPPORT MATERIALS

Reading • Sight Recognition

Sight Words Activity Page

Have the students circle the word for each picture.
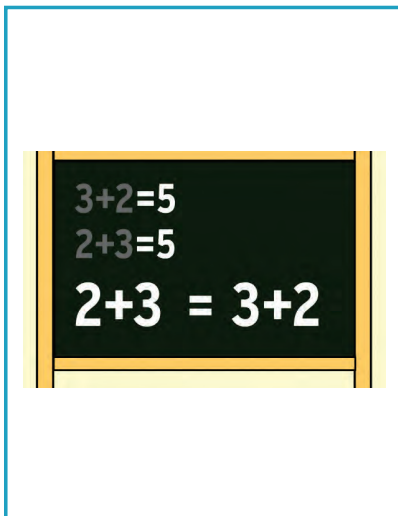
inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

---

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

---

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

---

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property
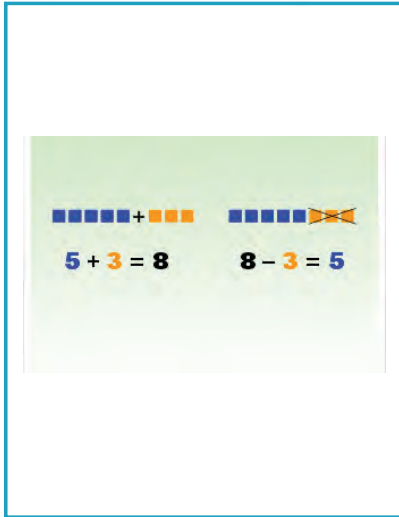
Sight Words Activity Page

inverse
operations

order of
operations

prime
factorization

commutative
property

identity
property

associative
property

distributive
property

inverse
operations

order of
operations

prime
factorization

commutative
property

identity
property

associative
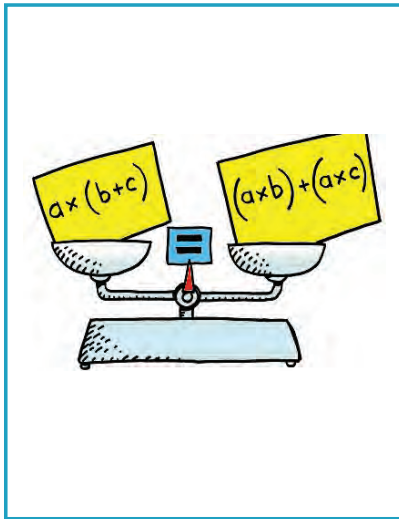property

distributive
property

inverse
operations

order of
operations

prime
factorization

commutative
property

identity
property

associative
property

distributive
property

Sight Words Activity Page

Write the numbers on their correct vocabulary graphics.
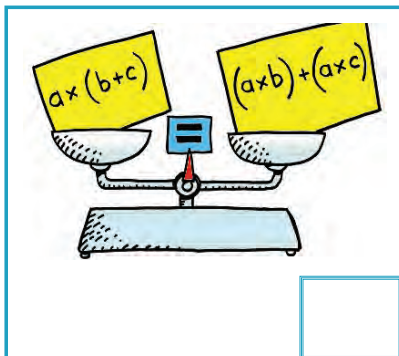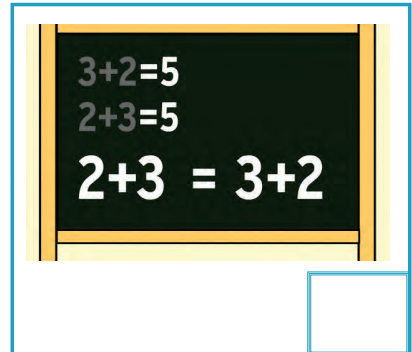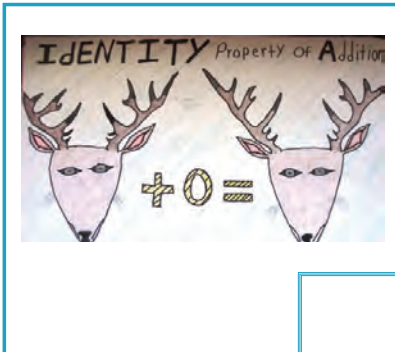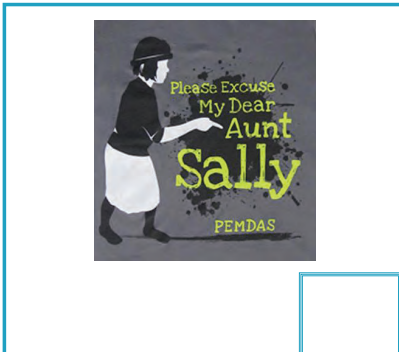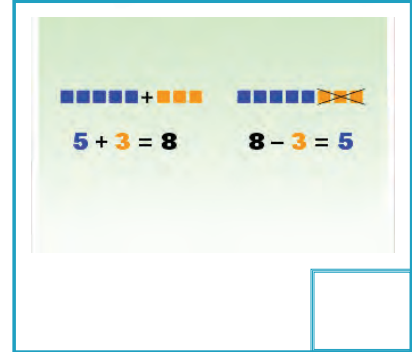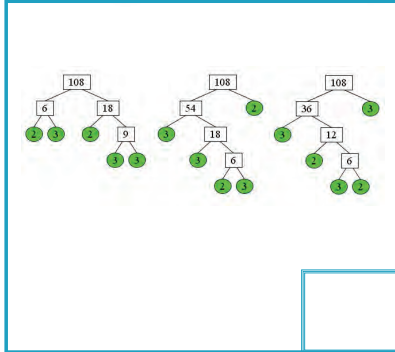
1. **inverse operations**
2. **order of operations**
3. **prime factorization**
4. **commutative property**
5. **identity property**
6. **associative property**
7. **distributive property**

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.

commutative property
order of operations
distributive property
prime factorization

associative property
identity property
inverse operations

```
o f i e t t c r p c o m m u t a t i v e p r o p e
n o s m d t u o p a r i p m v c m c p r a o t o p
d i e t e n e p o n o m p p r p e r s r p i p d r
n e n t o c o i b a i o t r d f e o d t f y e d r
i e t e e r r e r v r r r t u p r a c d o o m a e
o b i i d p p e t v p p e p o r e v p d p c s i r
s f t n s o a s e s e c o o t e s v r s a s n s m
i p r i m e f a c t o r i z a t i o o i r t s o c
e o p n o n r y c y i r p i e e r i t i y s e f s
t i n v e r s e o p e r a t i o n i r p e o r y c
r d i s t r i b u t i v e p r o p e r t y e e t a
o p e a r v i a s s o c i a t i v e p r o p e r p
b v t i d e n t i t y p r o p e r t y v r f a r e
s p r i m e f a c t o r i z a t i o n s z t i i c
r m r f e e p n i n v e r s e o p e r a t i o n s
r s v r a s s o c i a t i v e p r o p e r t y e d
i p t e f b d i s t r i b u t i v e p r o p e r t
y v u n i c r v t r p t c t p p m e o a p t f i m
i u n t c o m m u t a t i v e p r o p e r t y c i
e n m u r r r a b p r r p r o t f t c r t r a i o
a r o o e o t r c y y a i a t e i r n r d p p r e
s v i o e i p i d e p a r e i v d t i i p r y b a
i e e s i n e z s t r i r t i p o a y v p r r e r
o p t o u n p e p o a i p t r o e r i c i e e c d
c s o e i t t r o r d e r o f o p e r a t i o o a
r i d e n t i t y p r o p e r d m p s y i e o t i
e b d n d t a o o r d e r o f o p e r a t i o n s
m f a p p e z e o o t e r t o o p p m o r r r r r
t y e c p z o r e t r t z o v r i b v t o e i r r
```

Sight Words Activity Page

commutative property
order of operations
distributive property
prime factorization

associative property
identity property
inverse operations

```
o f i e t t c r p c o m m u t a t i v e p r o p e
n o s m d t u o p a r i p m v c m c p r a o t o p
d i e t e n e p o n o m p p r p e r s r p i p d r
n e n t o c o i b a i o t r d f e o d t f y e d r
i e t e e r r e r v r r t u p r a c d o o m a e
o b i i d p p e t v p p e p o r e v p d p c s i r
s f t n s o a s e s e c o o t e s v r s a s n s m
i p r i m e f a c t o r i z a t i o o i r t s o c
e o p n o n r y c y i r p i e e r i t i y s e f s
t i n v e r s e o p e r a t i o n i r p e o r y c
r d i s t r i b u t i v e p r o p e r t y e e t a
o p e a r v i a s s o c i a t i v e p r o p e r p
b v t i d e n t i t y p r o p e r t y v r f a r e
s p r i m e f a c t o r i z a t i o n s z t i i c
r m r f e e p n i n v e r s e o p e r a t i o n s
r s v r a s s o c i a t i v e p r o p e r t y e d
i p t e f b d i s t r i b u t i v e p r o p e r t
y v u n i c r v t r p t c t p p m e o a p t f i m
i u n t c o m m u t a t i v e p r o p e r t y c i
e n m u r r r a b p r r p r o t f t c r t r a i o
a r o o e o t r c y y a i a t e i r n r d p p r e
s v i o e i p i d e p a r e i v d t i i p r y b a
i e e s i n e z s t r i r t i p o a y v p r r e r
o p t o u n p e p o a i p t r o e r i c i e e c d
c s o e i t t r o r d e r o f o p e r a t i o o a
r i d e n t i t y p r o p e r d m p s y i e o t i
e b d n d t a o o r d e r o f o p e r a t i o n s
m f a p p e z e o o t e r t o o p p m o r r r r r
t y e c p z o r e t r t z o v r i b v t o e i r r
```

STUDENT SUPPORT MATERIALS

Reading ● Encoding

Encoding Activity Page

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

i_____e operations

order of o_____ions

prime f_____ization

co_____ative property

i_____ity property

ssocia	nvers	mmut

dent	perat	

a_____tive property

dis_____tive property

actor   tribu

Encoding Activity Page

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

inve	**utative property**
order of op	**rse operations**
prime fac	**torization**
comm	**erations**
iden	**perty**

assoc

tity property

distributive pro

iative property

Encoding Activity Page

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

verse	in

——————— ———————

pe	o	tions	ra

——————— ——————— ——————— ———————

der	or		of

——————— ———————   ———————

o	pe	tions	ra

——————— ——————— ——————— ———————

prime

_____

| tor | za | tions | i | fac |

_____

| ta | com | mu | tive |

_____

| per | pro | ty |

_____

| den | i | ty | ti |

_____ _____ _____ _____

| ty | pro | per |

_____ _____ _____

| so | as | a | ci | tive |

_____ _____ _____ _____ _____

| ty | per | pro |

_____ _____ _____

Encoding Activity Page

bu	dis	tri	tive
___	___	___	___

per	pro	ty
___	___	___

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 Inverse operations are those that _____ another operation.
- ○ Support
- ○ Enhance
- ○ Expand
- ○ Undo

2 The acronym for the correct order of operations is
- ○ PENDAS
- ○ PEMMAS
- ○ PEMDAS
- ○ DEMPAS

3 Prime factorization is the breaking down of a composite number into _____ non-trivial divisors.
- ○ Smaller
- ○ Larger
- ○ Medium
- ○ Average

4 The _____ property applies when the order of numbers in a calculation does not affect the result.
- ○ Commutative
- ○ Identity
- ○ Associative
- ○ Distributive

5 The _____ property applies when an equality remains true regardless of the values of any variable that appears within it.
- ○ Commutative
- ○ Identity
- ○ Associative
- ○ Distributive

What's the Answer?

6 The _____ property applies when numbers can be added or multiplied in any order and still yield the same value.

- ○ Distributive
- ○ Associative
- ○ Identity
- ○ Commutative

7 The _____ property applies when adding two numbers and then multiplying by another yields the same result as multiplying each one by the number and then adding the products.

- ○ Associative
- ○ Commutative
- ○ Identity
- ○ Distributive

What's the Answer?

1 Inverse operations are those that _____ another operation.
- ○ Support
- ○ Enhance
- ○ Expand
- ● Undo

2 The acronym for the correct order of operations is
- ○ PENDAS
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- ○ PEMDAS
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- ○ Associative
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- ● Identity
- ○ Associative
- ○ Distributive

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- ● Associative
- ○ Identity
- ○ Commutative

7 The _____ property applies when adding two numbers and then multiplying by another yields the same result as multiplying each one by the number and then adding the products.
- ○ Associative
- ○ Commutative
- ○ Identity
- ● Distributive

Reading Comprehension Activity Page

Write the numbers/letters for sentence halves that match.

(1) An inverse operation

(A) remembering the order of operations.

(2) PEMDAS in the correct acronym for

(B) into smaller non-trivial divisors.

(3) Prime factorization breaks down a composite number

(C) and still yield the same value is the associative property.

(4) In the commutative property, the

(D) regardless of the values of any variables that appear in it.

(5) In the identity property, an equality remains true

(E) undoes another operation.

(6) The property by which numbers can be added or multiplied in any order

(F) order of numbers in a calculation does not affect the result.

(7) In the distributive property, adding two numbers and then multiplying

(G) by another yields the same result as multiplying each one by the tnumber then adding the products.

1→_____   2→ _____   3→ _____   4→ _____

5→ _____   6→ _____   7→ _____

Reading Comprehension Activity Page

1 An inverse operation

A remembering the order of operations.

2 PEMDAS in the correct acronym for

B into smaller non-trivial divisors.

3 Prime factorization breaks down a composite number

C and still yield the same value is the associative property.

4 In the commutative property, the

D regardless of the values of any variables that appear in it.

5 In the identity property, an equality remains true

E undoes another operation.

6 The property by which numbers can be added or multiplied in any order

F order of numbers in a calculation does not affect the result.

7 In the distributive property, adding two numbers and then multiplying

G by another yields the same result as multiplying each one by the tnumber then adding the products.

1→ __E__   2→ __A__   3→ __B__   4→ __F__

5→ __D__   6→ __C__   7→ __G__

Reading Comprehension Activity Page

Cut out the words and glue them under their definitions.

Numbers added or multiplied in any order yield same value	**PEMDAS**	**Order of numbers does not affect the result**
Breaking down a composite number into smaller divisors	**Undoes another operation**	**a(b+c)=ab+ac**
Equality remains true regardless of variable values		

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

Reading Comprehension Activity Page

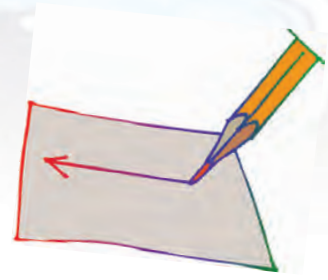|		
Numbers added or multiplied in any order yield same value associative property	**PEMDAS** order of operations	**Order of numbers does not affect the result** commutative property
Breaking down a composite number into smaller divisors prime factorization	**Undoes another operation** inverse operations	**a(b+c)=ab+ac** distributive property
Equality remains true regardless of variable values identity property		

STUDENT SUPPORT MATERIALS

Writing

Writing Activity Page

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

inv_____e oper_____ns

or_____ of operat_____s

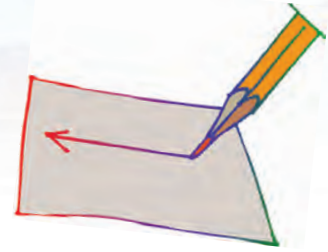pri____e factor_____tion

com_____tive pro_____ty

ide_____ty pr_____rty

assoc_____ive pro_____ty

distrib_____tive pro_____ty

Writing Activity Page

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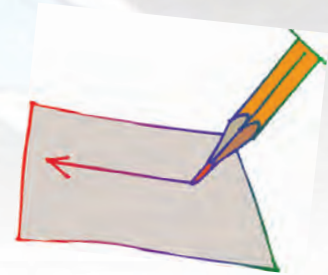
i_____ o_____s

o_____ of _____s

p_____ f_____n

c_____ p_____y

i_____ p_____y

a_____ p_____y

d_____ p_____y

Basic Writing Activity Page
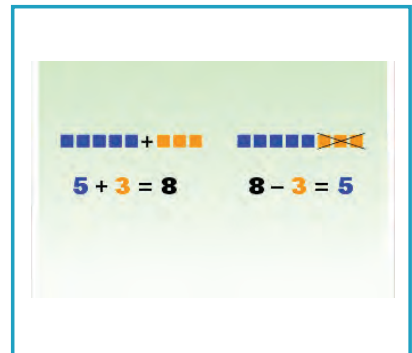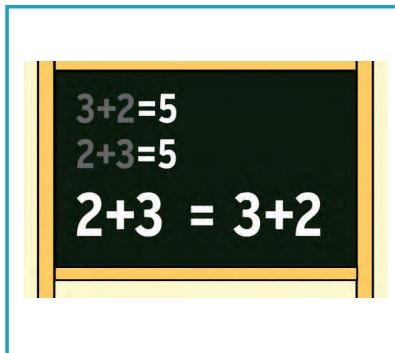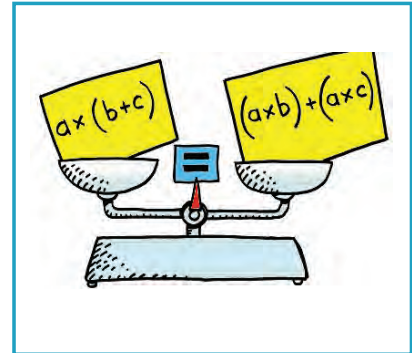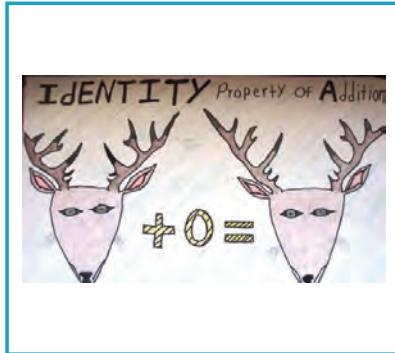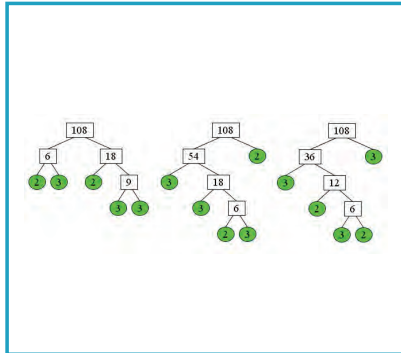
Have the students write the word for each picture.

_____

_____

_____

_____

_____

_____

_____

Crossword Puzzle
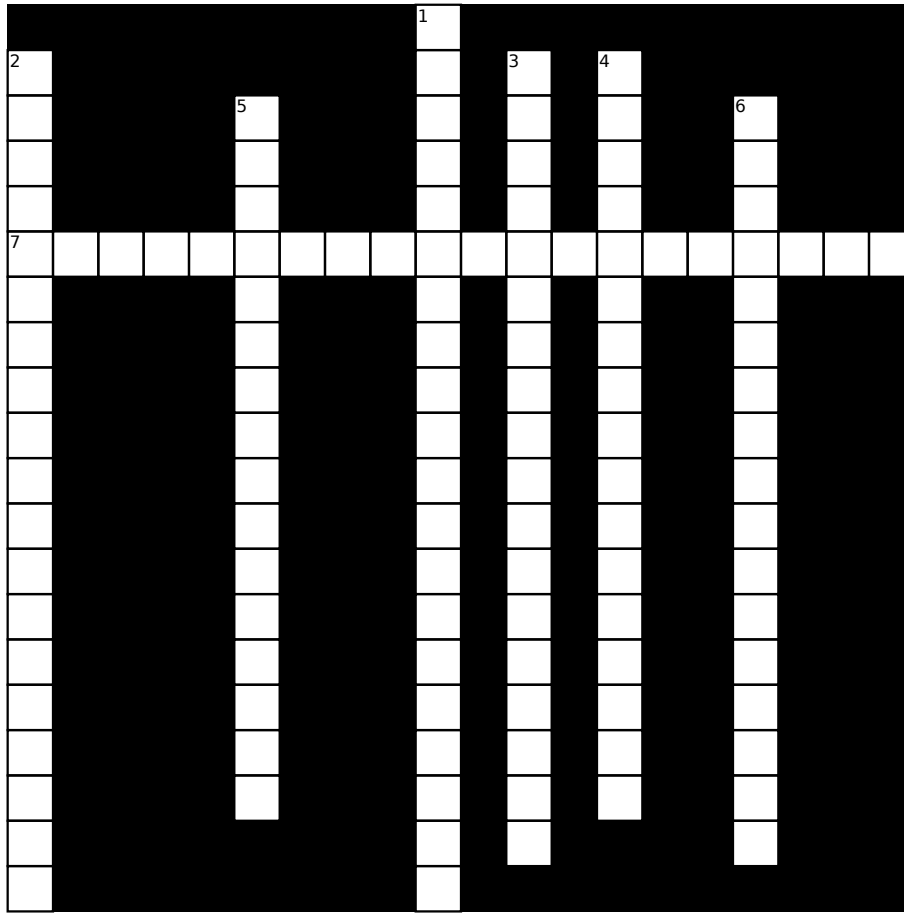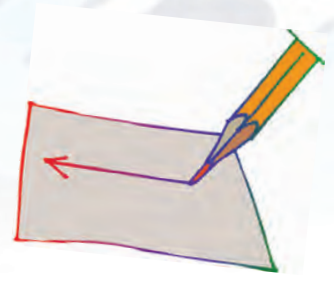
Across

7   Order of numbers does not affect the result (2 Words)

Down

1   a(b+c)=ab+ac (2 Words)

2   Numbers added or multiplied in any order yield same value (2 Words)

3   Breaking down a composit number into smaller divsors (2 Words)

4   Undoes another operation (2 Words)

5   Equality remains true regardless of variable values (2 Words)

6   PEMDAS (3 Words)

Crossword Puzzle Answers

The completed crossword grid reads:

- **2 Down:** ASSOCIATIVEPROPERTY
- **5 Down:** IDENTITYPROPERTY
- **1 Down:** DISTRIBUTIVEPROPERTY
- **3 Down:** PRIMEFACTORIZATION
- **4 Down:** INVERSEOPERATIONS
- **6 Down:** ORDEROFOPERATIONS
- **7 Across:** COMMUNTATIVEPROPERTY

Across

7 Order of numbers does not affect the result (2 Words)

Down

1 a(b+c)=ab+ac (2 Words)

2 Numbers added or multiplied in any order yield same value (2 Words)

3 Breaking down a composit number into smaller divsors (2 Words)
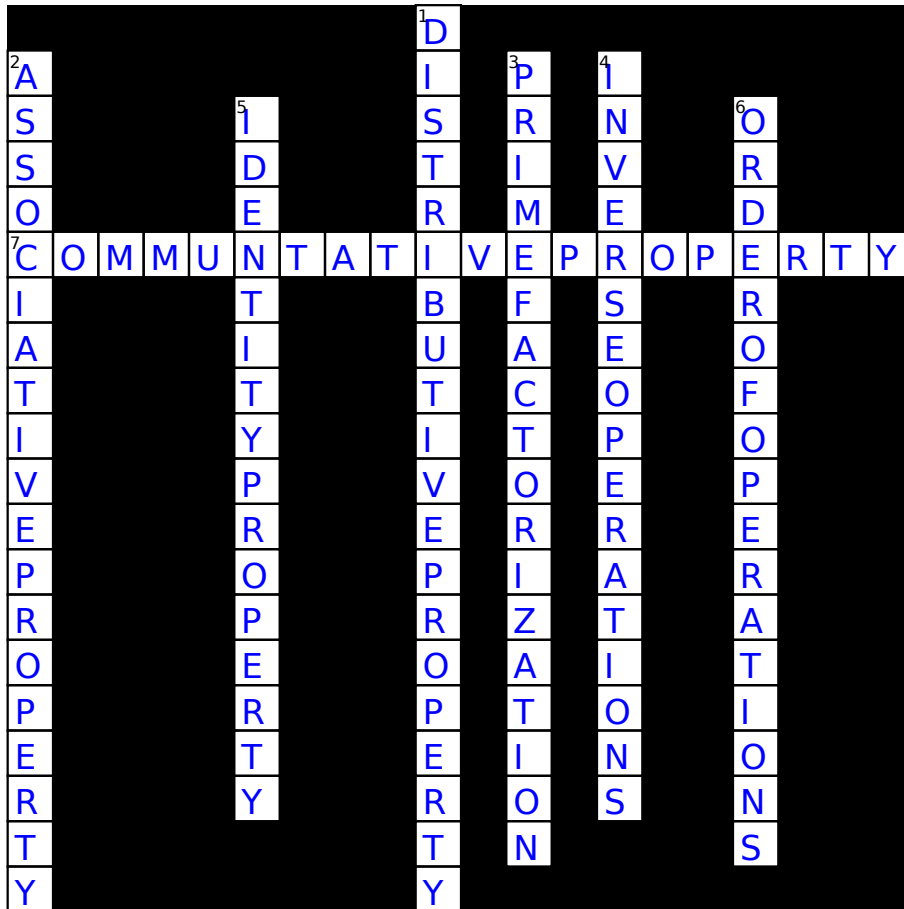
4 Undoes another operation (2 Words)

5 Equality remains true regardless of variable values (2 Words)

6 PEMDAS (3 Words)

UNIT ASSESSMENT

Understanding Meaning of Operations & Number Theory

Unit Assessment Teacher's Notes
Grade 8 ● Unit 2

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 **INVERSE OPERATIONS**.

2. Write the number 2 by the picture for **ORDER OF OPERATIONS**.

3. Write the number 3 by the picture for **PRIME FACTORIZATION**.

4. Write the number 4 by the picture for **COMMUTATIVE PROPERTY**.

5. Write the number 5 by the picture for **IDENTITY PROPERTY**.

6. Write the number 6 by the picture for **ASSOCIATIVE PROPERTY**.

7. Write the number 7 by the picture for **DISTRIBUTIVE PROPERTY**.

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

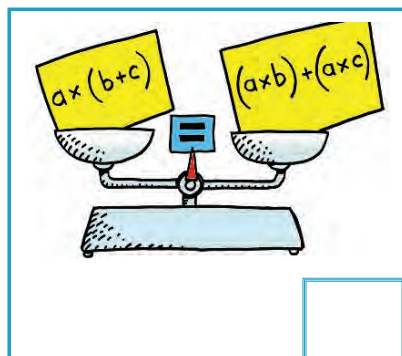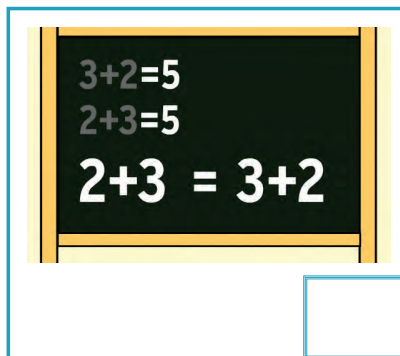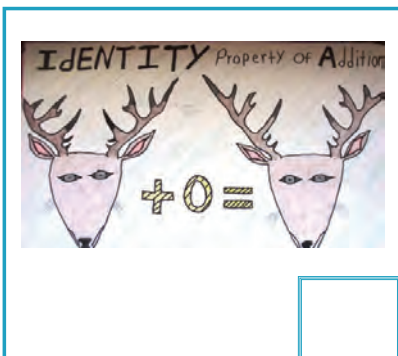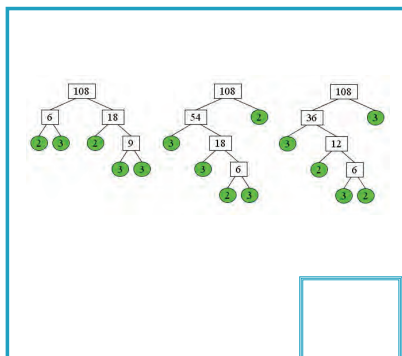Date:_____   Student's Name:_____

Number Correct:_____   Percent Correct:_____

Please Excuse My Dear Aunt Sally PEMDAS

5 + 3 = 8   8 – 3 = 5

108   108   108

IdENTITY Property of Addition
+ 0 =

3+2=5
2+3=5
2+3 = 3+2

a×(b+c)   (a×b)+(a×c)

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

5 + 3 = 8   8 – 3 = 5

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

3+2=5
2+3=5
2+3 = 3+2

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

inverse operations

order of operations

prime factorization

commutative property

identity property

associative property

distributive property

inv____ operations

arse
erse
irse
orse
urse
ars
ers
irs
ors

o____ of operations

rrdar
rrder
rrdir
rrdor
rrdur
rdar
rder
rdir
rdor

prime factoriza____

chin
chen
chan
chon
chun
tian
tien
tion
tiun

distribu____ property

tav
tev
tiv
tov
tuv
tave
teve
tive
tove

iden____ property

tate
tete
tite
tote
tute
taty
tety
tity
toty

associa____ property

tav
tev
tiv
tov
tuv
tave
teve
tive
tove

commuta____ property

tav
tev
tiv
tov
tuv
tave
teve
tive
tove

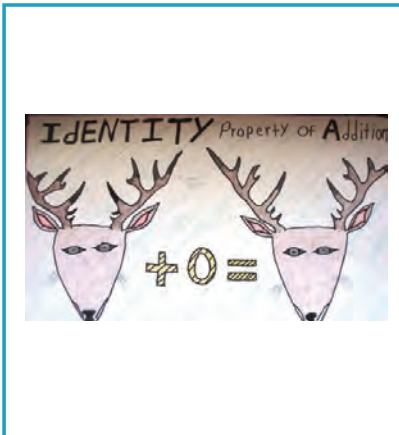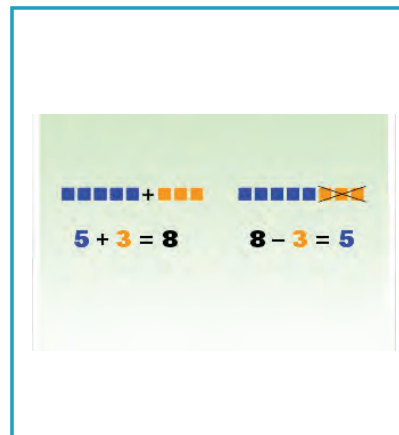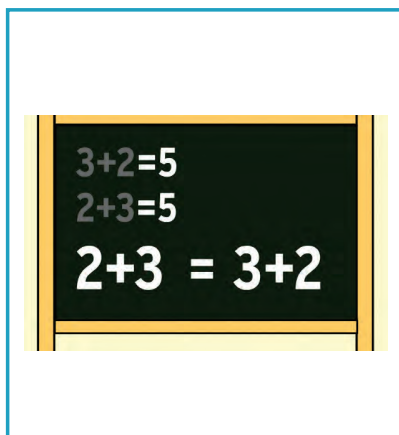| Numbers added or multiplied in any order yield same value	PEMDAS	Order of numbers does not affect the result
Breaking down a composite number into smaller divisors	Undoes another operation	a(b+c)=ab+ac
Equality remains true regardless of variable values		

inverse operations

order of operations

prime factorization

commutative property

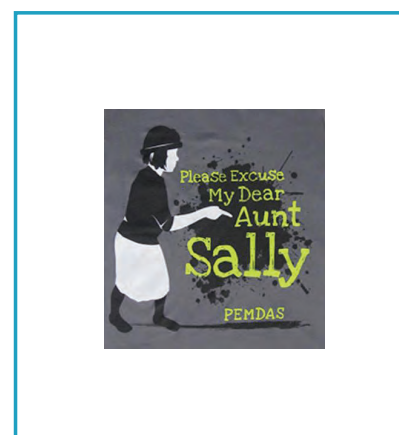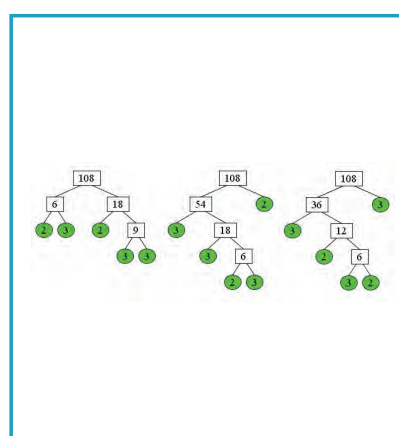identity property

associative property

distributive property
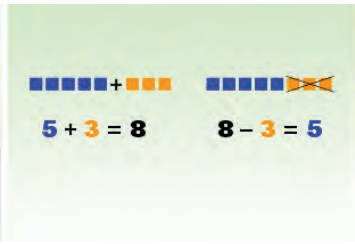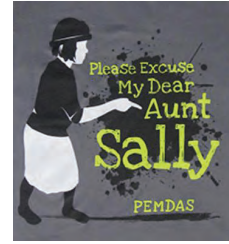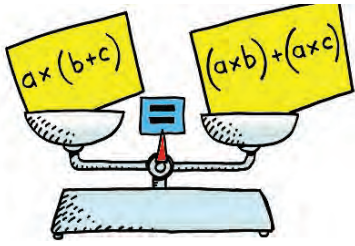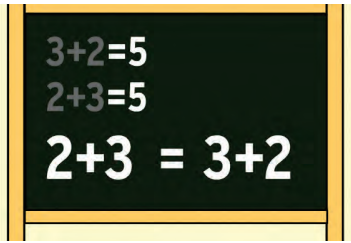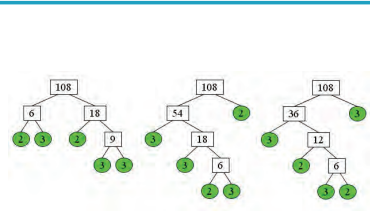
UNIT 3: Measurement, Estimation & Computation
Measurable Attributes & Techniques

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 inheriently 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

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.

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 kaleidescope?

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
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.

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
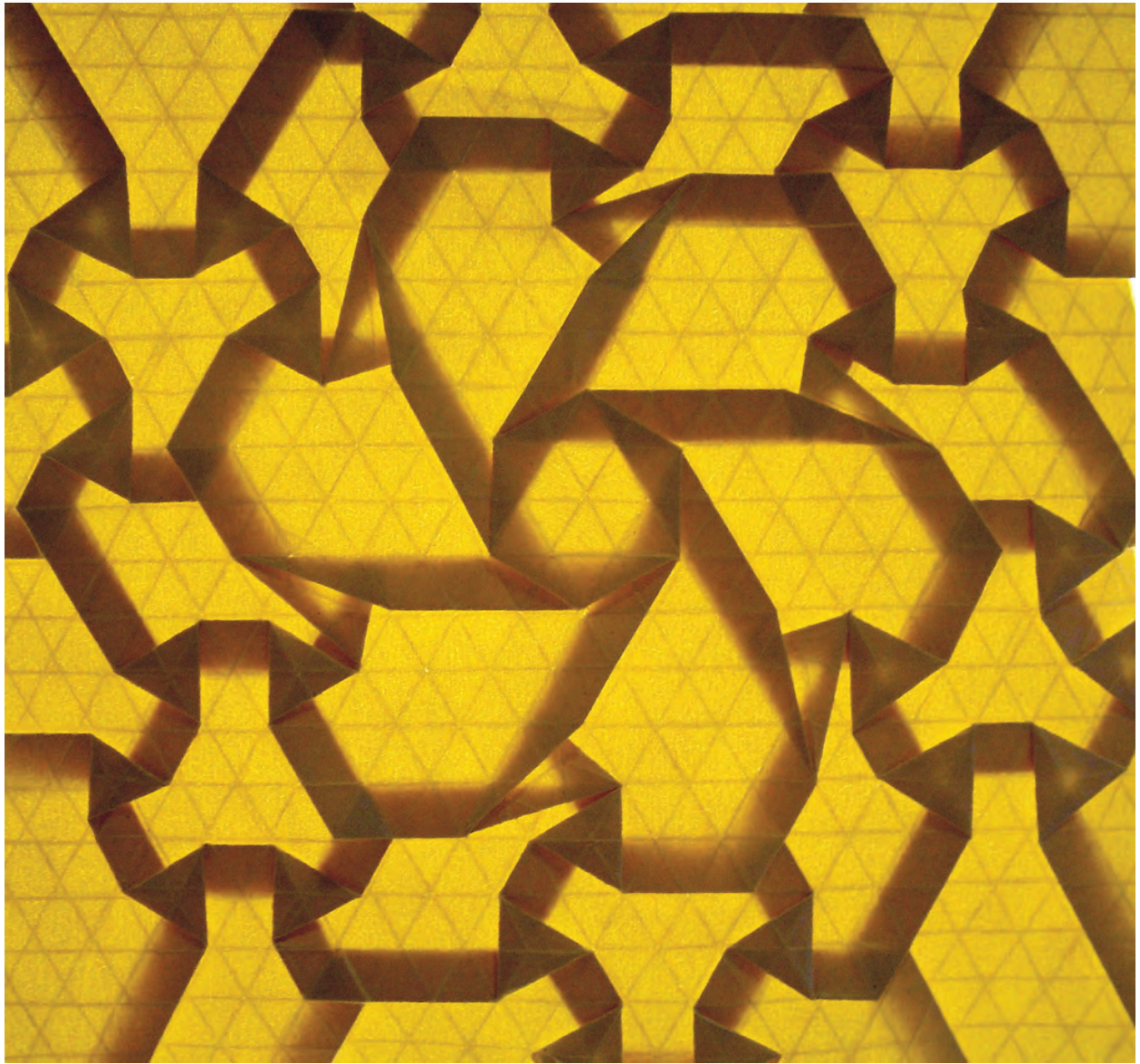
PLANE FIGURE

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.
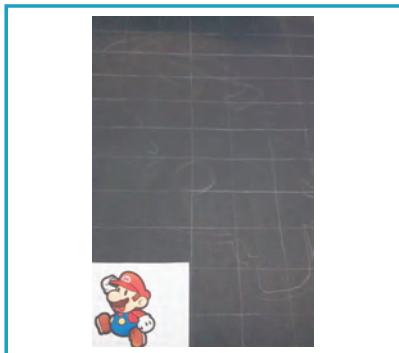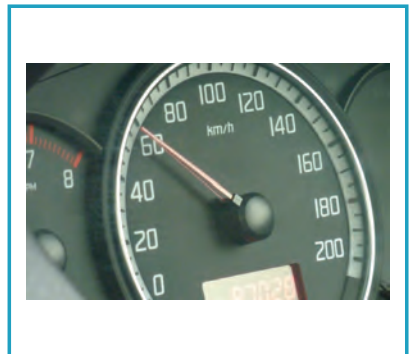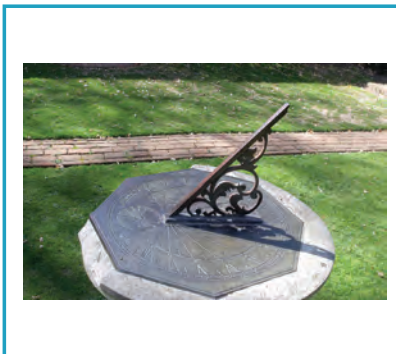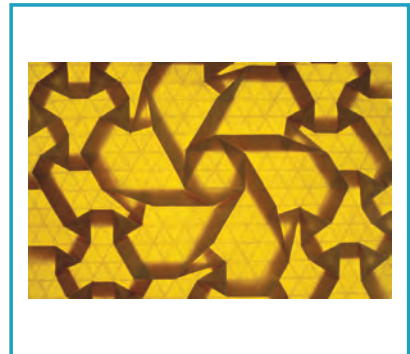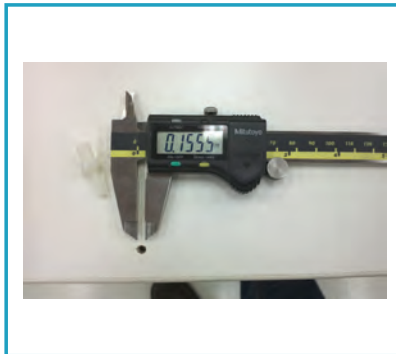
STUDENT SUPPORT MATERIALS

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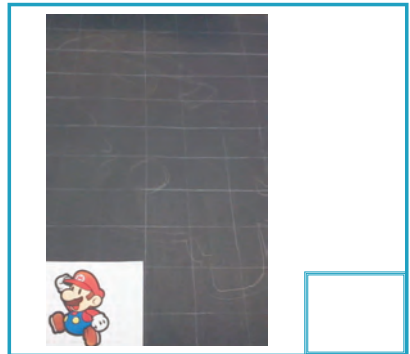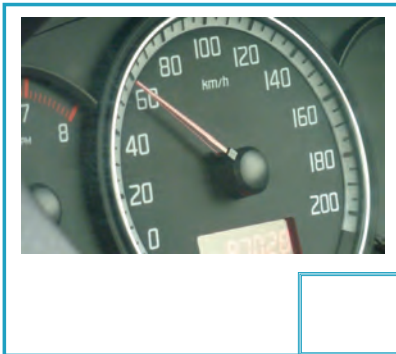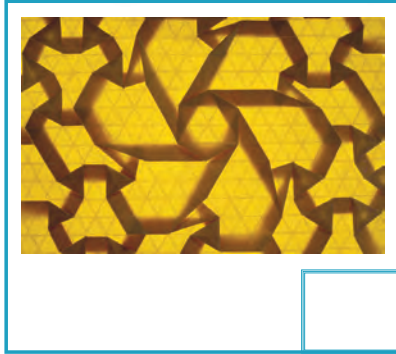
1. **measurements**
2. **dimensions**
3. **plane figure**
4. **geometric figure**
5. **indirect measurement**
6. **rate**
7. **scale factor**

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

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**

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

_____ _____ _____

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?

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

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- ○ Failure
- ○ Loss
- ○ Assistance

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- ○ Number
- ○ 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

2 The length, width and height of a long house are

3 A plane figure is a closed two-dimension figure

4 Squares and triangles are examples of

5 Using a string to measure a round object is an example

6 The rate at which birds migrate to warmer climates

7 The scale factor is important for taking a blue print

A that lies entirely in one plane.

B of indirect measurement.

C is different depending on the species.

D measurements when that species is captured.

E geometric figures.

F and making the design a reality.

G its dimensions.

1→_____   2→ _____   3→ _____   4→ _____

5→ _____   6→ _____   7→ _____

Reading Comprehension Activity Page

1 A biologist studying a given fish species may take several

A that lies entirely in one plane.

2 The length, width and height of a long house are

B of indirect measurement.

3 A plane figure is a closed two-dimension figure

C is different depending on the species.

4 Squares and triangles are examples of

D measurements when that species is captured.

5 Using a string to measure a round object is an example

E geometric figures.

6 The rate at which birds migrate to warmer climates

F and making the design a reality.

7 The scale factor is important for taking a blue print

G 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

Resembling figures in geometry	**Ratio of measurements**	**Closed, 2-dimensional and in one plane**
geometric figure	scale factor	plane figure
Measurements of object size	**Determining magnitude or quantity**	**Quotient comparing two measures of different units**
dimensions	measurements	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
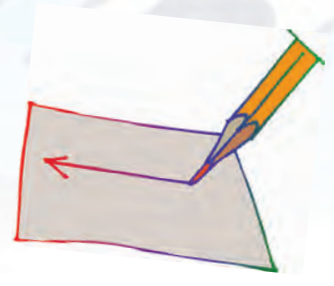
s_____ f_____r

Basic Writing Activity Page

Have the students write the word for each picture.

_____

_____

_____

_____

_____

_____

_____
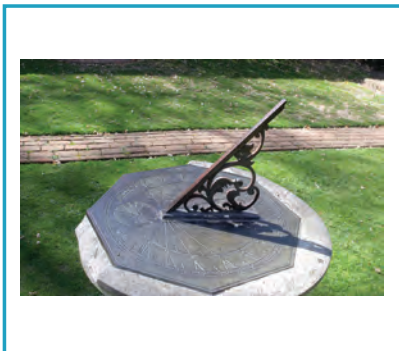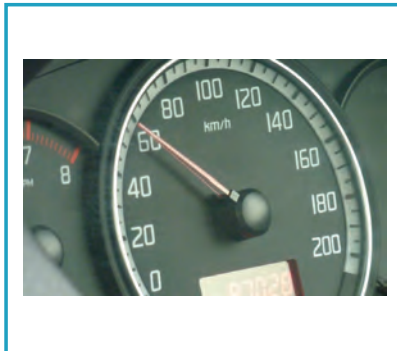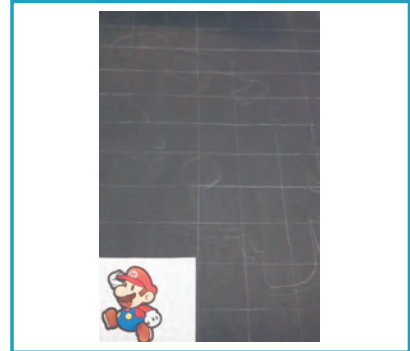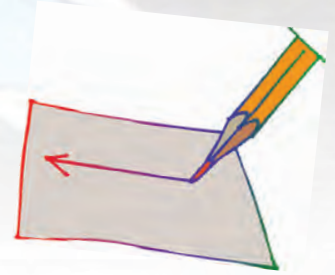
Crossword Puzzle

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
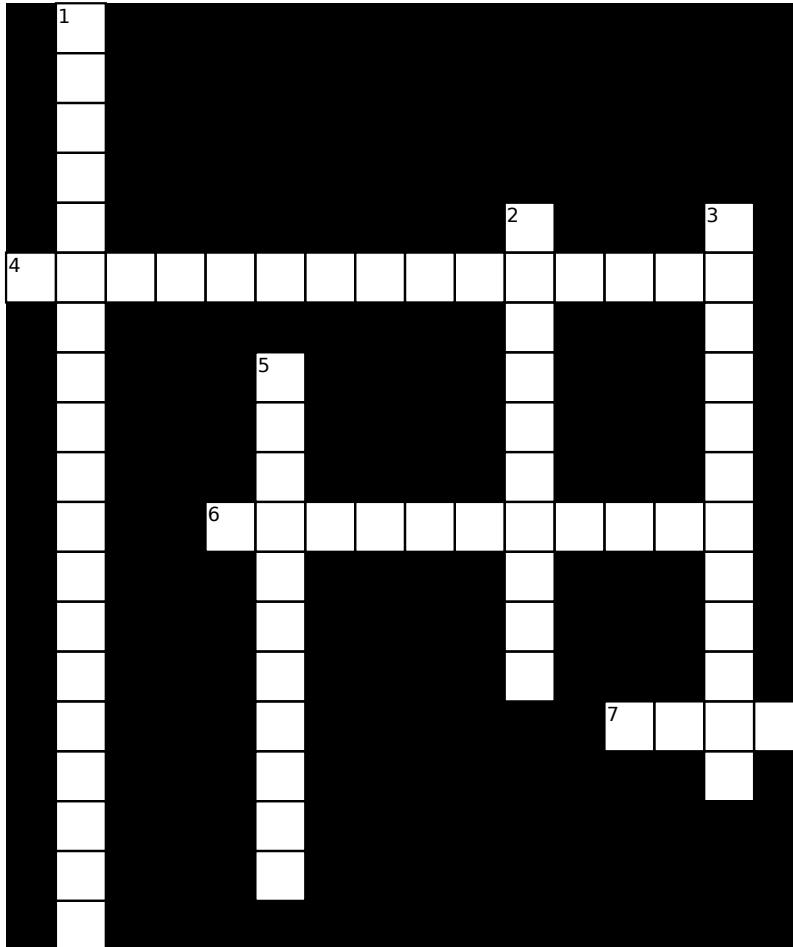
5 Ratio of measurements (2 Words)

Crossword Puzzle Answers
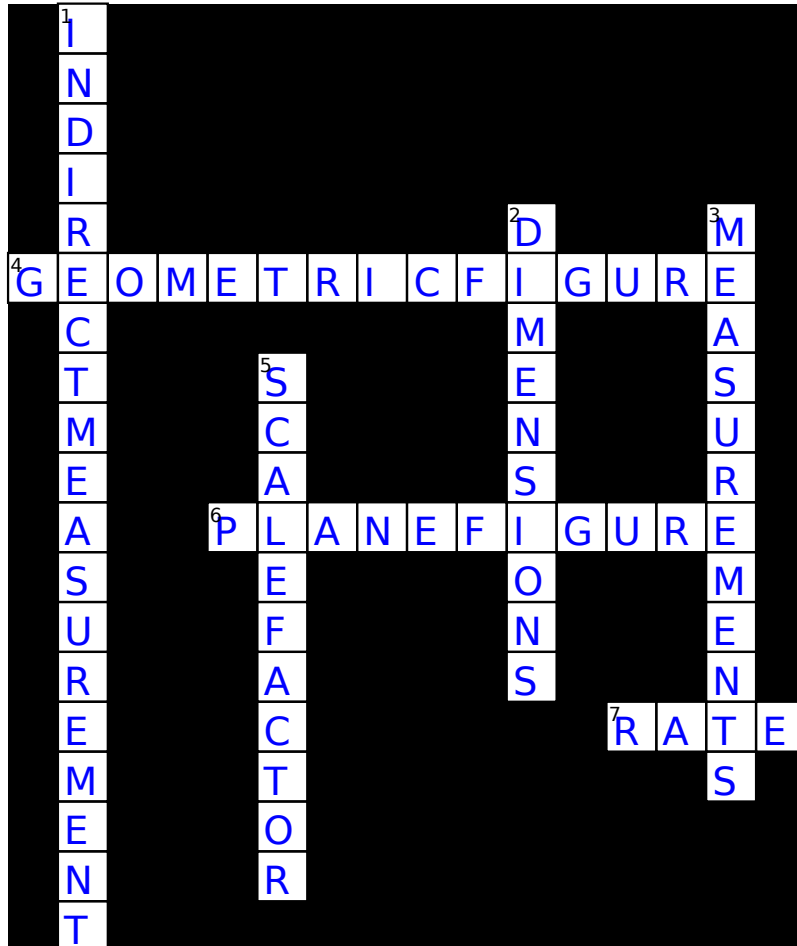
The crossword grid contains the following answers:

1 Down: INDIRECTMEASUREMENT
2 Down: DIMENSIONS
3 Down: MEASUREMENTS
4 Across: GEOMETRICFIGURE
5 Down: SCALEFACTOR
6 Across: PLANEFIGURE
7 Across: RATE

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

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

measurem____

ants
ents
ints
onts
unts
antts
entts
intts
ontts

di-
mens____

ans
ens
ins
ons
unds
ians
iens
ions
iuns

plane fi____

ngar
nger
ngir
ngor
gar
gere
gire
gore
gure

geome____
figure

trak
trek
trik
trok
truk
trac
trec
tric
troc

indi____
measurement

rakt
rekt
rikt
rokt
rukt
ract
rect
rict
roct

r____

ayde
eyde
iyde
oyde
uyde
ate
ete
ote
ute

scale fa____

ktar
kter
ktir
ktor
ktur
ctar
cter
ctir
ctor

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
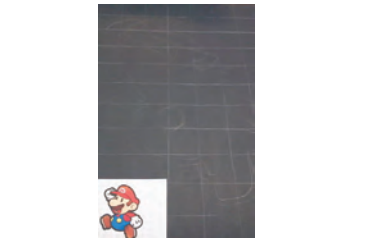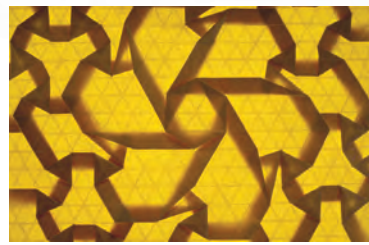
UNIT 4: Measurement, Estimation & Computation

Estimation & Computation

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.

truncating

Read a very detailed paragraph to the students. Now go around the room and ask the students to paraphrase what was said. Explain that they are truncating the story or "shortening" it. Numbers and operations can sometimes be truncated too!

rounding

Ask the students to pretend that the only coin currency in the U.S. is pennies. Dump a role of pennies on the table and give a student a piece of candy. Now buy the candy from the student for $0.99. Start counting out pennies until you get to about 30. Then just give the student a dollar bill and say "keep the change." Explain that rounding up or down often makes life simpler!

estimation

Ask the students how long it would take to get to Anchorage, Alaska by air. Ask if they know this distance to the exact minute or second. Explain that most of them estimated the time.

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.

appropriateness

Have the students write their names on a piece of paper in pen. Now hand out small erasers and have them erase it. Explain that it is difficult because they should have used a pencil! The appropriateness of the eraser was based on what was used originally. In math, appropriateness applies to most concepts!

percent

Have the students write their whole names on a piece of paper. Now have them make a list of the letters in their name and the number of times that each letter is used. Explain that the frequency that each letter occurs can be represented as a percent. What percent of each student's name is the letter "t"?

ratios

Have the students count the number of objects in the room that are predominantly red and those that are predominantly green. Ask them to express the resulting numbers as a ratio of red items to green items.

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.

proportions

Have each student draw a stick figure of any size on the board. Ask what proportion of students chose to draw very small figures. Large figures?

VOCABULARY PICTURES

TRUNCATING

ROUNDING

ESTIMATION

APPROPRIATENESS

PERCENT

RATIOS

PROPORTIONS

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.

Change

Group the students in pairs. There should be one student without a partner to be "it" for the first round of the activity. Have the students in each pair stand back to back, with elbows interlocked. Tell the students to listen for a specific word, sequence of words, or sentence. When the students hear the word, sequence, or sentence you said at the beginning of the round, they should drop arms and quickly find new partners. However, "it" must also find a partner—thus producing a new "it" for the next round of the activity.

Wild Cars

Make two "roads" on the floor using masking tape. Be certain that there are a number of curves and circles in the roads. The roads should stretch for at least ten feet. If you have a floor rug, chalk may be used to fashion the roads. Place a toy car at the beginning of each road. Lay the vocabulary pictures at the end of the roads. Have a student sit beside each car. Name one of the vocabulary pictures and say "Go." The two students should "drive" their cars along the roads as quickly as they can. The winner is the player who first parks his car on the picture for the vocabulary word you said.

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

Cat's Cradle

Group the students in a circle, sitting on the floor. Provide each student with a vocabulary picture (prepare extra pictures if necessary). The students should stand their vocabulary pictures on the floor, leaning against their legs. Give a student in the circle a ball of string. The student should hold the end of the ball of string and then say the name of a vocabulary picture that another student has. After identifying the picture, he/she should then toss the ball of string to the student who has that picture (being careful to hold tightly to his/her end of the string). The student who receives the ball of string must then repeat this process—tossing the ball of string to another student in the circle. The students should continue in this way until a "cat's cradle" has been created with the string in the center of the circle. This activity may be repeated more than once by collecting and redistributing the pictures for each new round.

Roll 'Em Again!

Mount the vocabulary pictures on the board. Number each picture from one to six (repeat a number as often as necessary). Then, group the students into two teams. Give the first player in each team a die. When you say "Go," the first player in each team must roll his/her die. He/She should call the number showing on it and then say a complete sentence about a vocabulary picture on the board that has the same number. Repeat this process until all students have participated.

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.

Configurations

Before the activity begins, print the sight words on an overhead transparency sheet (fill the transparency with words). Place the transparency on an overhead projector and project the sight words onto the board. Review the sight words with the students. Then, outline each of the sight words on the board with chalk. When a configuration has been created for each sight word, turn the overhead projector off. Then, point to one of the configurations and call upon a student to identify the sight word for the configuration. Continue in this way until all of the sight words have been correctly identified. You may wish to turn the projector on momentarily to verify a student's response.

Letter Encode

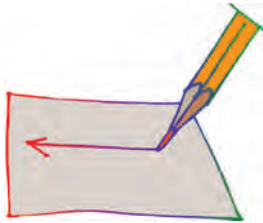Give each student his/her envelope that contains the alphabet letters. Show a picture from this unit. The students must use the cut-out letters to spell the word for the picture. Review the students' work. Repeat, until all of the words have been spelled.

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

Watch Your Half

Prepare a photocopy of each of the vocabulary pictures. Cut the photocopied pictures in half. Keep the picture halves in separate piles. Group the students into two teams. Give all of the picture halves from one pile to the players in Team One. Give the picture halves from the other pile to the players in Team Two. Say a vocabulary word. When you say "Go," the student from each team who has the picture half for the vocabulary word you said should rush to the board and write the word on the board. The first player to do this correctly wins the round. Repeat until all players have participated. This activity may be played more than once by collecting, mixing, and redistributing the picture halves to the two teams.

Back Writing

Group the students into two teams. Have the first player from each team stand in front of the board. Use the index finger of your writing hand to "write" the first letter of a sight word on the two players' backs. When you have done this, say "Go." Each of the players should then write a sight word on the board that begins with that letter. Repeat with other pairs of players until all players in each team have played and until all sight words have been written 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.

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

MATERIALS

Sight Words

truncating

rounding

estimation

appropriateness

percent

ratios

proportions

STUDENT SUPPORT MATERIALS

Reading ● **Sight Recognition**

Sight Words Activity Page

Have the students circle the word for each picture.

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

Sight Words Activity Page

truncating

rounding

estimation

appropriateness

percent

ratios

proportions

Sight Words Activity Page

Write the numbers on their correct vocabulary graphics.

1. truncating
2. rounding
3. estimation
4. appropriateness
5. percent
6. ratios
7. proportions

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.

proportions	rounding	truncating
ratios	percent	
appropriateness	estimation	

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

Sight Words Activity Page

proportions   rounding   truncating
ratios   percent
appropriateness   estimation

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

STUDENT SUPPORT MATERIALS

Reading   ●   Encoding

Encoding Activity Page

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

trun_____g

R_____ng

est_____ion

ap_____eness

p_____t

propriat	oundi	catin

port	ercen

r_____os

Pro_____ions

imat

ati

Encoding Activity Page

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

trun	**imation**
ro	**cating**
est	**ortions**
approp	**unding**
pe	**riateness**

Encoding Activity Page

ra

rcent

prop

tios

Encoding Activity Page

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

ting	ca	trun

_____ _____ _____

ding	roun

_____ _____

ti	es	tion	ma

_____ _____ _____ _____

Encoding Activity Page

prop	ap	ate	ness

____ ____ ____ ____

ri

____

per	cent

____ ____

tios | ra

_____ _____

tions | por | pro

_____ _____ _____

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 Another word for shortening or cutting off a part of something is _____ it.
- ○ Lengthening
- ○ Rotating
- ○ Following
- ○ Truncating

2 If you picked 5.963 bushels of blueberries and someone asked you how much you picked, you're likely to just say 6 bushels. This is an example of
- ○ Lying
- ○ Reversing
- ○ Exaggerating
- ○ Rounding

3 You don't know exactly how much fuel you would need to get from Hollis to Metlakatla by boat but you guess it will cost about $100. You are using
- ○ Luck
- ○ Measurements
- ○ Estimation
- ○ Nonsense

4 The _____ of language used to speak to our elders is important.
- ○ Volume
- ○ Appropriateness
- ○ Complexity
- ○ Bashful

5 What _____ of people in Alaska prefer winter to summer?
- ○ Percent
- ○ Likelihood
- ○ Cause
- ○ Intelligence

What's the Answer?

6 The ratio of people living in Alaska compared to the lower 48 is quite _____.
- ○ Large
- ○ Small
- ○ Happy
- ○ Equal

7 The discovery of life on other planets would be a discovery of epic _____.
- ○ Livelihood
- ○ Rate
- ○ Proportions
- ○ Linkages

What's the Answer?

1 Another word for shortening or cutting off a part of something is _____ it.
- ○ Lengthening
- ○ Rotating
- ○ Following
- ● Truncating

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- ○ Equal

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- ○ Livelihood
- ○ Rate
- ● Proportions
- ○ Linkages

Reading Comprehension Activity Page

Write the numbers/letters for sentence halves that match.

1 Truncating a lengthy novel means taking the key points

2 In real life, it is often easier to

3 If an exact number is not known, it is

4 The appropriateness of one's tone of voice

5 The percentage of adults with college loans

6 The ratio of arm length to leg length on a human being

7 The proportion of dessert food as compared to whole grains in a diet

A may be different depending on the occasion.

B is usually fairly consistent.

C appears to be increasing.

D should be relatively small.

E often necessary to use estimation.

F round to the nearest whole number rather than use decimals.

G and making the story shorter.

1→_____   2→ _____   3→ _____   4→ _____

5→ _____   6→ _____   7→ _____

Reading Comprehension Activity Page

1 Truncating a lengthy novel means taking the key points

2 In real life, it is often easier to

3 If an exact number is not known, it is

4 The appropriateness of one's tone of voice

5 The percentage of adults with college loans

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B is usually fairly consistent.

C appears to be increasing.

D should be relatively small.

E often necessary to use estimation.

F round to the nearest whole number rather than use decimals.

G and making the story shorter.

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

Reading Comprehension Activity Page

Cut out the words and glue them under their definitions.

Replacing with a close approximation	**Quotient to compare quantities of same units**	**A rough calculation**
Comparative relation to a whole	**Shortening**	**Proportion in relation to a whole**
Suitable or fitting		

truncating   rounding   estimation   appropriateness

percent   ratios   proportions

Reading Comprehension Activity Page

Replacing with a close approximation	**Quotient to compare quantities of same units**	**A rough calculation**
rounding	ratios	estimation

Comparative relation to a whole	**Shortening**	**Proportion in relation to a whole**
proportions	truncating	percent

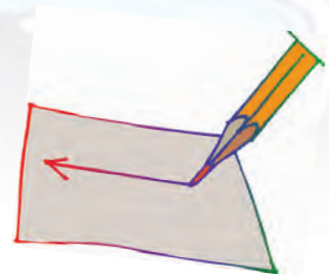| |
|---|
| **Suitable or fitting** |
| appropriateness |

STUDENT SUPPORT MATERIALS

Writing

Writing Activity Page

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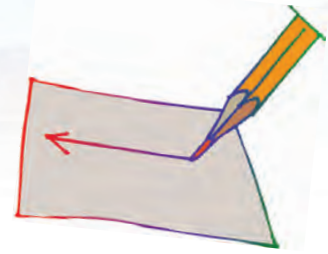
trun_____ng

r_____ding

esti_____on

ap_____riateness

per_____t

r_____ios

pro_____ions

Writing Activity Page

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

t_____g

r_____g

es_____n

ap_____s

p_____t

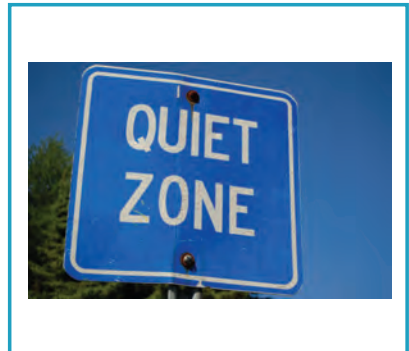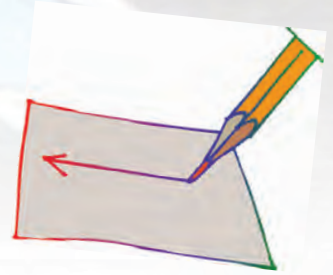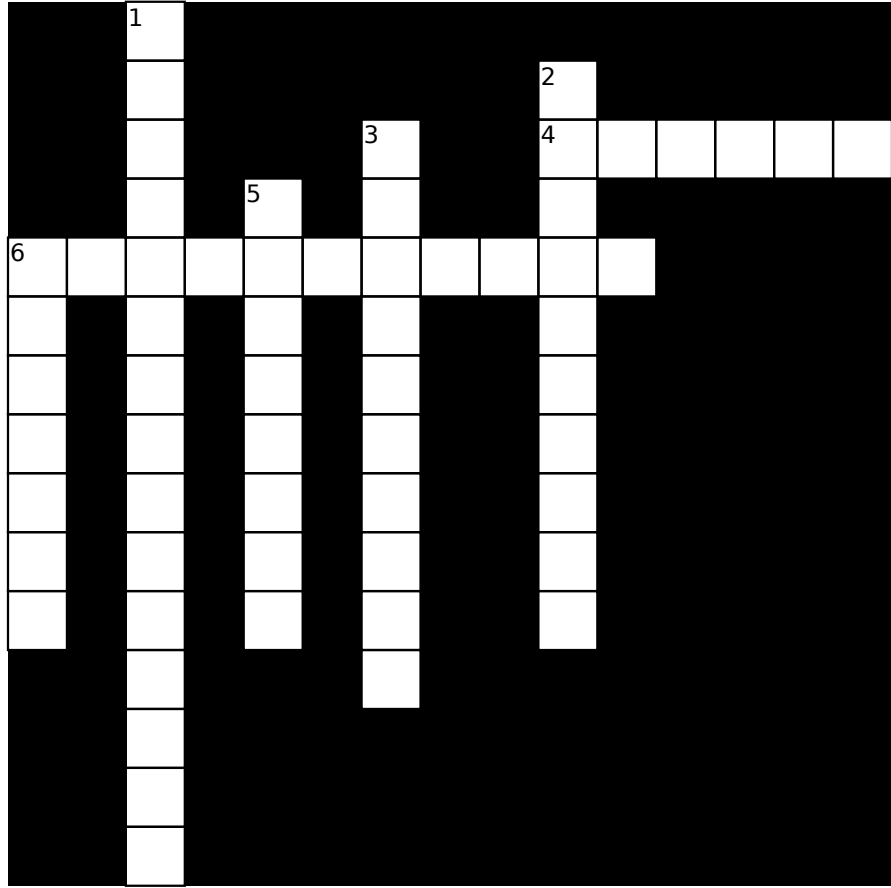ra_____s

pr_____s

Basic Writing Activity Page

Have the students write the word for each picture.

_____

_____

_____

_____

_____

_____

_____

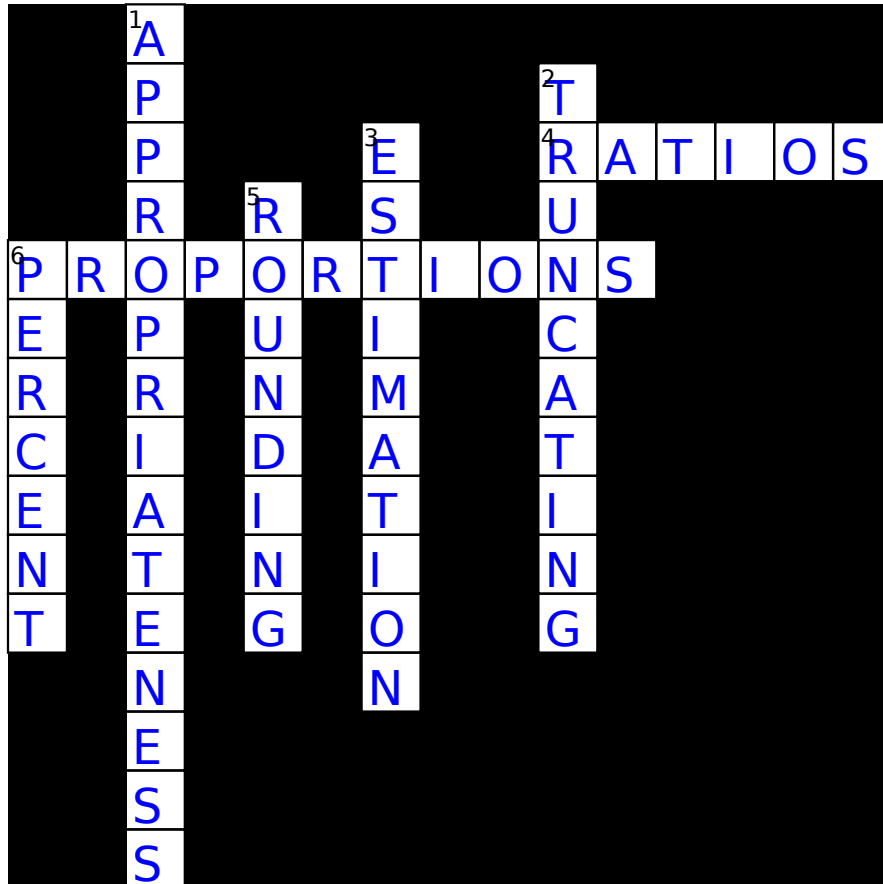# Crossword Puzzle

Across

4 Quotient to compare quantities of same units

6 Comparative relation to a whole

Down

1 Suitable or fitting

2 Shortening

3 A rough calculation

5 Replacing with a close approximation

6 Proportion in relation to a while

Crossword Puzzle Answers

		¹A						²T				
		P						R				
		P			³E		⁴R	A	T	I	O	S
		R	⁵R		S		U					
⁶P	R	O	P	O	R	T	I	O	N	S		
E		P	U		I		N					
R		R	N		M		C					
C		I	D		A		A					
E		A	I		T		T					
N		T	N		I		I					
T		E	G		O		N					
		N			N		G					
		E										
		S										
		S										

Across

4 Quotient to compare quantities of same units

6 Comparative relation to a whole

Down

1 Suitable or fitting

2 Shortening

3 A rough calculation

5 Replacing with a close approximation

6 Proportion in relation to a while

UNIT ASSESSMENT

Estimation & Computation

Unit Assessment Teacher's Notes
Grade 8 ● Unit 4
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 **TRUNCATING**.

2. Write the number 2 by the picture for **ROUNDING**.

3. Write the number 3 by the picture for **ESTIMATION**.

4. Write the number 4 by the picture for **APPROPRIATENESS**.

5. Write the number 5 by the picture for **PERCENT**.

6. Write the number 6 by the picture for **RATIOS**.

7. Write the number 7 by the picture for **PROPORTIONS**.

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.

MATH PROGRAM

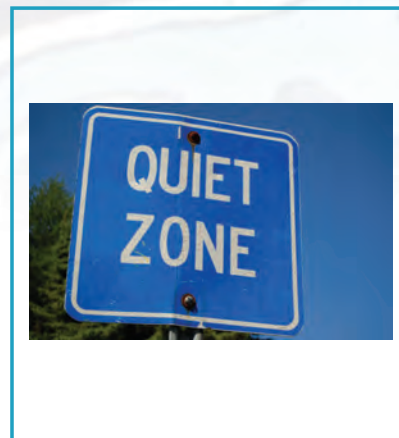**Unit Assessment Student Pages**
Grade 8 ● Unit 4

Date:_____   Student's Name:_____

Number Correct:_____   Percent Correct:_____

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

truncating
rounding
estimation
appropriateness
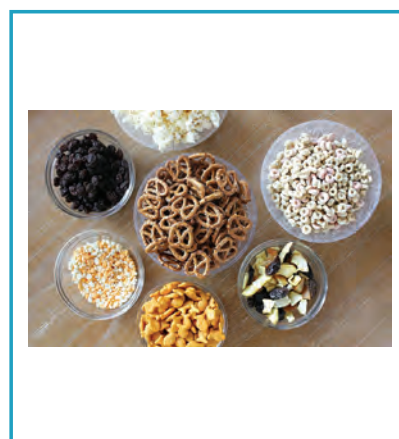percent
ratios
proportions

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

truncating
rounding
estimation
appropriateness
percent
ratios
proportions

trunca____

stang
steng
sting
stong
stung
tang
teng
ting
tong

roun____

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teng
ting
tong
tung
dang
deng
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dong

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chon
chun
tian
tien
tion
tiun

per____

sant
sent
sint
sont
sunt
cant
cent
cint
cont

appropriate____

nas
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nis
nos
nus
nass
ness
niss
noss

ra____

shase
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ties
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proport____

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ions

Replacing with a close approximation	Quotient to compare quantities of same units	A rough calculation

Comparative relation to a whole	Shortening	Proportion in relation to a whole

Suitable or fitting

truncating	rounding	estimation	appropriateness

percent	ratios	proportions

UNIT 5: Functions & Relationships

Describing Patterns & Functions

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.

linear patterns

Have each student choose a number from one to ten. Now give them three minutes to make a list of numbers starting at zero and adding that number over and over again. Explain that this is a linear pattern since there is the same amount between each number. Who got to the highest number? Who had the most additions?

tables

Draw a table on the board of student ages, genders, and favorite subjects. Now write those same data in a jumbled mess. Explain that tables help us to compile and order data.

sequences

Have students describe how the weather changes throughout the year and what activities they do throughout the year. Explain that there is a repeating "sequence" to the seasons.

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.

graphs

Ask the students to go around the room and make a list of how many girls and how many boys have green on their shoes. Now ask them to draw this as a graph on their paper. Explain that graphs help us to easily view a set of data!

ordered pairs

Show the students a map and have them point to a specific location that they'd like to visit. Explain that the point is a unique ordered pair on the earth giving a direction north/south and east/west. Explain that these "coordinates" are ordered pairs.

quadrilateral

Explain to the students that a quadrilateral is a polygon with four sides and four corners. Have the students fill a piece of paper with quadrilaterals and have them judge the best designs!

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.

rectangular prism

Using only tin foil and masking tape, ask each student to build a rectangular prism after being told the definition. Which two look the most alike and which two are the most different? What similarities do they all share?

VOCABULARY PICTURES

LINEAR PATTERNS

TABLES

SEQUENCES
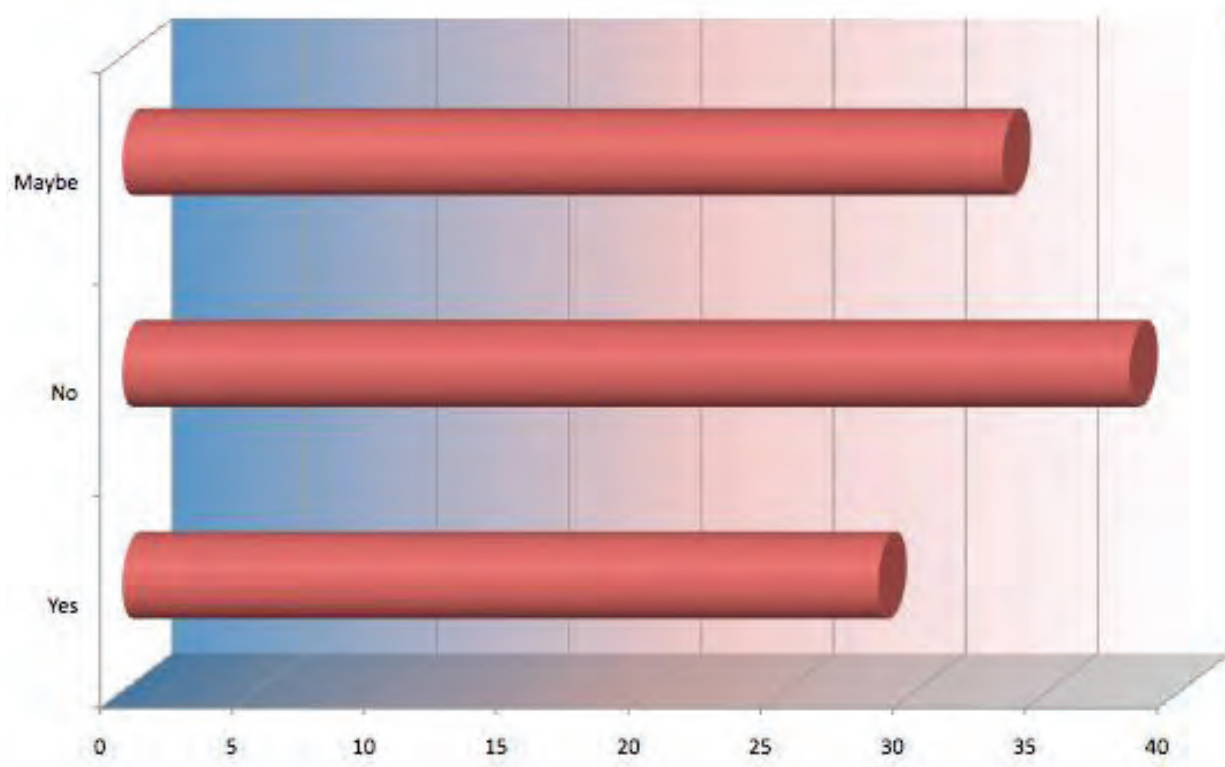
GRAPHS

ORDERED PAIRS

QUADRILATERAL

RECTANGULAR PRISM

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.

Turn and Face

Mount the vocabulary pictures on the walls and board. Group the students together in the center of the classroom. Say one of the vocabulary words and the students should turn to face the picture for the word you said. Depending upon the size of your class, this activity may be done in small groups. This activity may also be done in team form. In this case, have a player from each team stand in the center of the classroom. When a player faces the wrong direction (i.e., the wrong picture), he/she is "out" until a later round of the activity. Repeat until all players have had an opportunity to participate.

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

Balloon Volleyball

Group the students into two teams. The two teams should stand, facing one another. Toss a round, inflated balloon to the members of Team One. The members of Team One must then bounce the balloon to the members of Team Two. The players should continue to bounce the balloon back and forth in this way until a team loses the balloon. You may wish to establish the rule that players may not move their feet during the activity. When a team loses the balloon, show them a vocabulary picture and all team members in that team must say the vocabulary word for it. Repeat until players in both teams have responded a number of times.

Slip String

Mount the vocabulary pictures on the board. Join all of the students together with a long length of string. Before tying the ends of the string together, insert a roll of tape over one end of the string (a large washer can also be used). Then, tie the ends of the string together. Face away from the students. The students should then pass the roll of tape as quickly as possible along the string. When you clap your hands, the student who is holding the roll of tape, must identify (orally) a vocabulary picture you point to. For added motivation, you may wish to place more than one roll of tape (or washer) on the line of string. Repeat until many students have responded.

Roll 'Em Again!

Mount the vocabulary pictures on the board. Number each picture from one to six (repeat a number as often as necessary). Then, group the students into two teams. Give the first player in each team a die. When you say "Go," the first player in each team must roll his/her die. He/She should call the number showing on it and then say a complete sentence about a vocabulary picture on the board that has the same number. Repeat this process until all students have participated.

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.

Deal

Before the activity begins, obtain two decks of playing cards. Give all of the cards from one deck to the students (if possible, arrange it so that all students have the same number of cards). Mount the sight words on the board. Hold a playing card from the other deck of cards against one of the sight words on the board. The student who has the matching playing card must identify the sight word. When the student has done this correctly, he/she should place that playing card to the side. Continue in this way until a student or students have no playing cards left in their hands.

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

Mirror Writing

Group the students into two teams. Have the first player from each team stand in front of the board. Give each of the two players a small, unbreakable mirror. Stand some distance behind the two players with pictures for the sight words. Hold up one of the pictures. When you say "Go," the players must use the mirrors to look over their shoulders to see the picture you are holding. When a player sees the picture, he/she must write the sight word for that picture on the board. The first player to do this correctly wins the round. Repeat this process until all players in each team have had an opportunity to respond.

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).

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.
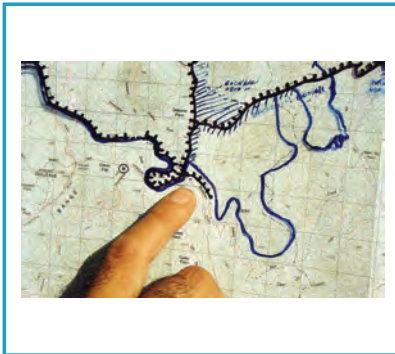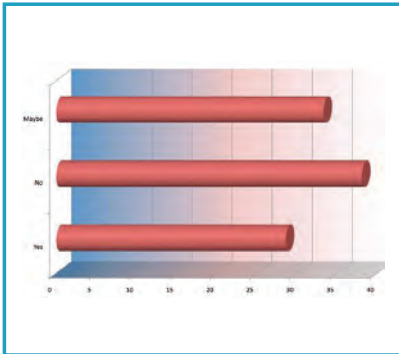
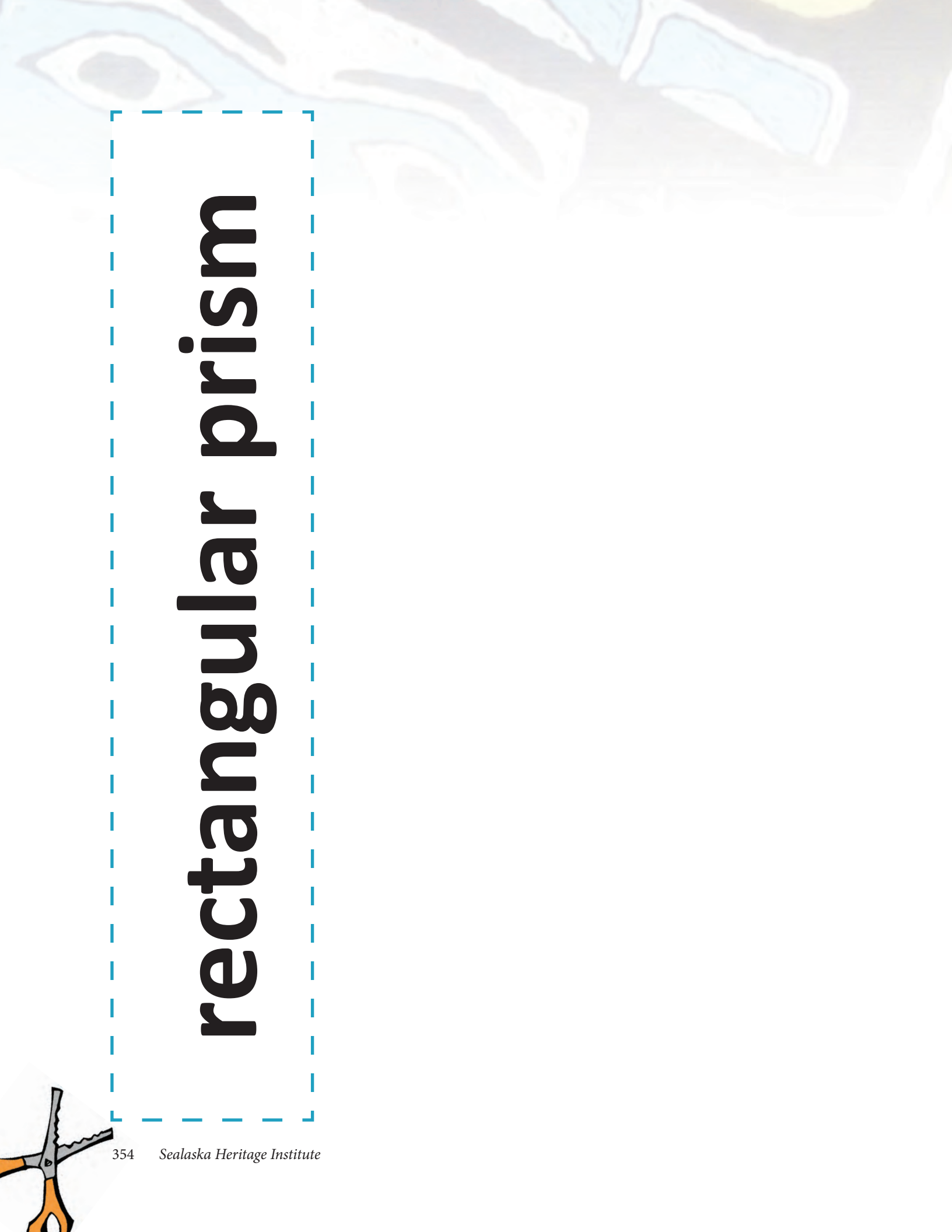# STUDENT SUPPORT MATERIALS

Sight Words

linear patterns

tables

sequences

graphs
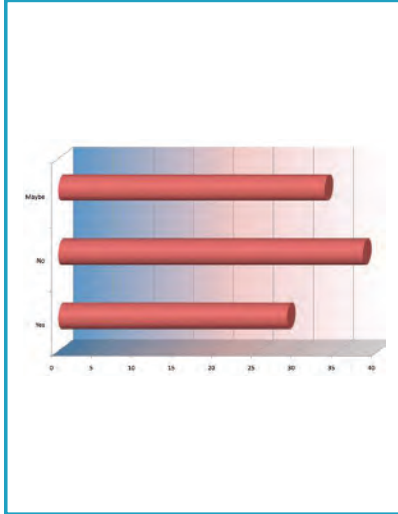
ordered pairs

quadrilateral

rectangular prism

STUDENT SUPPORT MATERIALS

Reading ● **Sight Recognition**

Sight Words Activity Page

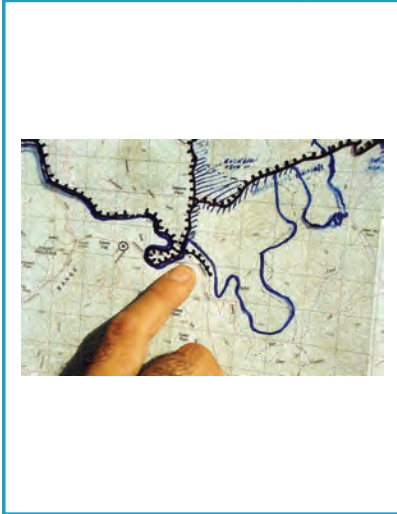*Have the students circle the word for each picture.*

linear patterns
tables
sequences
graphs
ordered pairs
quadrilateral
rectangular prism

linear patterns
tables
sequences
graphs
ordered pairs
quadrilateral
rectangular prism

linear patterns
tables
sequences
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linear patterns
tables
sequences
graphs
ordered pairs
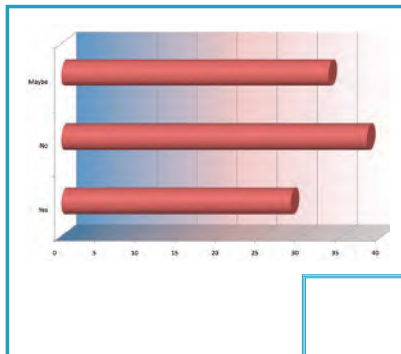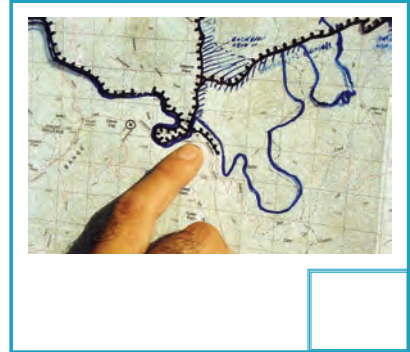quadrilateral
rectangular prism

Sight Words Activity Page

linear patterns

tables

sequences

graphs

ordered pairs

quadrilateral

rectangular prism

Sight Words Activity Page

Write the numbers on their correct vocabulary graphics.

1. **linear patterns**
2. **tables**
3. **sequences**
4. **graphs**
5. **ordered pairs**
6. **quadrilateral**
7. **rectangular prism**

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.

quadrilateral　　　ordered pairs　　　rectangular prism
graphs　　　　　　linear patterns
sequences　　　　　tables

```
n n t g g r e s e a q n n r i e p p e e a c g r c
s l s u d r e c t a n g u l a r p r i s m a n c r
d t n d r p l i g e t c r r e a t g r a p h s a r
n r a a r e a i a s a e s b a r r e l i i s t r h
i t t u a a s l r a r i a r s n p a l e i g a m r
r a e a e s r l l s e l i n e a r p a t t e r n s
a l t s s r p a b a s r r a r i a e d r i i o d l
s g r i e s g s s a r o m t d e e s s r t u r p
l o t l s g r a u p q u a d r i l a t e a h s e e
h p i n l o t t a b l e a r s e e e u b a a m i e
t g d l r r e r t t r r e s a r i r t a l a t s l
e p i c a l e a e l t a b l e s l n n a e a s s a
t p l i n e a r p a t t e r r o s e s n r i d e c
d r r e t m t s s p n i e p a r l t n r n s l m t
l u r p s r h r e c t a n g u l a r p r u t e g d
n a r g r a s c d d t q s r t n a u g r b a t e t
c e l l n s r e t r a t r r a q t e i r i s g l a
p r i t t s i e i i l o e d r m e e i p n a s i i
t b t e s e q u e n c e s e l e l c r r e i u l a
t a t a a m b a e r r a s l s p q r r q e a e l a
i n l r t r a s e p l n q o r d e r e d p a i s u
g l g m r t o r d e r e d p a i r s q e p r r r e
r s r a a b a e a d m i n r t g s g c u p p e e r
e u e m a u t i t i s r q u a d r i l a t e r a l
s h t t e p p u u d i l r t n t l r r t c s b r t
r r a a e a s r o i r i c s a l i e s o a c r e q
l e a e l r l i g g i t t e a q s u c s g s r t r
e i c s t r r e t s s i q a q e s p p a s a r l a
e a e e a p s o e e i l r c a e s e q u e n c q c
e h c a e c r u l r p p s r e e a h n r i d t p r
```

Sight Words Activity Page

ANSWER KEY

quadrilateral
graphs
sequences

ordered pairs
linear patterns
tables

rectangular prism

n n t g g r e s e a q n n r i e p p e e a c g r c
s l s u d r e c t a n g u l a r p r i s m a n c r
d t n d r p l i g e t c r r e a t g r a p h s a r
n r a a r e a i a s a e s b a r r e l i i s t r h
i t t u a a s l r a r i a r s n p a l e i g a m r
r a e a e s r l l s e l i n e a r p a t t e r n s
a l t s s r p a b a s r r a r i a e d r i i o d l
s g r i e s g s s a r o m t d e e s s r t u r p
l o t l s g r a u p q u a d r i l a t e a h s e e
h p i n l o t t a b l e a r s e e e u b a a m i e
t g d l r r e r t t r r e s a r i r t a l a t s l
e p i c a l e a e l t a b l e s l n n a e a s s a
t p l i n e a r p a t t e r r o s e s n r i d e c
d r r e t m t s s p n i e p a r l t n r n s l m t
l u r p s r h r e c t a n g u l a r p r u t e g d
n a r g r a s c d d t q s r t n a u g r b a t e t
c e l l n s r e t r a t r r a q t e i r i s g l a
p r i t t s i e i i l o e d r m e e i p n a s i i
t b t e s e q u e n c e s e l e l c r r e i u l a
t a t a a m b a e r r a s l s p q r r q e a e l a
i n l r t r a s e p l n q o r d e r e d p a i s u
g l g m r t o r d e r e d p a i r s q e p r r r e
r s r a a b a e a d m i n r t g s g c u p p e e r
e u e m a u t i t i s r q u a d r i l a t e r a l
s h t t e p p u u d i l r t n t l r r t c s b r t
r r a a e a s r o i r i c s a l i e s o a c r e q
l e a e l r l i g g i t t e a q s u c s g s r t r
e i c s t r r e t s s i q a q e s p p a s a r l a
e a e e a p s o e e i l r c a e s e q u e n c q c
e h c a e c r u l r p p s r e e a h n r i d t p r

STUDENT SUPPORT MATERIALS

Reading ● **Encoding**

Encoding Activity Page

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

linear p_____rns

t_____s

s_____nces

gr_____s

o_____d pairs

eque	rdere	able
tangu	aph	

qu_____lateral

rec_____lar prism

atte

adri

Encoding Activity Page

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

lin	bles
ta	airs
se	ear patterns
gr	angular prism
ordered p	aphs

Encoding Activity Page

quad

rilateral

rect

quences

Encoding Activity Page

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

ar	li	ne

_____ _____ _____

terns	pat

_____ _____

les	tab

_____ _____

quen se ces

_____ _____ _____

graphs

_____

pairs dered or

_____ _____ _____

ri | la | ral | te

_____ _____ _____ _____

quad

_____

tan | rec | lar | gu

_____ _____ _____ _____

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 Linear patterns include a list of numbers that increases or decreases by _____ amount between each number.
- ○ The same
- ○ A different
- ○ A larger
- ○ A smaller

2 A set of data arranged in rows and columns is a _____.
- ○ Table
- ○ Chair
- ○ List
- ○ Hard Drive

3 A _____ of events lead to the passage of the Alaska Native Claims Settlement Act (ANCSA).
- ○ Failure
- ○ Sequence
- ○ List
- ○ Plot

4 Data on an increase in bear attacks on humans over time may be best represented using:
- ○ Graphs
- ○ Traps
- ○ Bear Spray
- ○ Dictionaries

5 Coordinates on a GPS unit are listed as:
- ○ Cartoons
- ○ Stick Figures
- ○ Single Digit Numbers
- ○ Ordered Pairs

What's the Answer?

6 A quadrilateral is a polygon with four sides and four:
- ○ Wheelers
- ○ Line Breaks
- ○ Vertices
- ○ Linkages

7 A _____ prism has a bottom and top that are congruent rectangles.
- ○ Triangular
- ○ Rectangular
- ○ Square
- ○ Circular

What's the Answer?

(1) Linear patterns include a list of numbers that increases or decreases by _____ amount between each number.
- ● The same
- ○ A different
- ○ A larger
- ○ a smaller

(2) A set of data arranged in rows and columns is a _____.
- ● Table
- ○ Chair
- ○ List
- ○ Hard Drive

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- ○ List
- ○ Plot

(4) Data on an increase in bear attacks on humans over time may be best represented using:
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- ○ Bear Spray
- ○ Dictionaries

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- ○ Single Digit Numbers
- ● Ordered Pairs

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- ○ Wheelers
- ○ Line Breaks
- ● Vertices
- ○ Linkages

7 A _____ prism has a bottom and top that are congruent rectangles.
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- ● Rectangular
- ○ Square
- ○ Circular

Reading Comprehension Activity Page

Write the numbers/letters for sentence halves that match.

1 Linear patterns are derived from a list of numbers that increase or

A decrease by the same amount between each number.

2 Tables are valuable tools for arranging

B from year to year can be very valuable to resource managers.

3 The sequence of events leading up to a crime

C data in rows and columns.

4 Graphs depicting the changes in salmon harvest

D is shown as an ordered pair called a coordinate.

5 The latitude and longitude of one's location on a GPS

E both examples of a quadrilateral.

6 Squares and rectangles are

F that are congruent rectangles.

7 Rectangular prisms have a top and a bottom

G can be very important to a jury hearing the case.

1→_____   2→ _____   3→ _____   4→ _____

5→ _____   6→ _____   7→ _____

Reading Comprehension Activity Page

1 Linear patterns are derived from a list of numbers that increase or

2 Tables are valuable tools for arranging

3 The sequence of events leading up to a crime

4 Graphs depicting the changes in salmon harvest

5 The latitude and longitude of one's location on a GPS

6 Squares and rectangles are

7 Rectangular prisms have a top and a bottom

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B from year to year can be very valuable to resource managers.

C data in rows and columns.

D is shown as an ordered pair called a coordinate.

E both examples of a quadrilateral.

F that are congruent rectangles.

G can be very important to a jury hearing the case.

1→ A   2→ C   3→ G   4→ B

5→ D   6→ E   7→ F

Reading Comprehension Activity Page

Cut out the words and glue them under their definitions.

Order of events	Increasing or decreasing by same amount	Diagrams

Give location of a point on a plane	Polygon with 4 sides and 4 vertices	Congruent rectangles on top and bottom

Data arranged in rows and columns

linear patterns

tables

sequences

graphs

ordered pairs

quadrilateral

rectangular prism

Reading Comprehension Activity Page

ANSWER KEY

Order of events	Increasing or decreasing by same amount	Diagrams
sequences	linear patterns	graphs

Give location of a point on a plane	Polygon with 4 sides and 4 vertices	Congruent rectangles on top and bottom
ordered pairs	quadrilateral	rectangular prism

Data arranged in rows and columns
tables

STUDENT SUPPORT MATERIALS

Writing

Writing Activity Page

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

li_____r pat_____s

ta_____s

seq_____ces

gr_____hs

or_____ed pa_____s

quad_____ateral

rec_____ular p_____m

Writing Activity Page

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

l_____ p_____s

t_____s

s_____s

g_____s

o_____ p_____s

q_____l

r_____ p____m

Basic Writing Activity Page
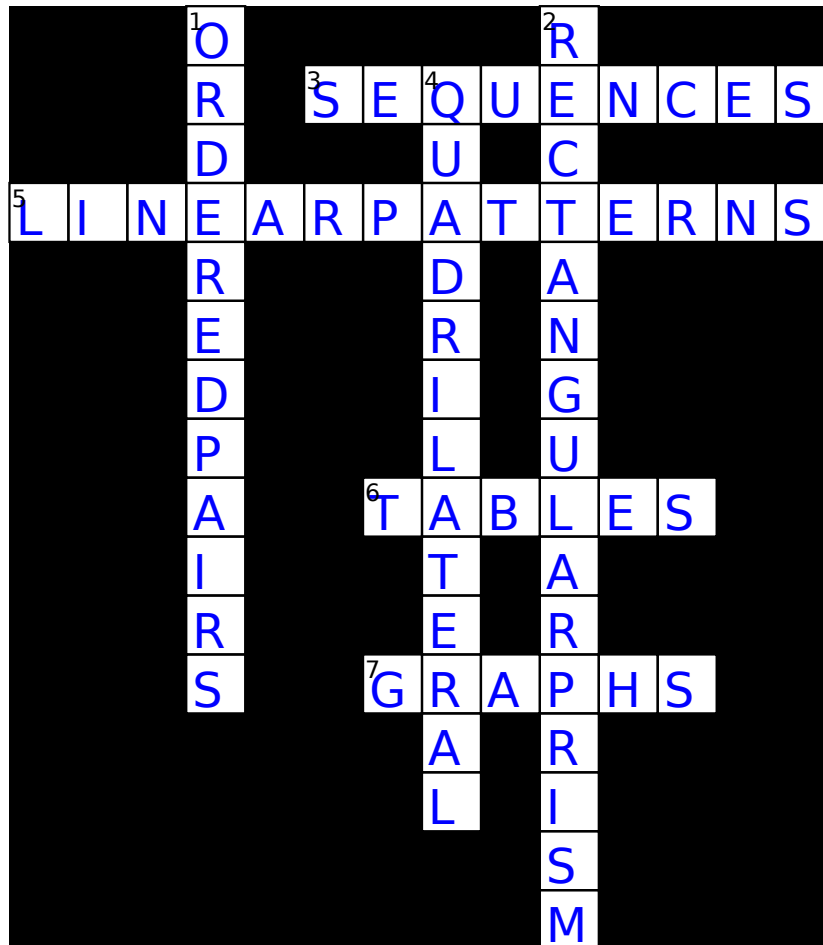
Have the students write the word for each picture.

_____

_____

_____

_____

_____

_____

_____
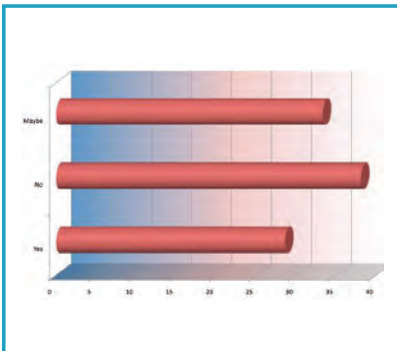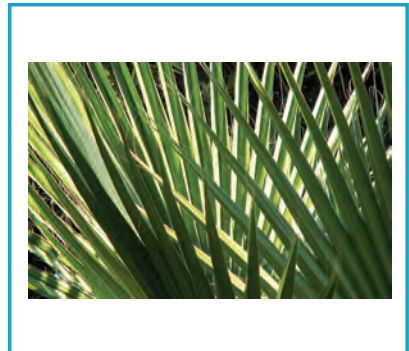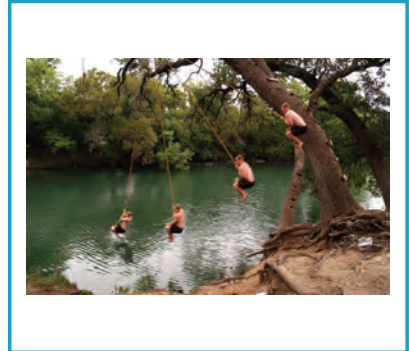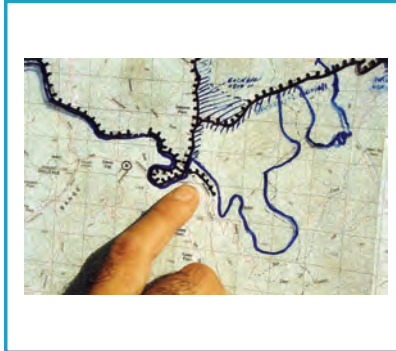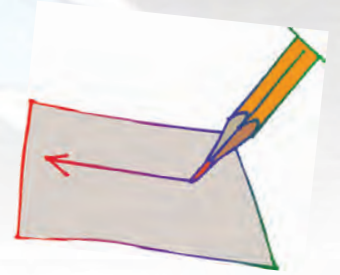
Crossword Puzzle
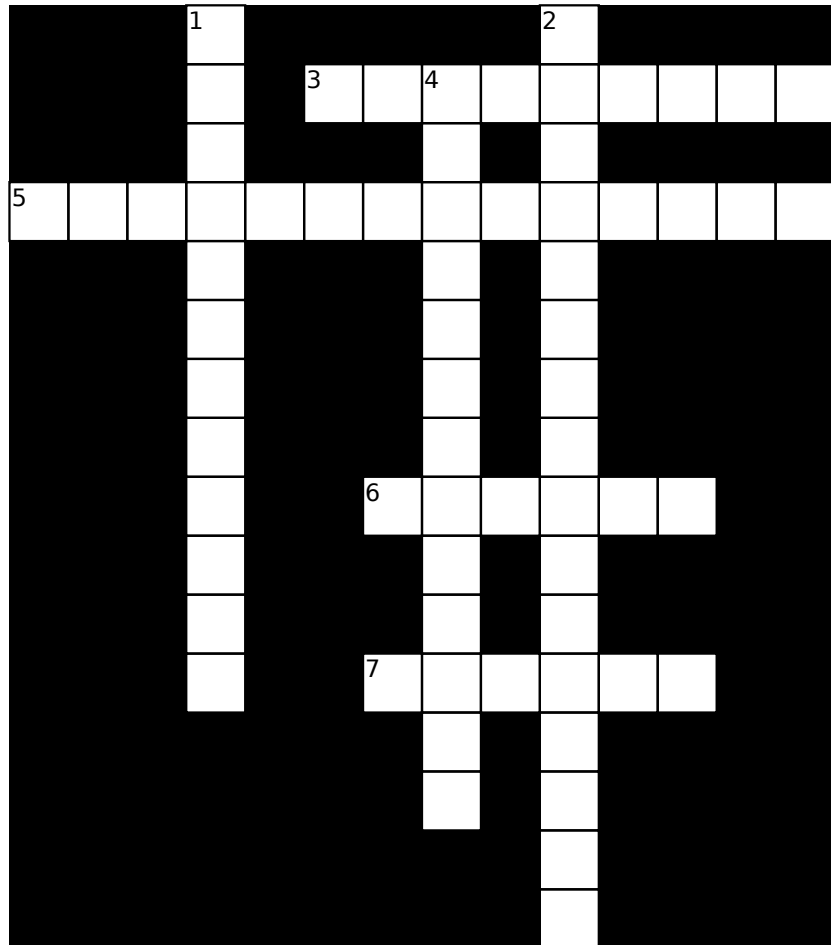
Across

3 Order of events

5 Increasing or decreasing by same amount (2 Words)

6 Data arranged in rows and columns

7 Diagrams

Down

1 Give location of a point on a plane (2 Words)

2 Congruent rectangles on top and bottom (2 Words)

4 Polygon with 4 sides and 4 vertices

Crossword Puzzle Answers

The crossword grid contains the following answers:

Down 1: ORDEREDPAIRS
Down 2: RECTANGULARPRISM
Across 3: SEQUENCES
Down 4: QUADRILATERAL
Across 5: LINEARPATTERNS
Across 6: TABLES
Across 7: GRAPHS

Across

3 Order of events

5 Increasing or decreasing by same amount (2 Words)

6 Data arranged in rows and columns

7 Diagrams

Down

1 Give location of a point on a plane (2 Words)

2 Congruent rectangles on top and bottom (2 Words)

4 Polygon with 4 sides and 4 vertices

UNIT ASSESSMENT

Describing Patterns & Functions

Unit Assessment Teacher's Notes
Grade 8   ●   Unit 5
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 **LINEAR PATTERNS**.

2. Write the number 2 by the picture for **TABLES**.

3. Write the number 3 by the picture for **SEQUENCES**.

4. Write the number 4 by the picture for **GRAPHS**.

5. Write the number 5 by the picture for **ORDERED PAIRS**.

6. Write the number 6 by the picture for **QUADRILATERAL**.

7. Write the number 7 by the picture for **RECTANGULAR PRISM**.

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.

MATH PROGRAM

Date:_____   Student's Name:_____

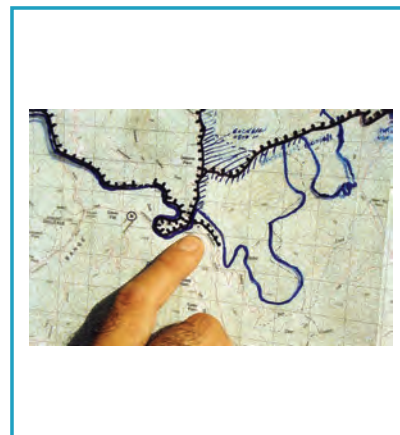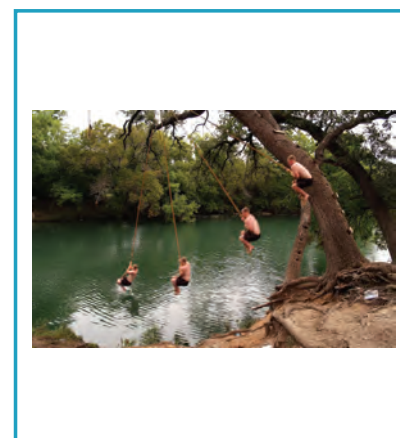Number Correct:_____   Percent Correct:_____

linear patterns
tables
sequences
graphs
ordered pairs
quadrilateral
rectangular prism

linear patterns
tables
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quadrilateral
rectangular prism

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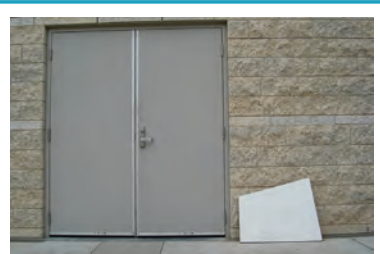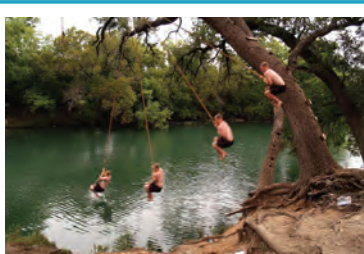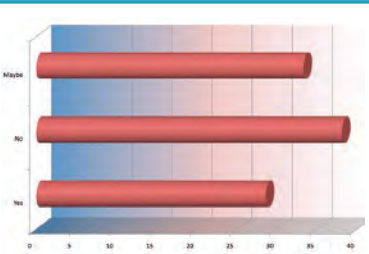| Order of events	Increasing or decreasing by same amount	Diagrams
Give location of a point on a plane	Polygon with 4 sides and 4 vertices	Congruent rectangles on top and bottom
Data arranged in rows and columns		

linear patterns	tables	sequences	graphs

ordered pairs	quadrilateral	rectangular prism

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