1. Algebra

Grade 9

A-7ab, A-13, A-16, A-18

Materials: toothpicks
pieces of string 4 cm long
paper
ruler
graph paper

1. Let the toothpicks be telephone poles and the string be a telephone wire.

a) Place a pole, a string, a pole, a string, a pole (until you have 5 poles) to represent part of a telephone line between Cypress Hills and Maple Creek.

b) If there are 3 posts in a row, how many line segments are there?
If there are 4 posts in a row, how many line segments are there?
If there are 5 posts in a row, how many line segments are there?
Write the relationship between the posts and the line segments.

c) Write an equation to represent this relationship using y = number of posts and x = number of line segments.

s) Use the equation to make a table of values. Graph the solution.

h) In which quadrant will the solutions lie? Why?

i) Should the points on the graph be joined with a line? Explain.

j) Suppose we had said that x = number of posts and y = number of line segments.

h) Make a table of values and graph the coordinate pairs.

i) Compare the graphs and write about how the coordinates in the two graphs are the same and/or different.

When you have completed this station, place your answer sheet in your portfolio.
Label your portfolio entry.

Please tidy up the station.

2. Algebra

Grade 9

A-7b, A-18,

2. Materials: pattern cards
pattern blocks
grid paper

1. Look carefully at the pattern cards.

a) Write the rule for each pattern.

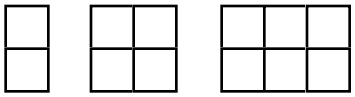
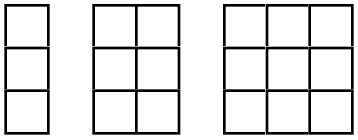
b) Write the formula or the equation and write what each letter stands for.

2. Use the toothpicks or the grid paper to represent each of the following formulas (rules).

a) t = 3b b) t = 3b+2 c) y = -x

Draw to record your results.

3. a) Make this chart on a piece of paper.
b) Use the squares from the pattern blocks to create the pattern in the chart.
c) Writing the number of tiles (length) and the formulas for the perimeter of these tiles.

pattern	base	1	2	3	4	5	formula
	perimeter						
	perimeter						
	perimeter						

4. Use the patterns above to determine the formula for the perimeter of rectangles when the height is 10 units and 50 units. Explain this in your own words.

5. Repeat this activity using the parallelograms and the rhombuses to see if the rule holds for all quadrilaterals. Record your findings.

6. Would the pattern hold for the hexagons? Use drawings to explain your answer.

When you have completed this station, place your graph, your table and your answer sheet in your portfolio. Label your portfolio entry.

Please tidy up the station.

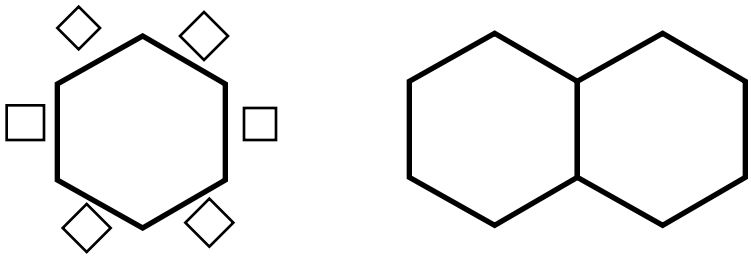
3. Algebra

Grade 9

A-7b, A-15,A-18,

Materials: two colors of cubes or tiles
hexagonal pattern blocks
paper
ruler
graph paper

1. a) Create hexagonal picnic tables using the yellow hexagons. Continue the pattern until you have 5 tables in a row.



b) Use centimetre cubes to represent chairs around the picnic tables.

c) Make a table to represent the relationship between the tables and the chairs.

Number of tables						
	1	**2**	**3**	**4**	**5**	**6**
Number of chairs						

d) List these values as ordered pairs. (x,y)

e) Graph the pairs on a coordinate plane.

Turn the card over please

g) Which quadrant did you use and why?

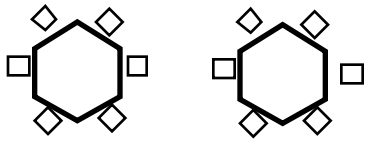
f) Continue to add coordinates to the pattern on your graph to find out how many chairs will be needed for 8 tables.

h) Should a line be drawn to join the points? Why or why not?

h) What is the written rule for the relationship between the tables and the chairs and make a formula for the rule.

i) Use the formula to determine how many chairs are needed for 12 tables? ... 20 tables?

j) Suppose the 12 tables and the 20 tables were separated from each other and chairs were added on the sides that don't have any, how many more people could you sit in total at the tables? Explain your strategy.



etc.

When you have completed this station, place your answer sheet in your portfolio.
Label your portfolio entry.

Please tidy up the station.

4. Algebra

Grade 9

A-7b, A-18,

Materials: paper
calculator

1. a) Start with any number
b) Double it
c) Multiply by 5.
d) Take half your number
e) Divide by 5
f) Add 10
g) Subtract the number you start with
h) The number you have is 10

2) Try again with another number and see if it works again.

3) Using □ as the number, draw the picture for each stage and see why this works.

a) □

b) □ □

c) etc.

4) Now use an algebraic expression to represent each stage. Replace □ by "n".

5) Draw the pictures and write the directions for the following algebraic expressions in this number puzzle.

x
x + 10
4x + 40
2x + 20
2x
x

6) Make your own number puzzle. (Hint draw pictures to help you, them write the algebraic expressions.

7)) Neatly copy only the instructions for your puzzle on a file card and file it in a box (provided by the teacher).

When you have completed this station, place your file card in the correct location, and put your work sheet in your portfolio.

Label your portfolio entry.

Please tidy up the station.

5. Algebra — Grade 9

A-22

Materials: Base ten blocks
alge-tiles (x's and y's)
paper & pencil

1. Trace each alge-tile and show the value of each. Use the longer one for "x" and the shorter for "y".

2. Use the tiles to explain the difference between x^2 and 2x.

3. Explain what an "xy" represents.

4. Trace each base ten block and give the value.

5. How are Base ten blocks similar to the algetiles and how are they different?

6. Use the base ten blocks to represent $3(10)^2 + 5(10) + 4$
Draw to record your answer.
This number is equal to what ?

7. Leave the Base ten blocks in front of you and directly under them use the algetiles to show $3x^2 + 5x + 4$. Explain how the two models are similar and how they are different.

8. Can we give a value to the entire expression if we do not know the value of "x"? Explain.

9. Suppose the value of "x" is 10. How does this compare to the Base ten blocks? Can we substitute Base ten blocks with the algetiles? What are the limitations of the Base Ten blocks? What could we use to represent x^3? Can we represent x^4? Explain.

10. a) How could you represent $3x^2 + x - 2$ using the algetiles?
b) Suppose that x = 10, could you use the Base ten blocks to represent this? Explain your procedure?

12. Use algetiles to represent these numbers. Draw to record your answer.

a) $2x^2 + 6x + 2$ **b) $x^2 - 3x - 5$**

c) $-x2 + 6x - 3$ **d) $-x^2 - x - 1$**

13. Suppose x = 10, draw these expressions using Base ten blocks and evaluate the expression using the blocks. Will you need 2 colors?

When you have completed this station,
file your work sheet in your portfolio.

Label your portfolio entry.
Please tidy up the station.

6. Algebra Grade 9

A-22, A-24

Materials: alge-tiles (x's and y's)
paper & pencil

1. Use algetiles to simplify each of the following expressions. Draw to record your answer explaining what you are doing at each step.

a) $5x^2 + 4y^2 + x - x^2 - y^2 + y$

b) $y - 3x^2 + y + x^2 + y - 4y^2 + 3xy$

2. Close your eyes and take several tiles. Place them in front of you without looking. Record the tiles in any order and then combine like terms. Record the simplified expression. Write the simplified expression

Repeat this activity 4 more times.

3. How do we use the "Zero Principle" when combining like terms to simplify expressions

4. In your own words define "like terms" and explain why we cannot combine terms that are not alike.

When you have completed this station,
file your work sheet in your portfolio
and place the algetiles in their containers.

Label your portfolio entry.

Please tidy up the station.

7. Algebra

Grade 9

Algebra
A-22, A-24

Materials: alge-tiles (x's and y's)
paper & pencil

1. Remembering that (-3) and (+3) are opposites, use the alge-tiles to show that (x^2 - 2x + 4) and ($-x^2$ + 2x - 4) are opposites. Draw alge-tiles to support your explanation.

2. Use algetiles to simplify each of the following expressions. Draw to record your answer.

a) ($2y^3$ - $3y^2$ - 1) + ($-5y^2$ - $4y^3$ + 3)

b) ($5x^2$ + 7x +9) + ($3x^2$ + 4x + 2)

c) ($-5y^2$ +7y -12) + ($-3y^2$ +4y -2)

d) (1 -$7x^2$ +2x) + (x^3 - $3x^2$ +7)

3. Each of the following expressions is equal to $2x^2$ + 4y + 3xy. Use the alge-tiles to find the missing term.

a) -2x + 13 - 2y - 2xy - 10 + 5xy + 6y - 3 + $2x^2$

b) 3x + 3y - 2xy - 7 - $3x^2$ + y + 1 - 3x + $5x^2$ + 6