

MATH GRADE 8

CURRICULUM PACKAGE

June 2012

*Creating
Futures*



2012

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Dene Kede

Dene Kede, the culture-based curriculum of the NWT, serves as the heart of the NWT Curriculum. Dene Kede was developed under the guidance of Dene elders and shares, through its teachings, the knowledge, skills, and values of the Dene. These cultural understandings serve as the underpinnings for all learning in all content areas and it is expected that the teachings and knowledge contained within Dene Kede shall be woven into all lessons. In this manner our students will become more capable, more successful and better able to *walk in two worlds*.

DENE KEDE GRADE 8

Strong Like Two People:

Module Purpose: to motivate student to pursue educational goals which include learning in Dene and non-Dene cultures

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators is used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
Major Cultural Understanding: Education in both cultures creates a person who is "Strong Like Two People".	
Explain ways that education in both cultures creates a person who is "Strong Like Two People".	<ul style="list-style-type: none"> • Demonstrate understanding of how academic and cultural education creates a person who is Strong Like Two People. <ul style="list-style-type: none"> ○ S/he can operate in and enjoy both cultures. ○ S/he has the trust of both cultures and can help the two to understand each other. ○ S/he will be able to make positive choices from both cultures.
Major Cultural Understanding: Being "Strong Like Two People" will provide more opportunities for the student.	
Describe how being "Strong Like Two People" will provide more opportunities for the student.	<ul style="list-style-type: none"> • Explain opportunities that might include: <ul style="list-style-type: none"> ○ Occupational choices and higher standards of living ○ Prestige ○ Gain knowledge and therefore influence ○ Ability to help Dene in complex areas of economic and political development ○ Ability to learn and experience the world
Major Cultural Understanding: Attitudes for becoming "Strong Like Two People"	
Identify attitudes for becoming "Strong Like Two People"	<ul style="list-style-type: none"> • Explain benefit of attitudes such as: <ul style="list-style-type: none"> ○ Setting academic and cultural goals ○ Seeking learning experiences and support
Major Cultural Understanding: Strategies for goal setting	
Identify various strategies for goal setting	<ul style="list-style-type: none"> • Visualize self in five years as a young adult • Assess personal strengths and weaknesses that will help or hinder in reaching long-term goals • Identify year-end goals • Identify what must be done to reach goals • Identify people to help them reach their goals • Identify shorter-term goals
Hunting Camp	
Module Purpose: to give students the knowledge and understandings related to a spring or fall hunting camp and to give them the experience of a fall hunting camp.	
Major Cultural Understanding: Dene knowledge of the hunting area is important to hunting success and safety.	
Explain ways in which Dene knowledge of the hunting area is important to hunting success and safety.	<ul style="list-style-type: none"> • Describe route landmarks and Dene names • Identify geographical features, landmarks and spiritual site in the area • Identify potentially dangerous areas • Explain importance of historical land use information • Identify seasonal uses of area by community
Major Cultural Understanding: Dene knowledge of game is important for hunting success.	
Describe how Dene knowledge of game is important for hunting success.	<ul style="list-style-type: none"> • Identify small game found at hunting location • Identify small game and caribou habitat, life cycles and habits (Note: Caribou are to be studied only if people in the community hunt them. This can be substituted with any other large game hunted in the fall or spring.) • Describe hunting techniques based on knowledge of game • Identify other resources in the area used by the community

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Hunting Camp

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators is used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
Major Cultural Understanding: Attitudes related to camping and hunting	
Explain significance of attitudes related to camping and hunting	<ul style="list-style-type: none"> • Explain importance of showing respect toward others and the land • Ways to learn in unfamiliar situations • Demonstrate taking responsibility and leadership in doing camp chores • Demonstrate following leadership of the hunt leader during the hunt • Demonstrate patience and determination
Major Cultural Understanding: Skills related to land travel and camping	
Demonstrate skills related to land travel and camping	<ul style="list-style-type: none"> • Demonstrate setting up and maintaining a camp • Demonstrate using a map for travel • Demonstrate computing travel distances using a map • Demonstrate canoe handling • Demonstrate using direction indicators
Major Cultural Understanding: Skills related to hunting	
Demonstrate skills related to hunting	<ul style="list-style-type: none"> • Illustrate how to predict weather • Demonstrate skills of: tracking, pursuing and shooting game • Demonstrate the making of stretchers or other equipment required for small game
Major Cultural Understanding: Skills related to Dene laws	
Explain/demonstrate various skills related to Dene laws	<ul style="list-style-type: none"> • Ways of honouring water, land and fire • Illustrate handling game and equipment with respect • Describe reasons for hunting only as much as can be used and using as much of the parts as possible
Major Cultural Understanding: Skills related to land and water safety and survival	
Explain/demonstrate skills related to land and water safety and survival	<ul style="list-style-type: none"> • Explain ways of making shelter: moss huts with smoke fire, spruce bark • Describe how to make a shelter with pitch and roots and poles, spruce bough shelters • Explain first aid for burns, cuts and broken bones review • Demonstrate and/or describe practice of gun safety • Explain ways of finding direction using stars and wind and sun • Illustrate using ingenuity "when tools are not available • Describe/demonstrate how to make basic repairs to small engines
Major Cultural Understanding: Skills related to handling hunting and camping equipment and supplies	
Explain/demonstrate skills related to handling hunting and camping equipment and supplies	<ul style="list-style-type: none"> • Explain ways of gathering hunting equipment and basic camping supplies • Explain ways of packing for efficiency
Major Cultural Understanding: Skills related to handling game	
Explain/demonstrate skills related to handling game	<ul style="list-style-type: none"> • Explain ways of: <ul style="list-style-type: none"> ○ Cleaning and butchering ○ Making caches ○ Smoking meat or making drymeat ○ Cooking meat on a campfire ○ Packing meat

DENE KEDE GRADE 8

Birchbark Canoes

Module Purpose: to give students an awareness and appreciation of the science and technology behind the Dene birchbark canoes, an understanding of the historical importance of the canoe, and experience with working with land materials in a Dene way

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators is used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
Major Cultural Understanding: The birch bark canoe is an example of the sophistication of traditional Dene technology.	
Explain ways in which the birch bark canoe is an example of the sophistication of traditional Dene technology.	<ul style="list-style-type: none"> • Describe the scientific and technological principles of structure and materials used for: <ul style="list-style-type: none"> ○ Creating maneuverability and speed for the canoe ○ Creating canoe durability ○ Creating ability of canoe to bear weight ○ The scientific principles involved in: <ul style="list-style-type: none"> ○ Slipstreaming
Major Cultural Understanding: Canoes were a very important part of Dene history and culture.	
Identify how canoes were a very important part of Dene history and culture.	<ul style="list-style-type: none"> • Provide details regarding how canoes were a part of history and culture of the Dene in the following ways: <ul style="list-style-type: none"> ○ Uses of birch bark vs. Spruce vs. Moose hide canoes by ○ Various tribes and in various seasons ○ Caribou hunting ○ Fishing ○ Muskrat hunting ○ Trading ○ Enabled extensive hunting territory during summer ○ Months <ul style="list-style-type: none"> ○ Into the barrens ○ Down mountains
Major Cultural Understanding: Canoe building involved expertise and cooperation.	
Explain ways in which canoe building involved expertise and cooperation.	<ul style="list-style-type: none"> • Describe how Birchbark and moose hide canoes were built involving the efforts of many people working cooperatively together. • Explain reasons why learning how to build the canoes required many years of experience with others more knowledgeable and experienced in the making and using of canoes. • Explain ways in which those who were very skilled at building birchbark or moose skin canoes were highly esteemed people because the canoe designs were the result of generations of Dene experimenting and learning from one another. The knowledge passed down from one to another was very complex and invaluable.
Major Cultural Understanding: The land was shown respect when taking materials for canoe building.	
Describe way that the land was shown respect when taking materials for canoe building.	<ul style="list-style-type: none"> • Explain how bark was taken from trees in such a way that the trees were not killed. • Describe ways that the land was honoured for the resources it gave 10 enable life.
Major Cultural Understanding: Skills related to working with wood.	
Describe and/or demonstrate skills related to working with wood.	<ul style="list-style-type: none"> • Describe how to: <ul style="list-style-type: none"> ○ Work with spruce wood, spruce root, birchbark, spruce gum and moss ○ Work with wood working tools • Explain ways in which to achieve wood working while in the bush

DENE KEDE GRADE 8

Birchbark Canoes

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators is used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
Major Cultural Understanding: Attitudes related to working with wood.	
Explain positive attitudes related to working with wood.	<ul style="list-style-type: none"> • Describe how to demonstrate respecting and learning from resource people or Elders • Explain value of reflecting on personal talents and interests with respect to new experiences • Demonstrate how to show patience and determination while developing one's woodworking skills
Leadership	
Module Purpose: to give students an understanding of the meaning of Dene leadership, to provide them with stories of Dene leaders and heroes, and to give them a sense of what Dene leadership mean today.	
Major Cultural Understanding: A traditional Dene leader was one who enabled others to survive.	
Explain how a traditional Dene leader was one who enabled others to survive.	<ul style="list-style-type: none"> • Identify ways in which food and security were provided to those who went with a leader because of the leader's special abilities.
Major Cultural Understanding: Traditionally, Dene leaders were spiritual leaders.	
Explore and explain how traditionally, Dene leaders were spiritual leaders.	<ul style="list-style-type: none"> • Explain ways in which they lived morally good lives. • Explore and describe how they were prophets with messages to the Dene from the Creator. • Provide details of how they reminded Dene that there was a power greater than them and that they had to be humble in their living.
Major Cultural Understanding: Traditional Dene leaders had special abilities and attitudes.	
Identify traditional Dene leaders had special abilities and attitudes.	<ul style="list-style-type: none"> • Describe how they led by example rather than by force or persuasion. • Identify how that they were the most capable providers. • Explain ways that they knew the land exceptionally well and were hardworking. • Explore ways that they were often spiritual people possessing medicine powers that they used for the good of the people. • Describe their foresight and planned ahead. • Explain ways in which they demonstrated they were concerned with the welfare of the whole group, rather than simply themselves and their families. • Provide examples of ways they were generous. • Explain how they were humble. They did not brag about their abilities, nor did they abuse their power by imposing their wishes on people. • Describe how they recognized that their leadership was based on the support of others. • Provide examples of how they were often good orators and communicators.
Major Cultural Understanding: Traditionally, leaders were identified by Elders and led through consensus.	
Explore ways in which traditionally, leaders were identified by Elders and led through consensus.	<ul style="list-style-type: none"> • Explain why people did not compete for leadership nor were there elections. <ul style="list-style-type: none"> ○ Instead, a person became a leader when others chose to follow him or her (traditionally, the leaders were predominantly male) because of his abilities and attitudes. • Describe the impact of there being no law that said that everyone must follow the same leader. Those who did not wish to follow that person were free to go their own way or to make their own decisions. • Explore ways in which elders and the most experienced were influential deciding who should be chosen as leader. Every person did not have equal influence or power in deciding who to follow.

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Leadership

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators is used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
Major Cultural Understanding: Traditionally, leadership was based on consensus.	
Explain how traditionally, leadership was based on consensus.	<ul style="list-style-type: none"> • Describe how all those who depended upon his leadership chose him freely to be their leader. They gave the leader their full support in carrying out any decision that was made for the group. There was little in the way of fighting. Those who felt strongly in opposition to a leader could go their own way. • Explain how those who dissented were free to speak their minds to the leader. A good leader would hear all voices, especially those of the Elders and find a solution that suited everybody's concerns (consensus decision-making). • Describe how once consensus was reached and a decision made, it was expected that all the people in the group would act responsibly and efficiently in carrying out the decision. To do otherwise threatened the safety of the group.
Major Cultural Understanding: Traditionally, there were different levels of Dene leadership.	
Identify how traditionally, there were different levels of Dene leadership.	<ul style="list-style-type: none"> • Describe and discuss various levels of Dene Leadership, including: <ul style="list-style-type: none"> ○ The band camp - this was the main group of the Dene in traditional times. Most of their time was spent living within this group (see Grade 7 - Module Four). Often the camps were made up of extended families and friends and followers. The leader of this camp was often a male head of the extended family, a person who displayed all the characteristics of a good leader. ○ The tribe – when bands would come together for special annual hunts or celebrations, usually one person was chosen to speak for all of them. This tribal leader would meet with the bandleaders and Elders to make decisions concerning the tribe. ○ The hunting group or family camp - Small hunting groups would sometimes go off from the band camp to hunt and live, especially when food was scarce. These groups were usually made up of family, a father perhaps and one or two grown sons with their wives and children. The father or oldest hunter was the leader while they were away from the band.
Major Cultural Understanding: Non-Dene forms of selecting leadership have been introduced to the Dene.	
Explain how non-Dene forms of selecting leadership have been introduced to the Dene.	<ul style="list-style-type: none"> • Describe the impact of fur trade on Dene Leadership, those who dealt with the traders in the name of the camp or band became leaders. • Explain how after treaty, elected chief and councilors became official leaders. • Illustrate how/why today, elected mayors and Members of the Legislative Assembly (MLAs) form a part of Dene leadership.
Major Cultural Understanding: Dene perspectives on leadership are still valued and practiced.	
Describe way in which Dene perspectives on leadership are still valued and practiced.	<ul style="list-style-type: none"> • Provide examples of leaders who are humble and generous and explain why they are preferred. • Identify reasons why leaders are chosen for their skills and abilities in required areas. • Show ways that leaders consult with Elders for guidance. • Explore/discuss ways that support and cooperation are given to chosen leaders. • Show how consensus and negotiation are used in decision-making. • Explore/discuss ways that Dene Elders today use their Dene perspectives and knowledge about the land to help them to make decisions about how the land is to be used.

DENE KEDE GRADE 8

Leadership

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators is used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
Major Cultural Understanding: Attitudes that accompany good leadership.	
Explore attitudes that accompany good leadership.	<ul style="list-style-type: none"> • Explain ways in which the following attitudes contribute to good leadership: <ul style="list-style-type: none"> ○ Taking leadership if one has the required abilities and knowledge ○ Acknowledging talents in one another ○ Having input into choosing leadership and supporting it once chosen ○ Being humble, patient and generous ○ Leading by example rather than force
Major Cultural Understanding: Skills that accompany good leadership.	
Discuss skills that accompany good leadership.	<ul style="list-style-type: none"> • Weigh the value of these various skills on good leadership: <ul style="list-style-type: none"> ○ Communicating needs ○ Listening to concerns and voices of others ○ Consulting with experienced people for guidance ○ Making decisions based on the welfare of the whole rather than selected individuals ○ Recognizing that their position is based on the support of others
Discovering Our Dene Talents	
Module Purpose: to provide students with the learning attitudes and skills required to further develop their Dene skills	
Major Cultural Understanding: Practice is essential for developing the basic Dene Skills.	
Explain ways in which practice is essential for developing the basic Dene Skills.	<ul style="list-style-type: none"> • Explore and describe ways that various skills are developed with much practice and constant learning: <ul style="list-style-type: none"> ○ Mental attitude is important in being able to develop skills. ○ Setting personal goals and being determined to accomplish them. ○ Basic skills are often learned by watching and learning from family members. ○ Watching others learn and practice can develop skills.
Major Cultural Understanding: Developing one's Dene skills gives focus and meaning to life.	
Explore ways in which developing one's Dene skills gives focus and meaning to life.	<ul style="list-style-type: none"> • Describe how the development of Dene skills requires discipline and commitment, which are important to any life endeavour. • Explain ways in which skill development is a lifetime activity. • Describe how sharing and teaching one's skills to others is rewarding. • Identify ways in which one's skills may become one's livelihood. • Explore and describe how developing and sharing Dene skills strengthens the Dene culture. • Identify how one's developed skills may be seen as work done for the Creator.
Major Cultural Understanding: Development of Dene skills	
Describe the development of Dene skills	<ul style="list-style-type: none"> • Identify impact of developing one's basic Dene skills • Explain ways to explore and experience a wide range of Dene skills
Major Cultural Understanding: Attitudes helpful in developing basic Dene skills	
Identify attitudes that are helpful in developing basic Dene skills	<ul style="list-style-type: none"> • Identify and justify attitudes that are helpful in developing basic Dene skills, such as: <ul style="list-style-type: none"> ○ Persevering without frustration ○ Taking risks that could lead to error and correction ○ Making the choice to practice with one's personal time ○ Taking opportunities to observe and listen to family and community members as they work on their Dene skills ○ Sharing one's work with others so as to learn from one another

DENE KEDE GRADE 8

Discovering Our Dene Talents

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators is used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
Major Cultural Understanding: Strategies for developing basic Dene skills	
Explore and describe strategies for developing basic Dene skills	<ul style="list-style-type: none"> • Demonstrate the setting small goals for oneself • Explain the value of promising small rewards for oneself as one makes progress • Describe the value of reminding self that perfection only comes with practice • Describe the value of reminding self of the potential value of the Dene skills one is developing • Describe the value of reminding self of cultural pride and pride in work for the creator

MATH GRADE 8

Strand: Number

General Outcome: Develop number sense

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
1. Demonstrate an understanding of perfect square and square root, concretely, pictorially and symbolically (limited to whole numbers). [C, CN, R, V]	<ul style="list-style-type: none"> • Represent a given perfect square as a square region using materials, such as grid paper or square shapes. • Determine the factors of a given perfect square, and explain why one of the factors is the square root and the others are not. • Determine whether or not a given number is a perfect square using materials and strategies, such as square shapes, grid paper or prime factorization, and explain the reasoning. • Determine the square root of a given perfect square and record it symbolically. • Determine the square of a given number.
2. Determine the approximate square root of numbers that are not perfect squares (limited to whole numbers). [C, CN, ME, R, T]	<ul style="list-style-type: none"> • Estimate the square root of a given number that is not a perfect square using the roots of perfect squares as benchmarks. • Approximate the square root of a given number that is not a perfect square using technology, e.g., calculator, computer. • Explain why the square root of a number shown on a calculator may be an approximation. • Identify a number with a square root that is between two given numbers.
3. Demonstrate an understanding of percents greater than or equal to 0%. [CN, PS, R, V]	<ul style="list-style-type: none"> • Provide a context where a percent may be more than 100% or between 0% and 1%. • Represent a given fractional percent using grid paper. • Represent a given percent greater than 100 using grid paper. • Determine the percent represented by a given shaded region on a grid, and record it in decimal, fractional and percent form. • Express a given percent in decimal or fractional form. • Express a given decimal in percent or fractional form. • Express a given fraction in decimal or percent form. • Solve a given problem involving percents. • Solve a given problem involving combined percents, e.g., addition of percents, such as GST + PST. • Solve a given problem that involves finding the percent of a percent, e.g., A population increased by 10% one year and then increased by 15% the next year. Explain why there was not a 25% increase in population over the two years.
4. Demonstrate an understanding of ratio and rate. [C, CN, V]	<ul style="list-style-type: none"> • Express a two-term ratio from a given context in the forms 3:5 or 3 to 5. • Express a three-term ratio from a given context in the forms 4:7:3 or 4 to 7 to 3. • Express a part to part ratio as a part to whole fraction, e.g., frozen juice to water; 1 can concentrate to 4 cans of water can be represented as $\frac{1}{5}$, which is the ratio of concentrate to solution, or $\frac{4}{5}$, which is the ratio of water to solution. • Identify and describe ratios and rates from real-life examples, and record them symbolically. • Express a given rate using words or symbols, e.g., 20 L per 100 km or 20 L/100 km. • Express a given ratio as a percent and explain why a rate cannot be represented as a percent.

MATH GRADE 8

Strand: Number

General Outcome: Develop number sense

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
5. Solve problems that involve rates, ratios and proportional reasoning. [C, CN, PS, R]	<ul style="list-style-type: none"> • Explain the meaning of $\frac{a}{b}$ within a given context. • Provide a context in which $\frac{a}{b}$ represents a: <ul style="list-style-type: none"> ○ fraction ○ rate ○ ratio ○ quotient ○ probability. • Solve a given problem involving rate, ratio or percent.
6. Demonstrate an understanding of multiplying and dividing positive fractions and mixed numbers, concretely, pictorially and symbolically. [C, CN, ME, PS]	<ul style="list-style-type: none"> • Identify the operation required to solve a given problem involving positive fractions. • Provide a context that requires the multiplying of two given positive fractions. • Provide a context that requires the dividing of two given positive fractions. • Estimate the product of two given positive proper fractions to determine if the product will be closer to 0, $\frac{1}{2}$ or 1. • Estimate the quotient of two given positive fractions and compare the estimate to whole number benchmarks. • Express a given positive mixed number as an improper fraction and a given positive improper fraction as a mixed number. • Model multiplication of a positive fraction by a whole number concretely or pictorially and record the process. • Model multiplication of a positive fraction by a positive fraction concretely or pictorially using an area model and record the process. • Model division of a positive proper fraction by a whole number concretely or pictorially and record the process. • Model division of a positive proper fraction by a positive proper fraction pictorially and record the process. • Generalize and apply rules for multiplying and dividing positive fractions, including mixed numbers. • Solve a given problem involving positive fractions taking into consideration order of operations (limited to problems with positive solutions).
7. Demonstrate an understanding of multiplication and division of integers, concretely, pictorially and symbolically. [C, CN, PS, R, V]	<ul style="list-style-type: none"> • Identify the operation required to solve a given problem involving integers. • Provide a context that requires multiplying two integers. • Provide a context that requires dividing two integers. • Model the process of multiplying two integers using concrete materials or pictorial representations and record the process. • Model the process of dividing an integer by an integer using concrete materials or pictorial representations and record the process. • Solve a given problem involving the multiplication of integers (2-digit by 2-digit) without the use of technology. • Solve a given problem involving the division of integers (2-digit by 2-digit) without the use of technology.

MATH GRADE 8

Strand: Number

General Outcome: Develop number sense

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
(Continued)	<ul style="list-style-type: none"> • Generalize and apply a rule for determining the sign of the product and quotient of integers. • Solve a given problem involving integers taking into consideration order of operations.

Strand: Patterns and Relations (Patterns)

General Outcome: Use patterns to describe the world and solve problems

1. Graph and analyze two-variable linear relations. [C, ME, PS, R, T, V]	<ul style="list-style-type: none"> • Determine the missing value in an ordered pair for a given equation. • Create a table of values by substituting values for a variable in the equation of a given linear relation. • Construct a graph from the equation of a given linear relation (limited to discrete data). • Describe the relationship between the variables of a given graph.
2. Model and solve problems using linear equations of the form: <ul style="list-style-type: none"> • $ax = b$ • $\frac{x}{a} = b, a \neq 0$ • $ax + b = c$ • $\frac{x}{a} + b = c, a \neq 0$ • $a(x + b) = c$ concretely, pictorially and symbolically, where a, b and c are integers. [C, CN, PS, V]	<ul style="list-style-type: none"> • Model a given problem with a linear equation and solve the equation using concrete models, e.g., counters, integer tiles. • Verify the solution to a given linear equation using a variety of methods, including concrete materials, diagrams and substitution. • Draw a visual representation of the steps used to solve a given linear equation and record each step symbolically. • Solve a given linear equation symbolically. • Identify and correct an error in a given incorrect solution of a linear equation. • Apply the distributive property to solve a given linear equation, e.g., $2(x + 3) = 5; 2x + 6 = 5; \dots$ • Solve a given problem using a linear equation and record the process.

Strand: Shape and Space (Measurement)

General Outcome: Use direct or indirect measurement to solve problems.

1. Develop and apply the Pythagorean theorem to solve problems. [CN, PS, R, T, V]	<ul style="list-style-type: none"> • Model and explain the Pythagorean theorem concretely, pictorially or using technology. • Explain, using examples, that the Pythagorean theorem applies only to right triangles. • Determine whether or not a given triangle is a right triangle by applying the Pythagorean theorem. • Determine the measure of the third side of a right triangle, given the measures of the other two sides, to solve a given problem. • Solve a given problem that involves Pythagorean triples, e.g., 3, 4, 5 or 5, 12, 13.
2. Draw and construct nets for 3-D objects. [C, CN, PS, V]	<ul style="list-style-type: none"> • Match a given net to the 3-D object it represents. • Construct a 3-D object from a given net. • Draw nets for a given right circular cylinder, right rectangular prism and right triangular prism, and verify by constructing the 3-D objects from the nets. • Predict 3-D objects that can be created from a given net and verify the prediction.
3. Determine the surface area of: <ul style="list-style-type: none"> • right rectangular prisms • right triangular prisms • right cylinders to solve problems. [C, CN, PS, R, V]	<ul style="list-style-type: none"> • Explain, using examples, the relationship between the area of 2-D shapes and the surface area of a given 3-D object. • Identify all the faces of a given prism, including right rectangular and right triangular prisms.

MATH GRADE 8

Strand: Shape and Space (Measurement)

General Outcome: Use direct or indirect measurement to solve problems.

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
(Continued)	<ul style="list-style-type: none"> • Describe and apply strategies for determining the surface area of a given right rectangular or right triangular prism. • Describe and apply strategies for determining the surface area of a given right cylinder. • Solve a given problem involving surface area.
4. Develop and apply formulas for determining the volume of right prisms and right cylinders. [C, CN, PS, R, V]	<ul style="list-style-type: none"> • Determine the volume of a given right prism, given the area of the base. • Generalize and apply a rule for determining the volume of right cylinders. • Explain the connection between the area of the base of a given right 3-D object and the formula for the volume of the object. • Demonstrate that the orientation of a given 3-D object does not affect its volume. • Apply a formula to solve a given problem involving the volume of a right cylinder or a right prism.

Strand: Shape and Space (3-D Objects and 2-D Shapes)

General Outcome: Describe the characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them.

5. Draw and interpret top, front and side views of 3-D objects composed of right rectangular prisms. [C, CN, R, T, V]	<ul style="list-style-type: none"> • Draw and label the top, front and side views for a given 3-D object on isometric dot paper. • Compare different views of a given 3-D object to the object. • Predict the top, front and side views that will result from a described rotation (limited to multiples of 90 degrees) and verify predictions. • Draw and label the top, front and side views that result from a given rotation (limited to multiples of 90 degrees). • Build a 3-D block object, given the top, front and side views, with or without the use of technology. • Sketch and label the top, front and side views of a 3-D object in the environment with or without the use of technology.
6. Demonstrate an understanding of tessellation by: <ul style="list-style-type: none"> • explaining the properties of shapes that make tessellating possible • creating tessellations • identifying tessellations in the environment. [C, CN, PS, T, V] 	<ul style="list-style-type: none"> • Identify, in a given set of regular polygons, those shapes and combinations of shapes that will tessellate, and use angle measurements to justify choices, e.g., squares, regular n-gons. • Identify, in a given set of irregular polygons, those shapes and combinations of shapes that will tessellate, and use angle measurements to justify choices. • Identify a translation, reflection or rotation in a given tessellation. • Identify a combination of transformations in a given tessellation. • Create a tessellation using one or more 2-D shapes, and describe the tessellation in terms of transformations and conservation of area. • Create a new tessellating shape (polygon or non-polygon) by transforming a portion of a given tessellating polygon, e.g., one by M. C. Escher, and describe the resulting tessellation in terms of transformations and conservation of area. • Identify and describe tessellations in the environment.

MATH GRADE 8

Strand: Statistics and Probability (Data Analysis)

General Outcome: Collect, display and analyze data to solve problems

Outcomes	Achievement Indicators – Measurable outcomes
<i>It is expected that students will:</i>	<i>The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:</i>
1. Critique ways in which data is presented. [C, R, T, V]	<ul style="list-style-type: none"> • Compare the information that is provided for the same data set by a given set of graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, to determine the strengths and limitations of each graph. • Identify the advantages and disadvantages of different graphs, including circle graphs, line graphs, bar graphs, double bar graphs and pictographs, in representing a specific given set of data. • Justify the choice of a graphical representation for a given situation and its corresponding data set. • Explain how the format of a given graph, such as the size of the intervals, the width of bars and the visual representation, may lead to misinterpretation of the data. • Explain how a given formatting choice could misrepresent the data. • Identify conclusions that are inconsistent with a given data set or graph and explain the misinterpretation.
Strand: Statistics and Probability (Chance and Uncertainty) General Outcome: Collect, display and analyze data to solve problems	
2. Solve problems involving the probability of independent events.[C, CN, PS, T]	<ul style="list-style-type: none"> • Determine the probability of two given independent events and verify the probability using a different strategy. • Generalize and apply a rule for determining the probability of independent events. • Solve a given problem that involves determining the probability of independent events.

**AAT MATH GRADE 9
TEST BLUEPRINT**

Multiple Choice (MC) and Numerical Response (NR)			
Item Type	Number of Items	Number of Marks	Percentage of Test
MC	40	40	80%
NR	10	10	20%
TOTAL	50	50	100%
Content Domain of Test			
Strand		Percentage of Items on Test	
Number		25 – 35%	
Patterns and Relations		30 - 40%	
Shape and Space		15– 25%	
Statistics and Probability		10 – 20%	
Cognitive Domain of Test			
Complexity Level		Percentage of Items on Test	
Low		30 – 40%	
Moderate		40 – 50%	
High		15 – 25%	