UNIT 6: Functions & Relationships

Modeling and Solving Equations & Inequalities

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.*

algebraic expression

Have the students call out common phrases and write them on the board. Now assign a number and letter for each word in the phrase and write them below with an addition symbol in between. Explain that these combinations of letters and numbers make up an algebraic expression.

inequality

Ask the students to each draw a fruit on the board. Explain that an = sign can be used between the same fruits but that a ≠ sign would be appropriate between two different fruits. Consider your favorite fruits and least favorite. The > and < symbols can be used to describe the likeability of each fruit. Explain that ≠, > and < are inequalities in contrast to equalities.

coordinate plane

Draw a rough outline of Alaska on the board then draw a grid with four quadrants over it. Explain that this is a coordinate plane. Ask how many students have been to each quadrant.

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.*

story (word) problem	***Explain that in the "real world" math is often used to solve problems or questions that actually exist. Have the students brainstorm small problems that they've had recently and how math might have helped them to reach a solution.***
similar form	***Show the students the picture of many buttons on page 415. Explain that they are all similar in both form and function though they come in several different sizes. What other useful items can they think of that come in different sizes?***
variable	***Have the students write a funny but appropriate sentence on a sheet of paper. Now have them assign a number for each unique word. They have created a code! Explain that replacing numbers with letters in math creates a code that can help us to visualize problems and more easily solve them.***

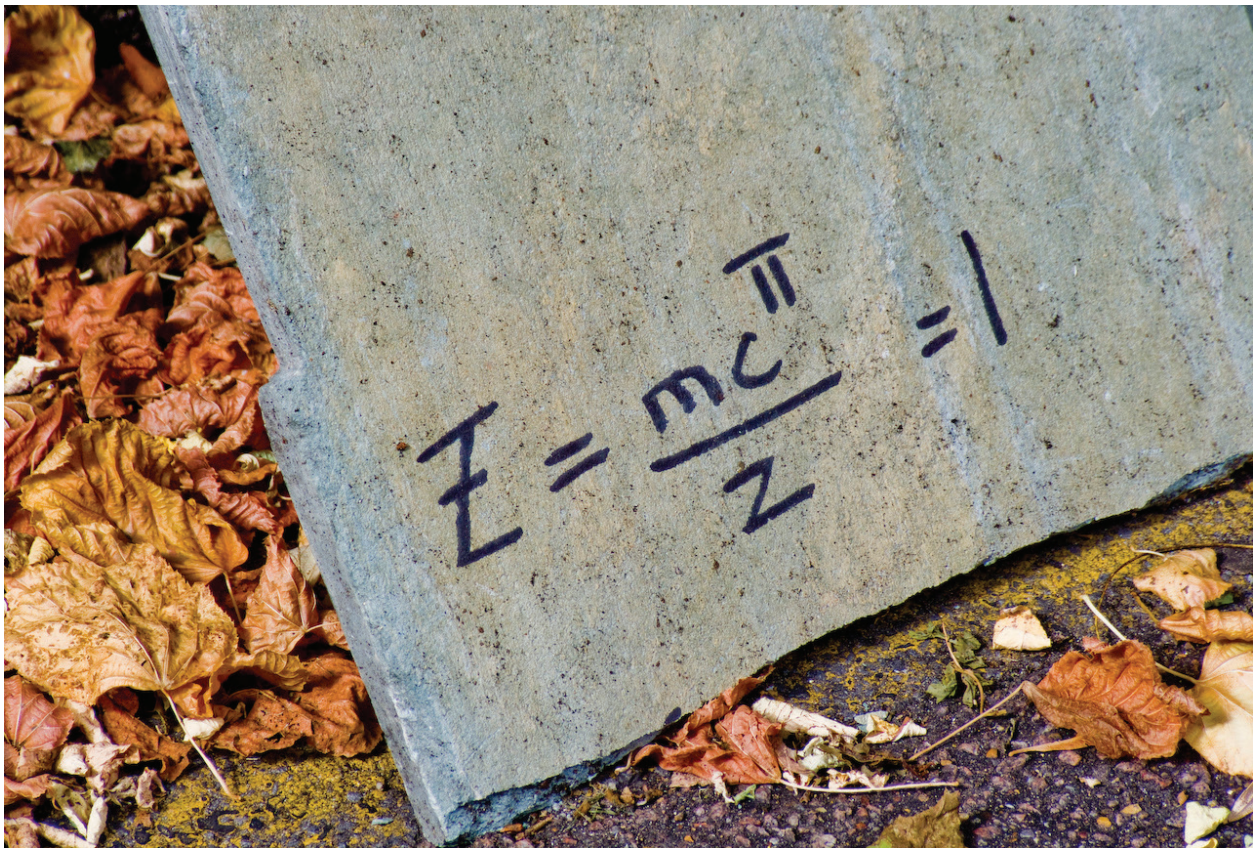
Process Skills

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.*

value

Place a dollar bill, a family photo, and a diet soda on the table. Ask the students to rate the worth of each item in terms of money. What about in terms of sentiment? Explain that this worth or "value" is dependent on the question asked.

VOCABULARY PICTURES


E = mc² / 2 = 1

ALGEBRAIC EXPRESSION

INEQUALITY

COORDINATE PLANE


There are 3 pink sweets and 5 blue sweets in a packet. How many altogether? How many sweets in 10 packets? How many sweets in 5 packets?
My runner bean was 3cm tall on Tuesday. If it was 7cm tall on Friday, how much had it grown?
I put a cake in the oven at half past two.
It took 2 hours to
time did I take the
the oven?
There are 10 pencils in each box.
How many penci
boxes?
Mum made 12 cakes. She shared them between Biff, Clip & Kipper. How many did they each get?

STORY (WORD) PROBLEM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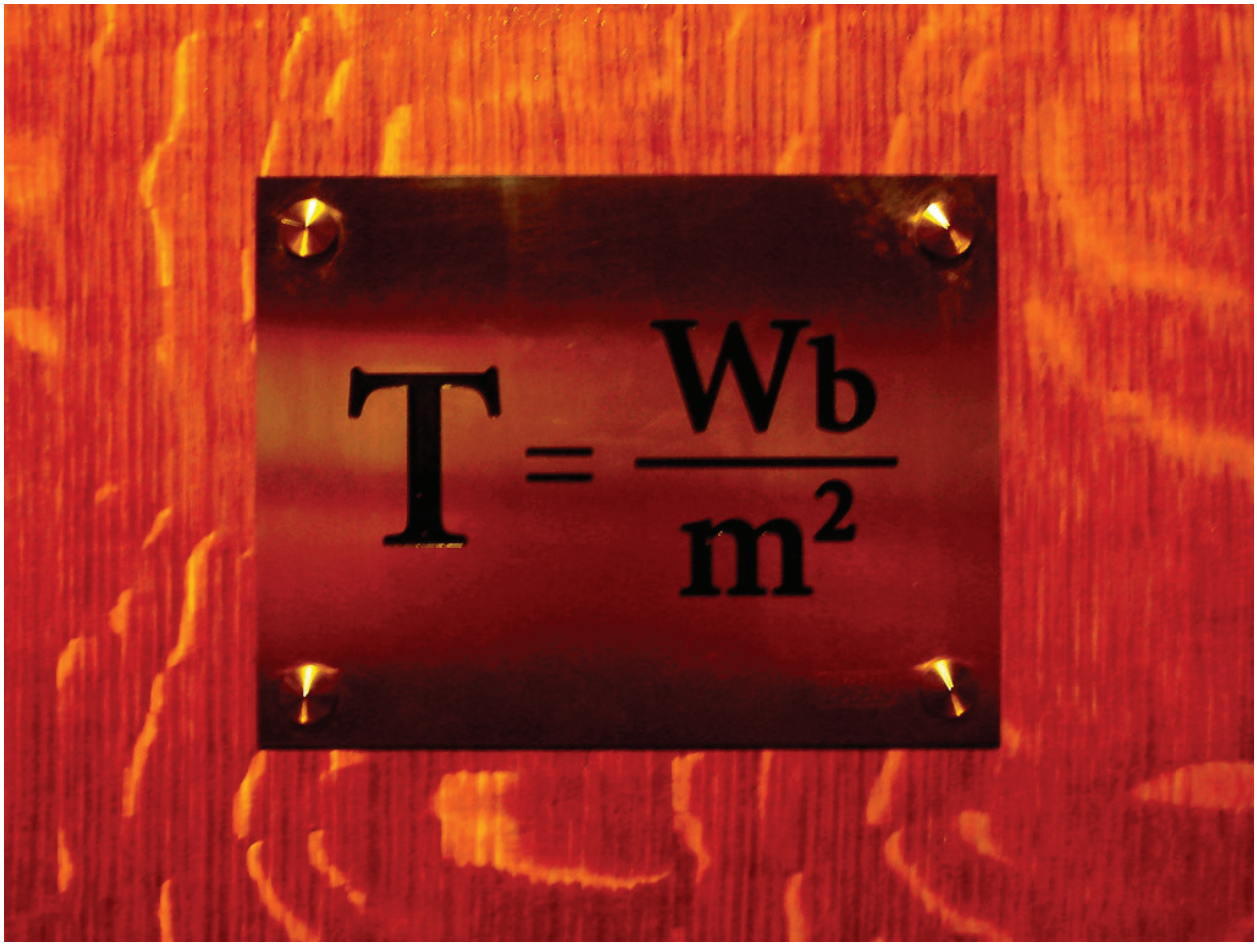
SIMILAR FORM


T = Wb / m²

VARIABLE


FEDERAL RESERVE NOTE
DG 39891668 A
G7
THIS NOTE IS LEGAL TENDER
FOR ALL DEBTS, PUBLIC AND PRIVATE
Treasurer of the United States
100

VALUE

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.

Nod and Clap

Mount the vocabulary pictures on the board. Point to one of the pictures and say its name. The students should nod their heads to indicate that you said the correct vocabulary word for the picture. However, when you point to a picture and say an incorrect name for it, the students should clap their hands ONCE. Repeat this process until all of the vocabulary pictures have been used a number of times in this way.

Student Support Materials

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

Language and Skills Development

SPEAKING

The Disappearing Pictures

Mount five or six pictures on the board, vertically. Point to the picture at the top and tell the students to name it. Continue in this way until the students have named all of the pictures from top to bottom. Then, remove the last picture and repeat this process—the students should say all of the vocabulary words, including the name for the "missing" picture. Then, remove another picture from the board and have the students repeat this process. Continue in this way until the students are saying all of the vocabulary words from a blank board or until the students cannot remember the "missing pictures."

Flashlight Name

Mount the vocabulary pictures on the board and the walls of the classroom. Darken the classroom as much as possible. Use a strong flashlight to direct the students' attention to one of the pictures. The students should identify the picture that is illuminated by the light of the flashlight. Continue in this way until all of the vocabulary words have been said a number of times.

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.

Funnel Words

Group the students into two teams. Give the first player in each team a funnel. Mount the sight words on the walls, board, and windows, around the classroom. Say one of the sight words. The students with the funnels must then look through them to locate the sight word you named. The first student to do this correctly wins the round. Repeat with other pairs of students until all players in each team have played.

Letter Encode

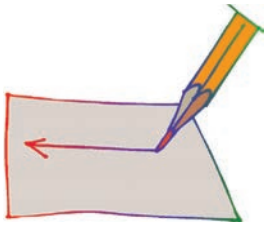
Give each student his/her envelope that contains the alphabet letters. Show a picture from this unit. The students must use the cut-out letters to spell the word for the picture. Review the students' work. Repeat, until all of the words have been spelled.

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.

Silent Dictation

Provide each student with writing paper and a pen. The students should watch carefully as you move your lips as though you are saying one of the sight words (do not voice the word). After "lipping" the sight word, each student should write that word on his/her sheet of paper. Repeat this process with other sight words. Afterwards, review the students' responses.

Student Support Materials

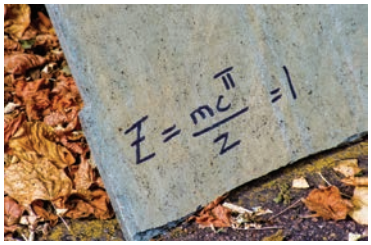
Have the students work on the activity pages from the Student Support Materials from this unit. Afterward, review their work.

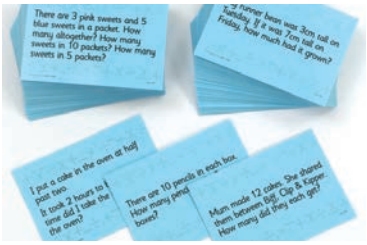
STUDENT SUPPORT MATERIALS

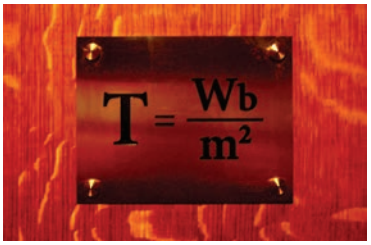
Listening • Mini Pictures

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.

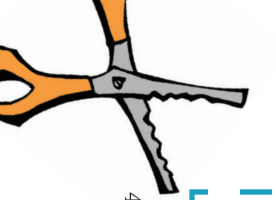






STUDENT SUPPORT MATERIALS

Sight Words



algebraic expression

inequality

coordinate

story (word) problem

similar form

variable

value

STUDENT SUPPORT MATERIALS

Reading • Sight Recognition

Sight Words Activity Page

Have the students circle the word for each picture.

algebraic expression

inequality

coordinate plane

story (word) problem

similar form

variable

value

algebraic expression

inequality

coordinate plane

story (word) problem

similar form

variable

value

algebraic expression

inequality

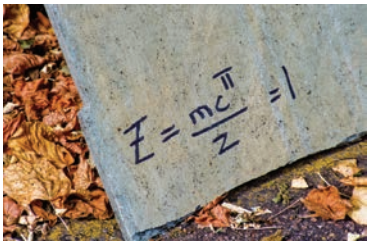
coordinate plane

story (word) problem

similar form

variable

value



algebraic expression

inequality

coordinate plane

story (word) problem

similar form

variable

value

algebraic expression

inequality

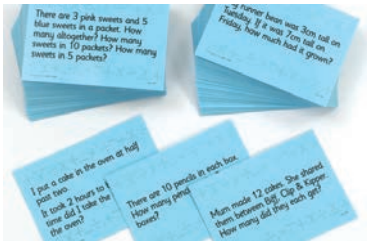
coordinate plane

story (word) problem

similar form

variable

value



algebraic expression

inequality

coordinate plane

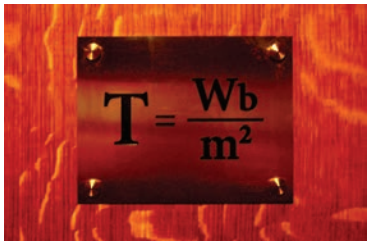
story (word) problem

similar form

variable

value

Sight Words Activity Page



algebraic expression

inequality

coordinate plane

story (word) problem

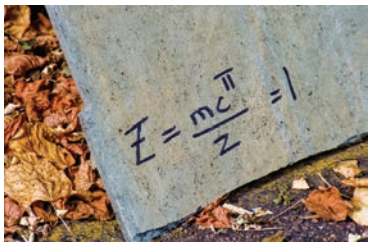
similar form

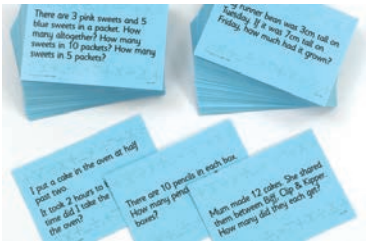
variable

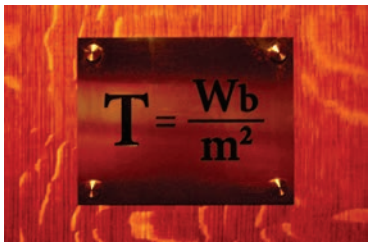
value

Sight Words Activity Page

Write the numbers on their correct vocabulary graphics.







1. **algebraic expression**
2. **inequality**
3. **coordinate plane**
4. **story (word) problem**
5. **similar form**
6. **variable**
7. **value**

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.

coordinate plane
variable
similar form
value
inequality
algebraic expression
story problem

i s p o s f x e s i m i l a r f o r t u x l u f v
t i a n b e p c i n e q u a l e p r u u l a i c x
n l s n e c c o o r d i n a t e p l a n e i i r a
n b v o x a i c o o r d i n a t e p l a i r l s i
i s a r e o e l i s t o r y p r o b u e i r b u a
m r l i q x n r c e p s r e e c e d s c q v a l u
e n c i o i v a i l a e p a p i i i a i b r r i r
o d r a r i r b r o r e l a v a r i a r o r c s l
i q l e q e r e v c l o y a l r a e m p b r n a u
l o u e n c t r i e l l r r e m a b t q i b l m u
t e f i o e r o e e r r o y b e t i i y b r m a b
e t s a r a i i m v i n e q u a l i t y r b i b r
n r n p a t r i l f a e o c s n i s i y i t v l a
a a p b n s o a r e l e i c a a l o i s d f i x e
a o y f a a r r p c e m t a i u m i g m y r i u r
l s y e q t l r c t e r v a r i a b l e i a e o i
y t i i d s i m i l a r f o r m o i e c v a a e l
s v p o t c n u q u e r e n u e y a t e e a o y q
v e l r i n r a o p f i l s o p l i i a i p l p i
l e n t p s t o r y p r o b l e m n l i t o v y o
r a o e o c b a b o n b c r q a o l o l e e i r s
a l y a l g e b r a i c e x p r e s s i o n p a q
s a c i s f c a t s y y e l i i a f s e u b o s o
l r e c o x m m a r b i s l v a l u e a l e t i e
c f s a l g e b r a i c e x p r e s s n y f a l i
r o a s r u x x m c x m y c o f d i a e a m i i p
l a e m e l u e v e a y m n o n e s r m o c i i p
r s s i c a d l i f p s p i m o v e n r a y i q a
a p o n u q c o r c a o i p r a e a l i b s r y i

Sight Words Activity Page

ANSWER KEY

coordinate plane
variable
similar form
value
inequality
algebraic expression
story problem

i s p o s f x e s i m i l a r f o r t u x l u f v
t i a n b e p c i n e q u a l e p r u u l a i c x
n l s n e c **c o o r d i n a t e p l a n e** i i r a
n b v o x a i c o o r d i n a t e p l a i r l s i
i s a r e o e l i s t o r y p r o b u e i r b u a
m r l i q x n r c e p s r e e c e d s c q v a l u
e n c i o i v a i l a e p a p i i i a i b r r i r
o d r a r i r b r o r e l a v a r i a r o r c s l
i q l e q e r e v c l o y a l r a e m p b r n a u
l o u e n c t r i e l l r r e m a b t q i b l m u
t e f i o e r o e e r r o y b e t i i y b r m a b
e t s a r a i i m v **i n e q u a l i t y** r b i b r
n r n p a t r i l f a e o c s n i s i y i t v l a
a a p b n s o a r e l e i c a a l o i s d f i x e
a o y f a a r r p c e m t a i u m i g m y r i u r
l s y e q t l r c t e r **v a r i a b l e** i a e o i
y t i i d **s i m i l a r f o r m** o i e c v a a e l
s v p o t c n u q u e r e n u e y a t e e a o y q
v e l r i n r a o p f i l s o p l i i a i p l p i
l e n t p **s t o r y p r o b l e m** n l i t o v y o
r a o e o c b a b o n b c r q a o l o l e e i r s
a l y **a l g e b r a i c e x p r e s s i o n** p a q
s a c i s f c a t s y y e l i i a f s e u b o s o
l r e c o x m m a r b i s l **v a l u e** a l e t i e
c f s a l g e b r a i c e x p r e s s n y f a l i
r o a s r u x x m c x m y c o f d i a e a m i i p
l a e m e l u e v e a y m n o n e s r m o c i i p
r s s i c a d l i f p s p i m o v e n r a y i q a
a p o n u q c o r c a o i p r a e a l i b s r y i

STUDENT SUPPORT MATERIALS

Reading • Encoding

Encoding Activity Page

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

alge_____c expression

in_____ity

c_____nate plane

story (word) p_____m

s_____r form

oordi	brai	alu
roble	equal	

Encoding Activity Page

va_____le

v_____e

imila

riab

Encoding Activity Page

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

algebraic e	lue
in	roblem
coord	xpression
story (word) p	inate plane
sim	ilar form

Encoding Activity Page

vari	**able**
va	**equality**

Encoding Activity Page

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

ge	al	ic	bra
_____	_____	_____	_____

qua	e	in	ty	li
_____	_____	_____	_____	_____

di	nate	co	or	plane
_____	_____	_____	_____	_____

Encoding Activity Page

ry	word	lem	sto	prob

form	si	mi	lar

ble	ri	va	a

Encoding Activity Page

lue **va**

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 combination of numbers and letters equivalent to a phrase in langue is an:
   - ❍ Oddity
   - ❍ Problem
   - ❍ Phrase of Speech
   - ❍ Algebraic Expression

2. An inequality is a mathematical sentence that includes one of these symbols EXCEPT:
   - ❍ >
   - ❍ <
   - ❍ =
   - ❍ ≠

3. A _____ plane is used for graphing ordered pairs.
   - ❍ Single Engine
   - ❍ Coordinate
   - ❍ Turbo Prop
   - ❍ Three-Dimensional

4. A _____ _____ can either come from a hypothetical situation or a real world problem that needs to be solved!
   - ❍ Story Problem
   - ❍ Best Friend
   - ❍ Right Angle
   - ❍ Common Courtesy

5. Many fish species have the same shape but not necessarily the same size. This is an example of
   - ❍ Nothing
   - ❍ Similar Form
   - ❍ Exceptionalism
   - ❍ Abstract Art

What's the Answer?

6 The average volume of water exiting the Stikine River can be _____ from year to year.

- ❍ Dry
- ❍ Variable
- ❍ Dangerous
- ❍ Right

7 The _____ of preserving stories, songs and regalia in many Alaska Native cultures is very high.

- ❍ Value
- ❍ Excellence
- ❍ Prosperity
- ❍ Method

What's the Answer?

ANSWER KEY

1. A combination of numbers and letters equivalent to a phrase in langue is an:
   - ❍ Oddity
   - ❍ Problem
   - ❍ Phrase of Speech
   - ● Algebraic Expression

2. An inequality is a mathematical sentence that includes one of these symbols EXCEPT:
   - ❍ >
   - ❍ <
   - ● =
   - ❍ ≠

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   - ❍ Best Friend
   - ❍ Right Angle
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- ● Value
- ❍ Excellence
- ❍ Prosperity
- ❍ Method

Reading Comprehension Activity Page

Write the numbers/letters for sentence halves that match.

1	An algebraic expression is a combination of numbers and letters	A	used for graphing ordered pairs.
2	The symbols >, <, and ≠	B	equivalent to a phrase in language.
3	A coordinate plane is	C	real life or hypothetical scenarios.
4	A story problem uses	D	represent inequalities.
5	Cherries and oranges have similar form	E	predict the weather.
6	There are many variables used to	F	but are different sizes.
7	The value of an object is not always	G	based on money.

1→_____ 2→ _____ 3→ _____ 4→ _____

5→ _____ 6→ _____ 7→ _____

Reading Comprehension Activity Page

ANSWER KEY

1	An algebraic expression is a combination of numbers and letters	A	used for graphing ordered pairs.
2	The symbols >, <, and ≠	B	equivalent to a phrase in language.
3	A coordinate plane is	C	real life or hypothetical scenarios.
4	A story problem uses	D	represent inequalities.
5	Cherries and oranges have similar form	E	predict the weather.
6	There are many variables used to	F	but are different sizes.
7	The value of an object is not always	G	based on money.

1→ B 2→ D 3→ A 4→ C

5→ F 6→ E 7→ G

Reading Comprehension Activity Page

Cut out the words and glue them under their definitions.

Includes >, < or ≠	**Used for graphing ordered pairs**	**Same shape different size**
Symbol representing numbers	**Magnitude, Quantity or Number**	**Combination of numbers and letters**
Math in hypothetical or real situations		

algebraic expression | **inequality** | **coordinate plane** | **story (word) problem**

similar form | **variable** | **value**

Reading Comprehension Activity Page

ANSWER KEY

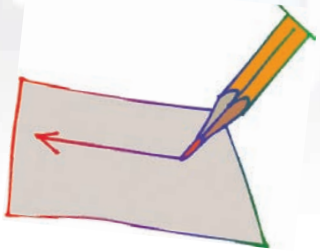
Includes >, < or ≠ inequality	**Used for graphing ordered pairs** coordinate plane	**Same shape different size** similar form
Symbol representing numbers variable	**Magnitude, Quantity or Number** value	**Combination of numbers and letters** algebraic expression
Math in hypothetical or real situations story (word) problem		

STUDENT SUPPORT MATERIALS

Writing

Writing Activity Page

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



al_____raic ex_____ssion

ine_____ity

coor_____ate pl_____e

st_____y (w_rd) pr_____lem

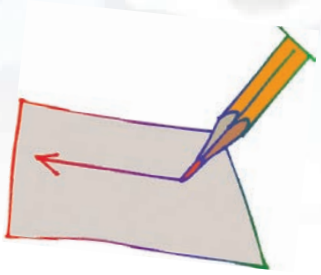
sim_____r f____rm

var_____le

va____ue

Writing Activity Page

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



a_____ e_____n

i_____y

c_____ p_____e

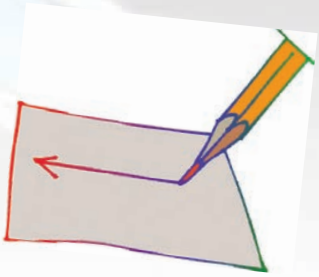
s_____ (w_____) p_____m

s_____ f_____

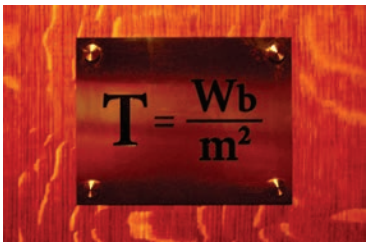
v_____le

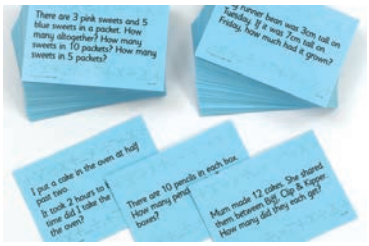
v_____e

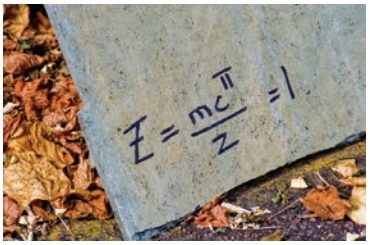
Basic Writing Activity Page



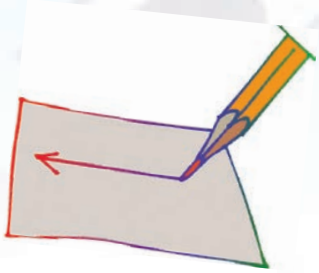
Have the students write the word for each picture.

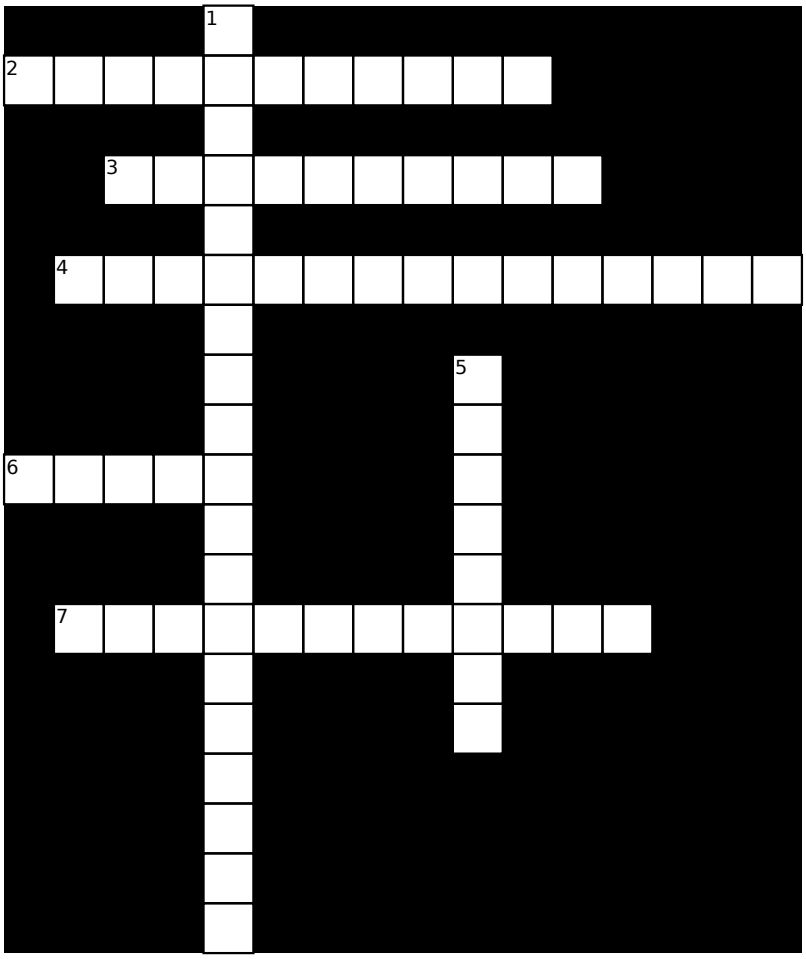






Crossword Puzzle





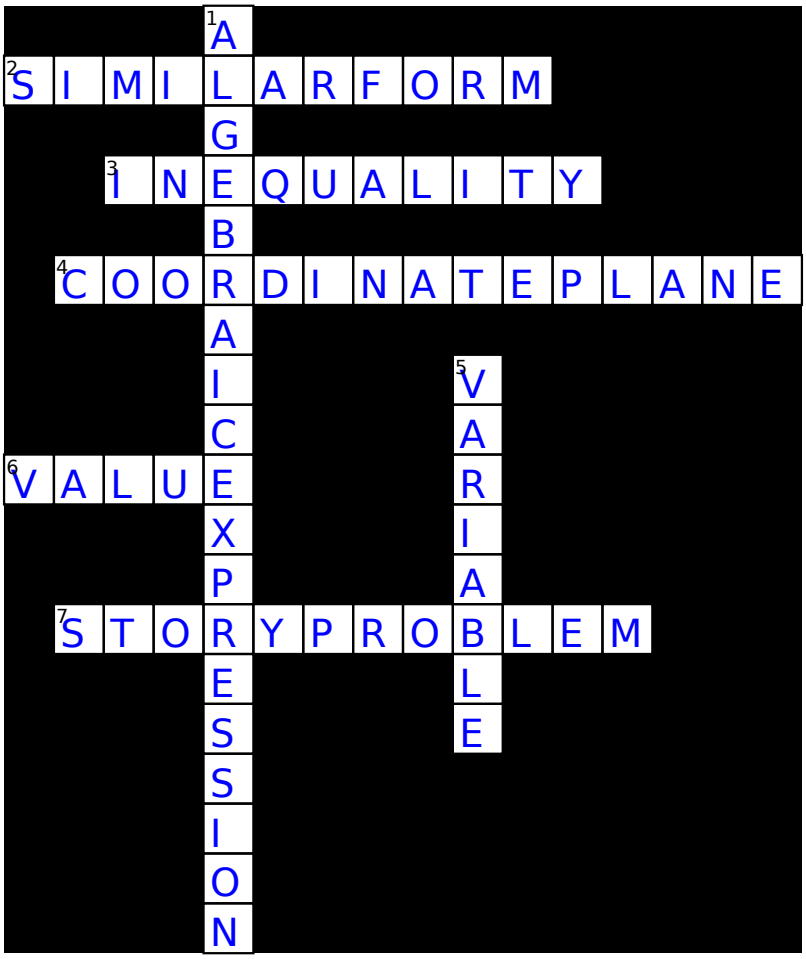
Across

2 Same shape different size (2 Words)
3 Includes >, < or ≠
4 Used for graphing ordered pairs (2 Words)
6 Magnitude, quantity or number
7 Math in hypothetical or real situations (2 Words)

Down

1 Combination of numbers and letters (2 Words)
5 Symbol representing numbers

Crossword Puzzle Answers



Across

2 Same shape different size (2 Words)
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4 Used for graphing ordered pairs (2 Words)
6 Magnitude, quantity or number
7 Math in hypothetical or real situations (2 Words)

Down

1 Combination of numbers and letters (2 Words)
5 Symbol representing numbers

UNIT ASSESSMENT

Modeling and Solving Equations & Inequalities

Unit Assessment Teacher's Notes
Grade 8 • Unit 6
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 **ALGEBRAIC EXPRESSION**.
2. Write the number 2 by the picture for **INEQUALITY**.
3. Write the number 3 by the picture for **COORDINATE PLANE**.
4. Write the number 4 by the picture for **STORY (WORD) PROBLEM**.
5. Write the number 5 by the picture for **SIMILAR FORM**.
6. Write the number 6 by the picture for **VARIABLE**.
7. Write the number 7 by the picture for **VALUE**.

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.

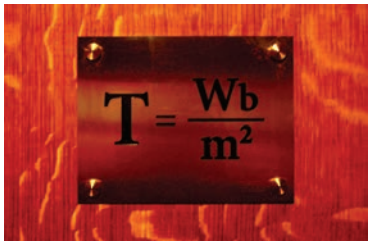
Teacher: To get a percentage for this student's assessment, divide the total number of questions correct by the total number of questions, then multiply this answer by 100 to determine the percentage of questions answered correctly.

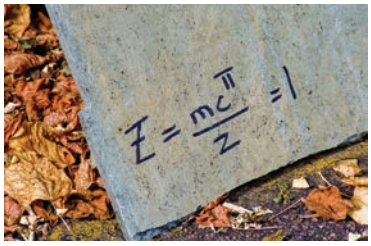
MATH PROGRAM

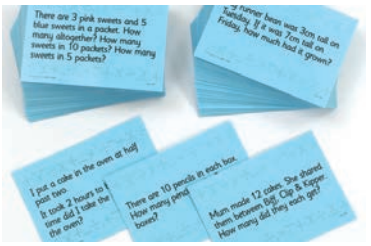
Unit Assessment Student Pages
Grade 8 • Unit 6

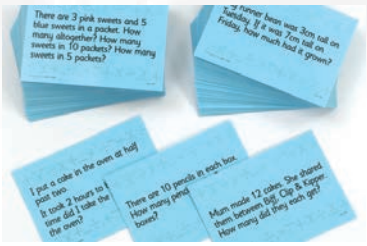
Date:_____ **Student's Name:_____**

Number Correct:_____ **Percent Correct:_____**


T = Wb / m²

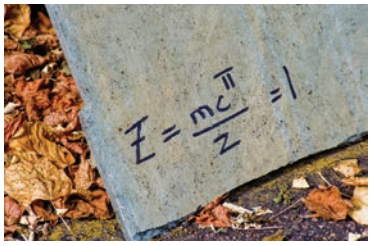



There are 3 pink sweets and 5 blue sweets in a packet. How many altogether? How many sweets in 10 packets? How many sweets in 5 packets?
I put a cake in the oven at half past two. It took 2 hours to bake. What time did I take the cake out of the oven?
There are 10 pencils in each box. How many pencils in three boxes?
Mum made 12 cakes. She shared them between Bill, Clip & Topper. How many did they each get?



algebraic expression
inequality
coordinate plane
story (word) problem
similar form
variable
value

algebraic expression
inequality
coordinate plane
story (word) problem
similar form
variable
value



algebraic expression
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algebraic expression
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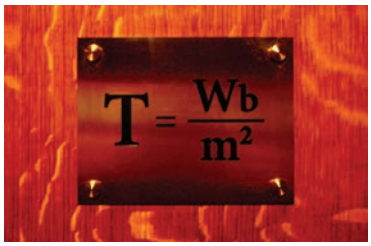

algebraic expression
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algebraic expression
inequality
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story (word) problem
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algebraic expression
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algeb____ expression

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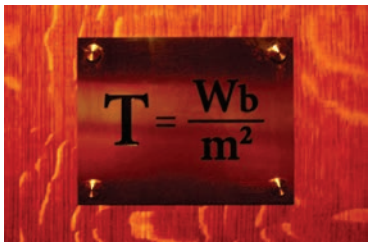
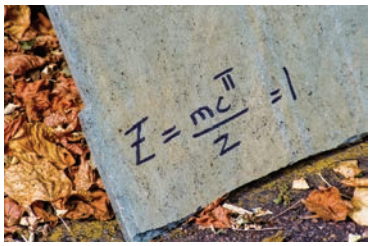
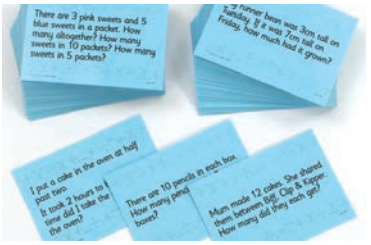
Includes >, < or ≠	**Used for graphing ordered pairs**	**Same shape different size**
Symbol representing numbers	**Magnitude, Quantity or Number**	**Combination of numbers and letters**
Math in hypothetical or real situations		

algebraic expression	**inequality**	**coordinate plane**	**story (word) problem**
similar form	**variable**	**value**	


T = Wb / m²


Z = mc / z


There are 3 pink sweets and 5 blue sweets in a packet. How many altogether? How many sweets in 10 packets? How many sweets in 5 packets?
A runner bean was 3cm tall on Tuesday. If it was 7cm tall on Friday, how much had it grown?
There are 10 pencils in each box. How many pencils in 4 boxes?
Mum made 12 cakes. She shared them between Bill, Clip & Kipper. How many did they each get?