Form A-l: Specific Description of an Alternative Education Program

This form must be submitted to the Regional Office of Education no later than **May 1** for approval in the first year of implementation. Significant changes require a resubmission of this form.

Do you understand fully the impact an Alternative Education Program will have on students as described on page 8?

☒ **Yes** ☐ **No**

1. Application information

#119	**Saskatchewan Rivers SD**	**V**
School Division Number	School Division	Region
545 11th Street East	**Prince Albert**	**S6V 1B1**
Street Address/P.O. Box	City/Town	Postal Code

Alternative Education Program (check one) ☒ Grade 10 ☒ Grade11 ☒ Grade12

50	**August 2011**	**June 2016**
Number of Students	Date of Commencement	Expiry Date

2. List Alternative Education course titles (18, 28, 38)

Math 18	**Math 28**	**Math 38**

3. Name the schools in which the Alternative Education Program is offered and identify them by their seven digit school code. (Attach a list if more space is required.)

School Number	School Name	School Number	School Name
6310143	Big River	5510123	Birch Hills
6310223	Canwood	5670104	Carlton Comprehensive
6310313	Debden	5510343	Kinistino
5610823	Meath Park	5651303	Prince Albert Collegiate
4810813	St. Louis	6310733	W.P. Sandin Composite
5611513	Wesmor Community		

4. Description of students

Include:

- **The special characteristics of the students that necessitate an Alternative Education Program**
  The target group consists of students of high school age who experience serious difficulties for a variety of reasons. These students began their school careers in regular programs but because of their learning difficulties, have been removed from regular and modified programs and placed in alternate programs for one or mor subject areas. Contributing factors to these students' learning difficulties may include the following: lower cognitive abilities, fetal alcohol spectrum disorders, substance abuse, isolation, poor school attendance patterns, involvement with the justice system, abuse, neglect and/or lack of positive role models.

- **The student referral process for enrolment in this program**
  Referrals for the alternate education program are received from elementary schools, high schools and other community agencies by the Student Support Services consultant. Collaboration with parents, former teachers, counselors, social workers and any other personnel from other agencies involved with the student occurs prior to a student enrolling in the program.

- **The criteria for student enrolment in an Alternative Education Program**
  Criteria for enrollment includes assessment and evaluation of the student's academic and cognitive functioning, as well a review of the student's educational history and the agreement and input of both the student and the parent(s)/guardian(s).

- **School Division Policy and Guidelines that pertain to Alternative Education Programs.**

SPECIAL CLASS PLACEMENT FORM
Alternative Education

Student's name:___________________________ Birthdate:____________
School:______________________________

Alternative Education classes are offered at Riverside Community School (middle years), Wesmor Community High School (Middle years and grades 9-12) and Carlton Comprehensive High School (grades 9-12).

Alternative Education programs are designed for students who have experienced significant and ongoing difficulties with regular education programs and would benefit from a substantially changed education program. Behavior challenges are not the primary reason for placing a student in Alternative Education. Families and students are invited to develop a Personal Program Plan with the teacher to meet the student's unique learning needs.

The goals of Alternative Education are to prepare students to find employment after graduation and to function as independent adults.

Benefits of Alternative Education
1. Core classes are tailored to meet the unique learning needs of the student.
2. Students are offered volunteer experiences.
3. Career and Work Exploration classes allow students to experience a variety of employment opportunities and gain valuable experiences for their resume
4. Curriculum focuses on real-life situations and challenges that they may encounter.

I understand that the Alternative Education program does not meet the current admission requirements for most post-secondary educational institutions.

I understand that one Alternative Education class at the grade 10, 11 or 12 level automatically registers my child in the Alternative Education program.
I understand that if my child discontinues the Alternative Education program, he or she will be required to complete all required Regular Education courses in order to graduate with a Regular Education Grade 12.
I understand that this placement will be reviewed as needed in order to meet my child's educational needs.

______________________________ ______________________

Signature of parent or guardian — Date

______________________________ ______________________

Signature of student — Date

______________________________ ______________________

Signature of Student Support Services Consultant — Date

5. Designing the Alternative Education Program

a) Are there to be courses included that are adopted from another school division? No.

If yes, please attach a complete copy of that school division's approved *Form A-I* and *Form A-2.*

If no, are these courses modelled after the submission of other school division(s)? Please indicate name(s) of school division(s).

These courses are modeled after the Saskatchewan Curriculum for Mathematics, grades 2 to 10.

b) Rationale - Please describe the intent or purpose of the program including a general definition of changes to be brought about in the students as a result of this program.

The goal of the Program is to help students plan their future with confidence, responsibility and independence. The program emphasizes a commitment to literacy and life-long learning, democratic values; individual self-worth; responsible social participation; respect for individual and cultural differences; the development of a healthy lifestyle (physically, mentally, spiritually, aesthetically and recreationally); preparation for entry into the workforce; and provision of the skills, knowledge and values necessary to make a meaningful contribution to our ever changing world.

6. Course descriptions

For each course being approved, please attach a detailed description of the following:

- Course title
- Foundational objectives
- Learning objectives/outcomes for each foundational objective
- Scope and sequence of knowledge and skills
- Provide a list of all **key resources**, both print and non-print, including author, copyright date, title, place of publication, publisher, and format description (e.g., book, video, workbook). The list of key resources might also include program support personnel, mentors, organizations, and electronic resources such as databases and World Wide Web sites.
  Note: Saskatchewan Learning's approval of this course does not imply formal evaluation and recommendation of the materials listed.

- Explanation of how the Common Essential Learnings have been incorporated (refer to *Understanding the Common Essential Learnings: A Handbook for Teachers,* Saskatchewan Education, 1988 and to *Objectives for the Common Essential Learnings*, which are available online at www.sasklearning.gov.sk.ca/docs/policy /cels/celobj .html)

- Examples of instructional approaches (refer to *Instructional Approaches: A Framework for Professional Practice,* Saskatchewan Education, 1991).

- Examples of assessment and evaluation techniques (refer to *Student Evaluation: A Teacher Handbook*, Saskatchewan Education, 1992).

- Description of course evaluation and renewal process.

(See Appendix E: Program Development Checklist.)

Authorization: ____

Director of Education/Superintendent/Designate Date

Mathematics 18/28/38

The preamble for the Mathematics curricula are taken from the preamble of the Workplace and Apprenticeship Mathematics 10 Curriculum (2010 Saskatchewan Curriculum) and Grade 7 Mathematics (2007 Saskatchewan Curriulum), as this is the same basis for the Mathematics curriculum for student in Alternative Education Programs.

There are three Broad Areas of Learning that reflect Saskatchewan's Goals of Education. K-12 mathematics contributes to the Goals of Education through helping students achieve knowledge, skills, and attitudes related to these Broad Areas of Learning.

Lifelong Learners

Related to the following Goals of Education:
- *Basic Skills*
- *Lifelong Learning*
- *Positive Lifestyle*

Students who are engaged in constructing and applying mathematical knowledge naturally build a positive disposition towards learning. Throughout their study of mathematics, students should be learning the skills (including reasoning strategies) and developing the attitudes that will enable the successful use of mathematics in daily life. Moreover, students should be developing understandings of mathematics that will support their learning of new mathematical concepts and applications that may be encountered within both career and personal interest choices. Students who successfully complete their study of K-12 mathematics should feel confident about their mathematical abilities and have developed the knowledge, understandings, and abilities necessary to make future use and/or studies of mathematics meaningful and attainable.

Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge. (NCTM, 2000, p. 20)

In order for mathematics to contribute to this Broad Area of Learning, students must actively learn the mathematical content in the outcomes through using and developing logical thinking, number sense, spatial sense, and understanding of mathematics as a human endeavour (the four goals of K-12 mathematics). It is crucial that the students discover the mathematics outlined in the curriculum rather than the teacher covering it.

Sense of Self, Community, and Place

Related to the following Goals of Education:
- *Understanding and Relating to Others*
- *Self Concept Development*
- *Spiritual Development*

To learn mathematics with deep understanding, students not only need to interact with the mathematical content, but with each other as well. Mathematics needs to be taught in a dynamic environment where students work together to share and evaluate strategies and understandings. Students who are involved in a supportive mathematics learning environment that is rich in dialogue and reflection are exposed to a wide variety of perspectives and strategies from which to construct a sense of the mathematical content. In such an environment, students also learn and come to value how they, as individuals and as members of a group or community, can contribute to understanding and social well-being through a sense of accomplishment, confidence, and relevance. When encouraged to present ideas representing different perspectives and ways of knowing, students in mathematics classrooms develop a deeper understanding of the mathematics. At the same time, students also learn to respect and value the contributions of others.

Mathematics provides many opportunities for students to enter into communities beyond the classroom by engaging with people in the neighbourhood or around the world. By working towards developing a deeper understanding of mathematics and its role in the world, students develop their personal and social identity, and learn healthy and positive ways of interacting and working together.

Engaged Citizens

Mathematics brings a unique perspective and way of knowing to the analysis of social impact and interdependence. Doing mathematics requires students to “leave their emotions at the door” and to engage in different situations for the purpose of understanding what is really happening and what can be done. Mathematical analysis of topics that interest students, such as trends in climate change, homelessness, health issues (e.g., hearing loss, carpal tunnel syndrome, diabetes), and discrimination can be used to engage the students in interacting and contributing positively to their classroom, school , community, and world. With the understandings that students derive through mathematical analysis, they become better informed and have a greater respect for and understanding of differing opinions and possible options. With these understandings, students can make better informed and more personalized decisions regarding roles within, and contributions to, the various communities in which students are members.

Related to the following Goals of Education:
- *Career and Consumer Decisions*
- *Membership in Society*
- *Growing with Change*

Cross-curricular Competencies

The Cross-curricular Competencies are four interrelated areas containing understandings, values, skills, and processes which are considered important for learning in all areas of study. These competencies reflect the Common Essential Learnings and are intended to be addressed in each area of study at each grade level.

Developing Thinking

It is important that, within their study of mathematics, students are engaged in personal construction and understanding of mathematical knowledge. This occurs most effectively through student engagement in inquiry and problem solving when students are challenged to think critically and creatively. Moreover, students need to experience mathematics in a variety of contexts – both real world applications and mathematical contexts – in which students are asked to consider questions such as “What would happen if ...”, “Could we find ...”, and “What does this tell us?” Students need to be engaged in the social construction of mathematics to develop an understanding and appreciation of mathematics as a tool which can be used to consider different perspectives, connections, and relationships. Mathematics is a subject that depends upon the effective incorporation of independent work and reflection with interactive contemplation, discussion, and resolution.

K-12 Goals for Developing Thinking:
- *thinking and learning contextually*
- *thinking and learning creatively*
- *thinking and learning critically.*

Related to CEL of Critical and Creative Thinking.

Developing Identity and Interdependence

Given an appropriate learning environment in mathematics, students can develop both their self-confidence and self-worth. An interactive mathematics classroom in which the ideas, strategies, and abilities of individual students are valued supports the development of personal and mathematical confidence. It can also help students take an active role in defining and maintaining the classroom environment and accepting responsibility for the consequences of their choices, decisions, and actions. A positive learning environment combined with strong pedagogical choices that engage students in learning serves to support students in behaving respectfully towards themselves and others.

K-12 Goals for Developing Identity and Interdependence:
- *Understanding, valuing, and caring for oneself (intellectually, emotionally, physically, spiritually)*
- *Understanding, valuing, and caring for others*
- *Understanding and valuing social, economic, and environmental interdependence and sustainability.*

Related to CELs of Personal and Social Development and Technological Literacy.

Developing Literacies

Through their mathematical learning experiences, students should be engaged in developing their understandings of the language of mathematics and their ability to use mathematics as a language and representation system. Students should be regularly engaged in exploring a variety of representations for mathematical concepts and should be expected to communicate in a variety of ways about the mathematics being learned. Important aspects of learning mathematical language are to make sense of mathematics, communicate one's own understandings, and develop strategies to explore what and how others know about mathematics. Moreover, students should be aware of and able to make the appropriate use of technology in mathematics and mathematics learning. It is important to encourage students to use a variety of forms of representation (concrete manipulatives, physical movement, oral, written, visual, and symbolic) when exploring mathematical ideas, solving problems, and communicating understandings.

All too often, it is assumed that symbolic representation is the only way to communicate mathematically. The more flexible students are in using a variety of representations to explain and work with the mathematics being learned, the deeper students' understanding becomes.

> *K-12 Goals for Developing Literacies:*
> *• Constructing knowledge related to various literacies*
> *• Exploring and interpreting the world through various literacies*
> *• Expressing understanding and communicating meaning using various literacies.*
> *Related to CELs of Communication, Numeracy, Technological Literacy, and Independent Learning.*

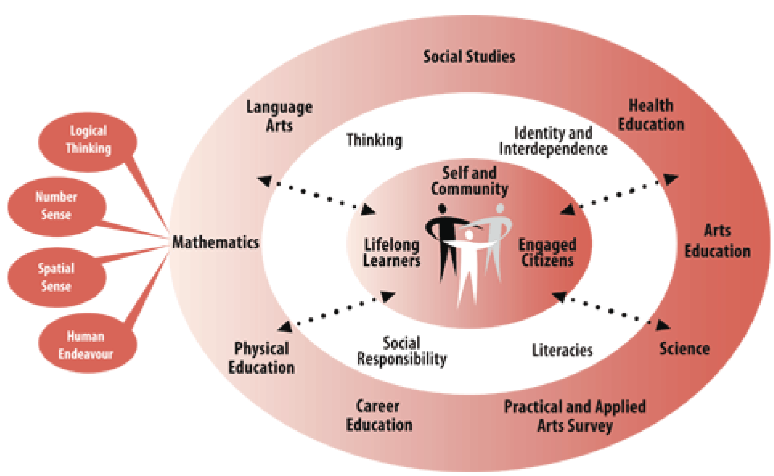
Developing Social Responsibility

As students progress in their mathematical learning, they need to experience opportunities to share and consider ideas, and resolve conflicts between themselves and others. This requires that the learning environment constructed by the teacher and students support respectful, independent, and interdependent behaviours. Every student should feel empowered to help others in developing their understanding, while finding respectful ways to seek help from others. By encouraging students to explore mathematics in social contexts, students can be engaged in understanding the situation, concern, or issue and then in planning for responsible reactions or responses. Mathematics is a subject dependent upon social interaction and, as a result, social construction of ideas. Through the study of mathematics, students learn to become reflective and positively contributing members of their communities. Mathematics also allows for different perspectives and approaches to be considered, assessed for contextual validity, and strengthened.

> *K-12 Goals for Developing Social Responsibility:*
> *• Using moral reasoning processes*
> *• Engaging in communitarian thinking and dialogue*
> *• Taking social action. Related to CELs of Communication, Critical and Creative Thinking, Personal and Social Development, and Independent Learning.*

K-12 Aim and Goals of Mathematics

The K-12 aim of the mathematics program is to have students develop the understandings and abilities necessary to be confident and competent in thinking and working mathematically in their daily activities, ongoing learning, and work experiences. The K-12 mathematics program is intended to stimulate the spirit of inquiry within the context of mathematical thinking and reasoning.



Defined below are four K-12 goals for mathematics in Saskatchewan. The goals are broad statements that identify the characteristics of thinking and working mathematically. At every grade level, students' learning should be building towards their attainment of these goals. Within each grade level, outcomes are directly related to the development of one or more of these goals. The instructional approaches used to promote student achievement of the grade level outcomes must, therefore, also promote student achievement with respect to the K-12 goals.

Logical Thinking
Through their learning of K-12 mathematics, students will **develop and be able to apply mathematical reasoning processes, skills, and strategies to new situations and problems.**

This goal encompasses processes and strategies that are foundational to understanding mathematics as a discipline. These processes and strategies include:

- observing
- inductive and deductive thinking
- proportional reasoning
- abstracting and generalizing
- exploring, identifying, and describing patterns
- verifying and proving
- exploring, identifying, and describing relationships
- modeling and representing (including concrete, oral, physical, pictorial, and symbolic representations)
- conjecturing and asking "what if" (mathematical play).

In order to develop logical thinking, students need to be actively involved in constructing their mathematical knowledge using the above strategies and processes. Inherent in each of these strategies and processes is student communication and the use of, and connections between, multiple representations.

Number Sense
Through their learning of K-12 mathematics, students will **develop an understanding of the meaning of, relationships between, properties of, roles of, and representations (including symbolic) of numbers and apply this understanding to new situations and problems.**

Foundational to students developing number sense is having ongoing experiences with:

- decomposing and composing of numbers
- relating different operations to each other
- modeling and representing numbers and operations (including concrete, oral, physical, pictorial, and symbolic representations)
- understanding the origins and need for different types of numbers
- recognizing operations on different number types as being the same operations
- understanding equality and inequality
- recognizing the variety of roles for numbers
- developing and understanding algebraic representations and manipulations as an extension of numbers
- looking for patterns and ways to describe those patterns numerically and algebraically.

Number sense goes well beyond being able to carry out calculations. In fact, in order for students to become flexible and confident in their calculation abilities, and to be able to transfer those abilities to more abstract contexts, students must first develop a strong understanding of numbers in general. A deep understanding of the meaning, roles, comparison, and relationship between numbers is critical to the development of students' number sense and their computational fluency.

Spatial Sense
Through their learning of K-12 mathematics, students will **develop an understanding of 2-D shapes and 3-D objects, and the relationships between geometrical shapes and objects and numbers, and apply this understanding to new situations and problems.**
Development of a strong spatial sense requires students to have ongoing experiences with:

- construction and deconstruction of 2-D shapes and 3-D objects
- investigations and generalizations about relationships between 2-D shapes and 3-D objects
- explorations and abstractions related to how numbers (and algebra) can be used to describe 2-D shapes and 3-D objects
- explorations and generalizations about the movement of 2-D shapes and 3-D objects
- explorations and generalizations regarding the dimensions of 2-D shapes and 3-D objects
- explorations, generalizations, and abstractions about different forms of measurement and their meaning.

Being able to communicate about 2-D shapes and 3-D objects is foundational to students' geometrical and measurement understandings and abilities. Hands-on exploration of 3-D objects and the creation and testing of conjectures based upon patterns that are discovered should drive the students' development of spatial sense, with formulas and definitions resulting from the students' mathematical learnings.

Mathematics as a Human Endeavour
Through their learning of K-12 mathematics, students will **develop an understanding of mathematics as a way of knowing the world that all humans are capable of with respect to their personal experiences and needs.**

Developing an understanding of mathematics as a human endeavour requires students to engage in experiences that:

- value place-based knowledge and learning
- value learning from and with community
- encourage and value varying perspectives and approaches to mathematics
- recognize and value one's evolving strengths and knowledge in learning and doing mathematics
- recognize and value the strengths and knowledge of others in doing mathematics
- value and honour reflection and sharing in the construction of mathematical understanding
- recognize errors as stepping stones towards further learning in mathematics
- require self-assessment and goal setting for mathematical learning
- support risk taking (mathematical and personal)
- build self-confidence related to mathematical insights and abilities
- encourage enjoyment, curiosity, and perseverance when encountering new problems
- create appreciation for the many layers, nuances, perspectives, and value of mathematics.

Students should be encouraged to challenge the boundaries of their experiences, and to view mathematics as a set of tools and ways of thinking that every society develops to meet their particular needs. This means that mathematics is a dynamic discipline in which logical thinking, number sense, and spatial sense form the backbone of all developments and those developments are determined by the contexts and needs of the time, place, and people.

The content found within the grade level outcomes for the K-12 mathematics program, and it's applications, is first and foremost the vehicle through which students can achieve the four K-12 goals of mathematics. Attainment of these four goals will result in students with the mathematical confidence and tools necessary to succeed in future mathematical endeavours.

Critical Characteristics of Mathematics Education
The following sections in this curriculum highlight some of the different facets for teachers to consider in the process of changing from covering to supporting students in discovering mathematical concepts. These facets include:

- the organization of the outcomes
- the seven mathematical processes
- the difference between covering and discovering mathematics
- the development of mathematical terminology
- First Nations and Métis learners and mathematics
- critiquing statements
- the concrete to abstract continuum
- modelling and making connections
- the role of homework
- the importance of ongoing feedback and reflection.

Organization of Outcomes
The content of K-12 mathematics can be organized in a variety of ways. In the grades 10-12 curricula, the outcomes are not grouped according to strands (as in the elementary mathematics curricula) or by topic (as in past curricula). The primary reasons for this are: a succinct set of high level outcomes for each grade, and variation between grades and pathways in terms of the topics and content within different courses.

Teaching Mathematics

At the National Council of Teachers of Mathematics (NCTM) Canadian Regional Conference in Halifax (2000), Marilyn Burns said in her keynote address, "When it comes to mathematics curricula there is very little to cover, but an awful lot to uncover [discover]." This statement captures the essence of the ongoing call for change in the teaching of mathematics. Mathematics is a dynamic and logic-based language that students need to explore and make sense of for themselves. For many teachers, parents, and former students this is a marked change from the way mathematics was taught to them. Research and experience indicate there is a complex, interrelated set of characteristics that teachers need to be aware of in order to provide an effective mathematics program.

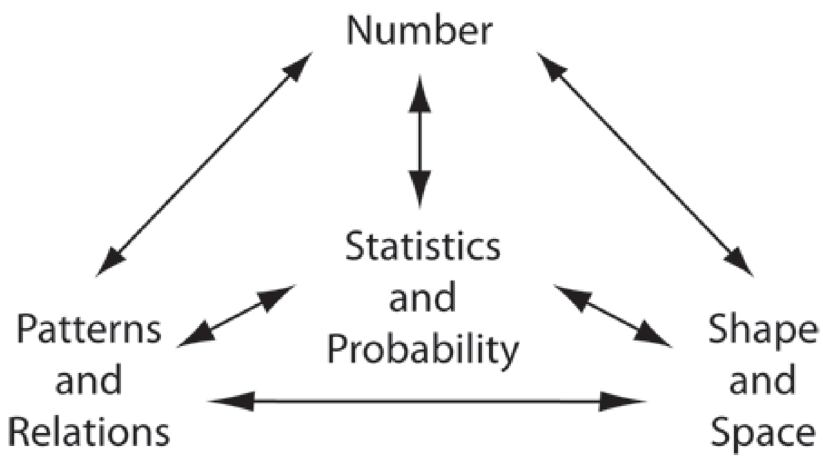
Critical Characteristics of Mathematics Education

The following sections in this curriculum highlight some of the different facets for teachers to consider in the process of changing from covering to supporting students in discovering mathematical concepts. These facets include:

- organization of the outcomes into strands
- seven mathematical processes
- the difference between covering and discovering mathematics
- development of mathematical terminology
- First Nations and Métis learners and mathematics
- continuum of understanding from concrete to abstract
- modeling and making connections
- role of homework
- importance of ongoing feedback and reflection.

Strands

The content of K-12 Mathematics can be organized in a variety of ways. In this curriculum, the outcomes and indicators are grouped according to four strands: **Number, Patterns and Relations, Shape and Space, and Statistics and Probability.**



Although this organization implies a relatedness among the outcomes identified in each of the strands, it should be noted the mathematical concepts are interrelated across the strands as well as within strands. Teachers are encouraged to design learning activities that integrate outcomes both within a strand and across the strands so that students develop a comprehensive and connected view of mathematics rather than viewing mathematics as a set of compartmentalized ideas and separate strands.

Mathematical Processes

This curriculum recognizes seven processes inherent in the teaching, learning, and doing of mathematics. These processes focus on: communicating, making connections, mental mathematics and estimating, problem solving, reasoning, and visualizing along with using technology to integrate these processes into the mathematics classroom to help students learn mathematics with deeper understanding.

The outcomes in K-12 Mathematics should be addressed through the appropriate mathematical processes as indicated by the bracketed letters following each outcome. Teachers should consider carefully in their planning those processes indicated as being important to supporting student achievement of the respective outcomes.

Communication [C]

Students need opportunities to read about, represent, view, write about, listen to, and discuss mathematical ideas using both personal and mathematical language and symbols. These opportunities allow students to create links among their own language, ideas, and prior knowledge, the formal language and symbols of mathematics, and new learnings.

Communication is important in clarifying, reinforcing, and adjusting ideas, attitudes, and beliefs about mathematics. Students should be encouraged to use a variety of forms of communication while learning mathematics. Students also need to communicate their learning using mathematical terminology, but only when they have had sufficient experience to develop an understanding for that terminology.

Concrete, pictorial, symbolic, physical, verbal, written, and mental representations of mathematical ideas should be encouraged and used to help students make connections and strengthen their understandings.

Connections [CN]

Contextualization and making connections to the experiences of learners are powerful processes in developing mathematical understanding. When mathematical ideas are connected to each other or to other real-world phenomena, students begin to view mathematics as useful, relevant, and integrated.

The brain is constantly looking for and making connections. Learning mathematics within contexts and making connections relevant to learners can validate past experiences and prior knowledge, and increase student willingness to participate and be actively engaged.

Mental Mathematics and Estimation [ME]
Mental mathematics is a combination of cognitive strategies that enhance flexible thinking and number sense. It is calculating mentally and reasoning about the relative size of quantities without the use of external memory aids. Mental mathematics enables students to determine answers and propose strategies without paper and pencil. It improves computational fluency and problem solving by developing efficiency, accuracy, and flexibility.
Estimation is a strategy for determining approximate values of quantities, usually by referring to benchmarks or using referents, or for determining the reasonableness of calculated values. Students need to know how, when, and what strategy to use when estimating. Estimation is used to make mathematical judgements and develop useful, efficient strategies for dealing with situations in daily life.

Problem Solving [PS]
Learning through problem solving should be the focus of mathematics at all grade levels. When students encounter new situations and respond to questions of the type, "How would you ...?", "Can you ...?", or "What if ...?", the problem-solving approach is being modeled. Students develop their own problem-solving strategies by being open to listening, discussing, and trying different strategies.
In order for an activity to be problem-solving based, it must ask students to determine a way to get from what is known to what is sought. If students have already been given ways to solve the problem, it is not problem solving but practice. A true problem requires students to use prior learnings in new ways and contexts. Problem solving requires and builds depth of conceptual understanding and student engagement.
Problem solving is a powerful teaching tool that fosters multiple and creative solutions. Creating an environment where students actively look for, and engage in finding, a variety of strategies for solving problems empowers students to explore alternatives and develops confidence, reasoning, and mathematical creativity.

Reasoning [R]
Mathematical reasoning helps students think logically and make sense of mathematics. Students need to develop confidence in their abilities to reason and explain their mathematical thinking. High-order inquiry challenges students to think and develop a sense of wonder about mathematics.
Mathematical experiences in and out of the classroom should provide opportunities for students to engage in inductive and deductive reasoning. Inductive reasoning occurs when students explore and record results, analyze observations, make generalizations from patterns, and test these generalizations. Deductive reasoning occurs when students reach new conclusions based upon what is already known or assumed to be true.

Visualization [V]
The use of visualization in the study of mathematics provides students with opportunities to understand mathematical concepts and make connections among them. Visual images and visual reasoning are important components of number sense, spatial sense, and logical thinking. Number visualization occurs when students create mental representations of numbers and visual ways to compare those numbers. Being able to create, interpret, and describe a visual representation is part of spatial sense and spatial reasoning. Spatial visualization and reasoning enable students to describe the relationships among and between 3-D objects and 2-D shapes including aspects such as dimensions and measurements. Visualization is also important in the students' development of abstraction and abstract thinking and reasoning. Visualization provides a connection between the concrete, physical, and pictorial to the abstract symbolic. Visualization is fostered through the use of concrete materials, technology, and a variety of visual representations as well as the use of communication to develop connections among different contexts, content, and representations.

Technology [T]
Technology tools contribute to student achievement of a wide range of mathematical outcomes, and enable students to explore and create patterns, examine relationships, test conjectures, and solve problems. Calculators, computers, and other forms of technology can be used to:

- explore and demonstrate mathematical relationships and patterns
- organize and display data
- extrapolate and interpolate
- assist with calculation procedures as part of solving problems
- decrease the time spent on computations when other mathematical learning is the focus
- reinforce the learning of basic facts and test properties
- develop personal procedures for mathematical operations
- create geometric displays
- simulate situations
- develop number sense
- develop spatial sense
- develop and test conjectures.

Technology contributes to a learning environment in which the growing curiosity of students can lead to rich mathematical discoveries at all grade levels. It is important for students to understand and appreciate the appropriate use of technology in a mathematics classroom. It is also important that students learn to distinguish between when technology is being used appropriately and when it is being used inappropriately. Technology should never replace understanding, but should be used to enhance it.

Discovering versus Covering

Teaching mathematics for deep understanding involves two processes: teachers covering content and students discovering content. Knowing what must to be covered and what can be discovered is crucial in planning for mathematical instruction and learning. The content that needs to be covered (what the teacher needs to explicitly tell the students) is the social conventions or customs of mathematics. This content includes things such as what the symbol for an operation looks like, mathematical terminology, and conventions regarding recording of symbols.

The content that can and should be discovered by students is the content that can be constructed by students based on their prior mathematical knowledge. This content includes things such as strategies, processes, rules, and problem solving, as well as the students' current and intuitive understandings of quantity and patterns. Any learning in mathematics that is a result of the logical structure of mathematics can and should be constructed by students.

For example, in Grade 7, the students encounter measures of central tendency for the first time in outcome SP7.1:

Demonstrate an understanding of the measures of central tendency and range for sets of data.

[C, CN, PS, R, T]

In this outcome, the terms " mean", "median" and "mode" are social conventions of the mathematics the students are learning and, as such, the teacher must tell the students all three of the terms. Before presenting and defining these terms, however; it is important that students first explore and share their understandings of what the center of a set of data could be. Hands on and physical representations of data sets, prompted by questions such as "who has the middle amount of linking cubes", "what is the most common number of linking cubes", "how could you determine how many linking cubes each of you would get if they were split up evenly", and "why are all of these values different" provide students with problem situations whose solution will result in the students developing an understanding of the different measures of central tendencies. In this type of learning, the teacher does not tell the students how to do the mathematics but, rather, invites the students to explore and develop an understanding of the logical structures inherent in the mathematics in increasing patterns. Thus, the teacher's role is to create inviting and rich inquiring tasks and to use questioning to effectively probe and further students' learning.

Development of Mathematical Terminology

Part of learning mathematics is learning how to speak mathematically. Teaching students mathematical terminology when they are learning for deep understanding requires that the students connect the new terminology with their developing mathematical understanding. As a result, it is important that students first linguistically engage with new mathematical concepts using words that they already know or that make sense to them.

For example, in outcome SS7.1:

Demonstrate an understanding of circles including circumference and central angles.

[C, CN, R, V]

the terminology of "circumference" and "central angles" will likely be unknown to the student. It is important that, before being introduced to these new words, students first explore and describe relationships they discover using the words that make sense to them. For example, students might say "distance around", "perimeter", or "length around" to describe finding the circumference. Once the students have developed understandings of the concepts in this outcome, the mathematical terminology can then be introduced to them. It is important that at that point teachers also model the use of the new words correctly.

In helping students develop their working mathematical language, it is also important for the teacher to recognize that for many students, including First Nations and Métis, they may not recognize a specific term or procedure, but the student may in fact have a deep understanding of the mathematical topic. Many perceived learning difficulties in mathematics are the result of students' cultural and personal ways of knowing not being connected to formal mathematical language.

In addition, the English language often allows for multiple interpretations of the same sentence, depending upon where the emphasis is placed. For example, consider the sentence "The shooting of the hunters was terrible" (Paulos, 1980, p. 65). Were the hunters that bad of a shot, was it terrible that the hunters got shot, was it terrible that they were shooting, or is this all about the photographs that were taken of the hunters? It is important that students be engaged in dialogue through which they explore possible meanings and interpretations of mathematical statements and problems.

First Nations and Métis Learners and Mathematics

It is important for teachers to realize that First Nations and Métis students, like all students, come to mathematics classes with a wealth of mathematical understandings. Within these mathematics classes, some First Nations and Métis students may develop a negative sense of their ability in mathematics and, in turn, do poorly on mathematics assessments. Such students may become alienated from mathematics because it is not taught to their schema, cultural and environmental content, or real life experiences. A first step in actualization of mathematics from First Nations and Métis perspectives is to empower teachers to understand that mathematics is not acultural. As a result, teachers then realize that the traditional ways of teaching the mathematics are also culturally-biased. These understandings will support the teacher in developing First Nations and Métis students' personal mathematical understandings and mathematical self-confidence and ability through a more holistic and constructivist approach to learning. Teachers need to consider factors that impact the success of First Nations and Métis students in mathematics: cultural contexts and pedagogy.

It is important for teachers to recognize the influence of cultural contexts on mathematical learning. Educators need to be sensitive to the cultures of others, as well as to how their own cultural background influences their current perspective and practice. Many First Nations and Métis view the world from a more holistic perspective than mathematics is often taught. Traditionally, mathematics instruction focused on the individual parts of the whole understanding and, as a result, the contexts presented tended to be compartmentalized and treated discretely. This focus on parts may be challenging for students who rely on whole contexts to support understanding.

Mathematical ideas are valued, viewed, contextualized, and expressed differently by cultures and communities. Translation of these mathematical ideas between cultural groups cannot be assumed to be a direct link. Consider, for example, the concept of "equal", which is a key understanding in this curriculum. The Western understanding of "equal" is "the same". In many First Nations and Métis communities, however, "equal" is understood as meaning 'for the good of the community'. Teachers need to support students in uncovering these differences in ways of knowing and understanding within the mathematic classroom. Various ways of knowing need to be celebrated to support the learning of all students.

Along with an awareness of students' cultural context, pedagogical practices also influence the success of First Nations and Métis students in the mathematics classroom. Mathematical learning opportunities need to be holistic, occurring within social and cultural interactions through dialogue, language, and the negotiation of meanings. Constructivism, ethnomathematics, and teaching through an inquiry approach are supportive of a holistic perspective to learning. Constructivism, inquiry learning, and ethnomathematics allow students to enter the learning process according to their ways of knowing, prior knowledge, and learning styles. Ethnomathematics also shows the relationship between mathematics and cultural anthropology. It is used to translate earlier or alternative forms of thinking into modern-day understandings. Individually, and as a class, teachers and students need to explore the big ideas that are foundational to this curriculum and investigate how those ideas relate to them personally and as a learning community. Mathematics learned within contexts that focus on the day-to-day activities found in students' communities support learning by providing a holistic focus. Mathematics needs to be taught using the expertise of elders and the local environment as educational resources. The variety of interactions that occur among students, teachers, and the community strengthen the learning experiences for all.

The Concrete to Abstract Continuum

It is important that, in learning mathematics, students be allowed to explore and develop understandings by moving along a concrete to abstract continuum. As understanding develops, this movement along the continuum is not necessarily linear. Students may at one point be working abstractly but when a new idea or context arises, they need to return to a concrete starting point. Therefore, the teacher must be prepared to engage students at different points along the continuum.

In addition, what is concrete and what is abstract is not always obvious and can vary according to the thinking processes of the individual. For example, when considering a problem about the total number of pencils, some students might find it more concrete to use pictures of pencils as a means of representing the situation. Other students might find coins more concrete because they directly associate money with the purchasing or having of a pencil.

As well, teachers need to be aware that different aspects of a task might involve different levels of concreteness or abstractness. Consider the following situational question involving subtraction:

The elevator moved from the 3rd floor to the 8th floor and then to the 2nd level of the underground parking. How many floors did the elevator travel?

Depending upon how the question is expected to be solved (or if there is any specific expectation), this question can be approached abstractly (using symbolic number statements), concretely (e.g., using manipulatives, pictures, role play), or both.

Models and Connections

New mathematics is continuously developed by creating new models as well as combining and expanding existing models. Although the final products of mathematics are most frequently represented by symbolic models, their meaning and purpose is often found in the concrete, physical, pictorial, and oral models and the connections between them.

To develop a deep and meaningful understanding of mathematical concepts, students need to represent their ideas and strategies using a variety of models (concrete, physical, pictorial, oral, and symbolic). In addition, students need to make connections between the different representations. These connections are made by having the students try to move from one type of representation to another (how could you write what you've done here using mathematical symbols?) or by having students compare their representations with others in the class.

In making these connections, students should be asked to reflect upon how the mathematical ideas and concepts that they already know are being used in their new models (e.g., I know that I can represent 1000 using the large cube of the base 10 blocks, so 10 000 could be represented by a rod of 10 of the 1000 cubes, 100 000 could be represented by a flat of 100 of the 1000 cubes, and 1 000 000 could be represented by 1000 of the 1000 cubes).

Making connections also relates to students building upon prior mathematical learnings. For example, when learning outcome N7.6:

Demonstrate an understanding of addition and subtraction of integers, concretely, pictorially, and symbolically.

[C,CN, PS, R, V]

the students' prior understandings of what integers are and what it means to add and subtract should become the starting points of their learning about adding and subtracting integers. It is not necessary for the teacher to tell the students how to add and subtract integers. Rather, students need to be challenged to use what they already know to construct ways and understandings of adding and subtracting integers.

Role of Homework

The role of homework in teaching for deep understanding is very important and also quite different from homework that is traditionally given to students. Students should be given unique problems and tasks that help students to consolidate new learnings with prior knowledge, explore possible solutions, and apply learnings to new situations. Although drill and practice does serve a purpose in learning for deep understanding, the amount and timing of the drill will vary among different learners. In addition, when used as homework, drill and practice frequently serves to cause frustration, misconceptions, and boredom to arise in students.

As an example of the type or style of homework that can be used to help students develop deep understanding of Grade 7 Mathematics, consider outcome N7.4:

Expand and demonstrate an understanding of percent to include fractional percents between 0% and 100%.

[C, PS, R]

When considering this outcome, it is important for the teacher to recognize that, prior to Grade , students have learned about whole numbered percents. As well, the students have had a great deal of experience with representing and understanding fractions as parts of the whole, area, group, or length. As a homework assignment, students could be asked "is it possible to have a fractional percent", "where and why would such percents occur", and "how could you represent fractional persents"? These are questions that the student would take on before any classroom-based learning has been initiated regarding fractional percents. The students' solutions to these types of questions help identify for the teacher the students' depth of understanding of both percent and fractions, and thereby inform the teacher's decisions for upcoming learning tasks within the classroom. By having the students share their answers to the questions, and discuss the different representations posed can also help to engage students in further learning and understanding about fractional percents.

Ongoing Feedback and Reflection

Ongoing feedback and reflection, both for students and teachers, are crucial in classrooms when learning for deep understanding. Deep understanding requires that both the teacher and students need to be aware of their own thinking as well as the thinking of others.

Feedback from peers and the teacher helps students rethink and solidify their understandings. Feedback from students to the teacher gives much needed information in the teacher's planning for further and future learnings.

Self-reflection, both shared and private, is foundational to students developing a deep understanding of mathematics. Through reflection tasks, students and teachers come to know what it is that students do and do not know. It is through such reflections that not only can a teacher make better informed instructional decisions, but also that a student can set personal goals and make plans to reach those goals.

Teaching for Deep Understanding

For deep understanding, it is vital that students learn by constructing knowledge, with very few ideas being relayed directly by the teacher. As an example, the addition sign (+) is something which the teacher must introduce and ensure that students know. It is the symbol used to show the combination or addition of two quantities. The process of adding, however, and the development of addition and subtraction facts should be discovered through the students' investigation of patterns, relationships, abstractions, and generalizations. It is important for teachers to reflect upon outcomes to identify what students need to know, understand, and be able to do. Opportunities must be provided for students to explain, apply, and transfer understanding to new situations. This reflection supports professional decision making and planning effective strategies to promote students' deeper understanding of mathematical ideas.

It is important for teachers to analyze the outcomes to identify what students need to know, understand, and be able to do. Teachers also need to consider opportunities they can provide for students to explain, apply, and transfer understanding to new situations. This analysis supports professional decision making and planning effective strategies to promote students' deeper understanding of mathematical ideas.

It is important that a mathematics learning environment include effective interplay of:

- reflection
- exploration of patterns and relationships
- sharing of ideas and problems
- consideration of different perspectives
- decision making
- generalizing
- verifying and proving
- modeling and representing.

Mathematics is learned when students are engaged in strategic play with mathematical concepts and differing perspectives. When students learn mathematics by being told what to do, how to do it, and when to do it, they cannot make the strong connections necessary for learning to be meaningful, easily accessible, and transferable. The learning environment must be respectful of individuals and groups, fostering discussion and self-reflection, the asking of questions, the seeking of multiple answers, and the construction of meaning.

Inquiry

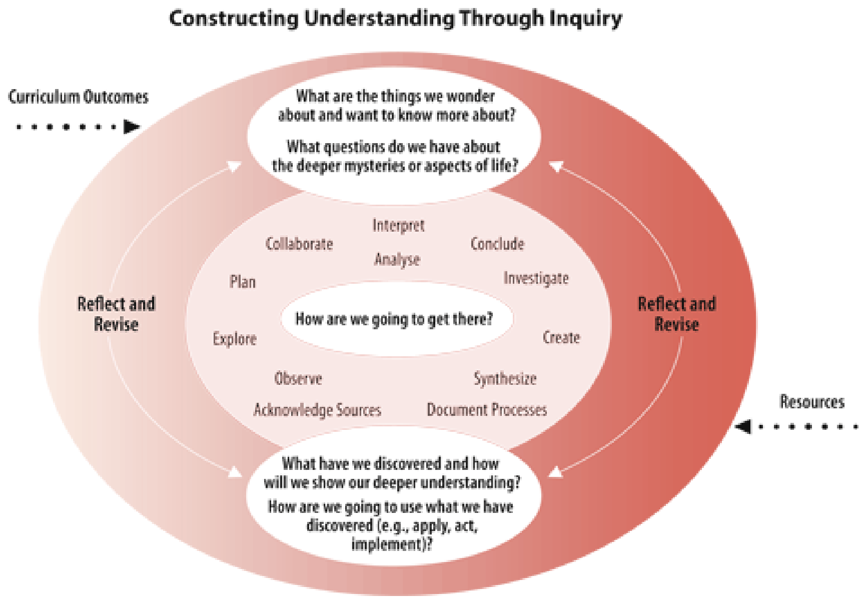
Inquiry learning provides students with opportunities to build knowledge, abilities, and inquiring habits of mind that lead to deeper understanding of their world and human experience. The inquiry process focuses on the development of compelling questions, formulated by teachers and students, to motivate and guide inquiries into topics, problems, and issues related to curriculum content and outcomes.

Inquiry is more than a simple instructional method. It is a philosophical approach to teaching and learning, grounded in constructivist research and methods, which engages students in investigations that lead to disciplinary and transdisciplinary understanding.

Inquiry builds on students' inherent sense of curiosity and wonder, drawing on their diverse backgrounds, interests, and experiences. The process provides opportunities for students to become active participants in a collaborative search for meaning and understanding. Students who are engaged in inquiry:

- construct deep knowledge and deep understanding rather than passively receiving it
- are directly involved and engaged in the discovery of new knowledge
- encounter alternative perspectives and conflicting ideas that transform prior knowledge and experience into deep understandings
- transfer new knowledge and skills to new circumstances
- take ownership and responsibility for their ongoing learning and mastery of curriculum content and skills. (Adapted from Kuhlthau & Todd, 2008, p. 1)

Inquiry learning is not a step-by-step process, but rather a cyclical process, with various phases of the process being revisited and rethought as a result of students' discoveries, insights, and co-construction of new knowledge. The following graphic shows various phases of this cyclical inquiry process.



Inquiry prompts and motivates students to investigate topics within meaningful contexts. The inquiry process is not linear or lock-step, but is flexible and recursive. Experienced inquirers will move back and forth through the cyclical process as new questions arise and as students become more comfortable with the process.

Well formulated inquiry questions are broad in scope and rich in possibilities. They encourage students to explore, gather information, plan, analyze, interpret, synthesize, problem solve, take risks, create, conclude, document, reflect on learning, and develop new questions for further inquiry.

In mathematics, inquiry encompasses problem solving. Problem solving includes processes to get from what is known to discover what is unknown. When teachers show students how to solve a problem and then assign additional problems that are similar, the students are not problem solving but practising. Both are necessary in mathematics, but one should not be confused with the other. If the path for getting to the end situation has already been determined, it is no longer problem solving. Students too must understand this difference.

Creating Questions for Inquiry in Mathematics

Teachers and students can begin their inquiry at one or more curriculum entry points; however, the process may evolve into transdisciplinary integrated learning opportunities, as reflective of the holistic nature of our lives and interdependent global environment. It is essential to develop questions that are evoked by students' interests and have potential for rich and deep learning. Compelling questions are used to initiate and guide the inquiry and give students direction for discovering deep understandings about a topic or issue under study.

The process of constructing inquiry questions can help students to grasp the important disciplinary or transdisciplinary ideas that are situated at the core of a particular curricular focus or context. These broad questions will lead to more specific questions that can provide a framework, purpose, and direction for the learning activities in a lesson, or series of lessons, and help students connect what they are learning to their experiences and life beyond school.

Effective questions in mathematics are the key to initiating and guiding students' investigations and critical thinking, problem solving, and reflection on their own learning. Questions such as:

- "When would you want to add two numbers less than 100?"
- "How do you know you have an answer?"
- "Will this work with every number? Every similar situation?"
- "How does your representation compare to that of your partner?"

are examples of questions that will move students' inquiry towards deeper understanding. Effective questioning is essential for teaching and student learning and should be an integral part of planning in mathematics. Questioning should also be used to encourage students to reflect on the inquiry process and the documentation and assessment of their own learning.

Questions should invite students to explore mathematical concepts within a variety of contexts and for a variety of purposes. When questioning students, teachers should choose questions that:

- help students make sense of the mathematics.
- are open-ended, whether in answer or approach. There may be multiple answers or multiple approaches.
- empower students to unravel their misconceptions.
- not only require the application of facts and procedures but encourage students to make connections and generalizations.
- are accessible to all students in their language and offer an entry point for all students.
- lead students to wonder more about a topic and to perhaps construct new questions themselves as they investigate this newly found interest. (Schuster & Canavan Anderson, 2005, p. 3)

Reflection and Documentation of Inquiry

An important part of any inquiry process is student reflection on their learning and the documentation needed to assess the learning and make it visible. Student documentation of the inquiry process in mathematics may take the form of reflective journals, notes, drafts, models, and works of art, photographs, or video footage. This documentation should illustrate the students' strategies and thinking processes that led to new insights and conclusions. Inquiry-based documentation can be a source of rich assessment materials through which teachers can gain a more in-depth look into their students' mathematical understandings.

It is important that students are required, and allowed to engage in, the communication and representation of their progress within a mathematical inquiry. A wide variety of forms of communication and representation should be encouraged and, most importantly, have links made between them. In this way, student inquiry into mathematical concepts and contexts can develop and strengthen student understanding.

Focuses on Grade-specific Outcomes

Student learning **outcomes** describe what students will learn in a particular discipline over a specific time frame (e.g., **Grade 10**). They specify the skills, knowledge, and attitudes that students are expected to know, understand, and be able to demonstrate.

Critical Characteristics

Outcomes:

- focus on what students will learn rather than what teachers will teach
- specify the skills, strategies, abilities, and understandings students are expected to be able to demonstrate but not prescribe the activity
- are observable, assessable, and attainable
- are grade and subject-specific
- are supported by indicators that provide the breadth and depth of expectations
- are written using action-based verbs
- identify the most important understandings and abilities to be developed in the specific grade level
- guide course, unit, and lesson planning.

The number and letter combination that precedes each of the outcomes indicates the strand (letter) and grade level of curriculum (number) that the outcome was taken from, allowing the teacher to find indicators and resources to support the assessment and teaching of the outcome.

Mathematics 18

Number

N4.1 Demonstrate an understanding of whole numbers to 1 000 000 (pictorially, physically, orally, in writing, and symbolically) by:

- representing
- describing
- comparing two numbers
- ordering three or more numbers
- hear a number and write the numeral.

(C,R,V)

N5.1 Represent, compare, and describe whole numbers to 1 000 000 within the contexts of place value and the base ten system, and quantity. [C, CN, R, T, V]

N4.2 Demonstrate an understanding of addition and subtraction of whole numbers by:

- using personal strategies for adding and subtracting
- estimating sums and differences
- solving problems involving addition and subtraction.

(C,CN,ME,PS,R)

N4.3 Demonstrate an understanding of multiplication of whole numbers by:

- applying mental mathematics strategies
- explaining the results of multiplying by 0 and 1

(C,CN,R)

N4.4 Demonstrate an understanding of multiplication by:

- using personal strategies for multiplication, with and without concrete materials
- using arrays to represent multiplication
- connecting concrete representations to symbolic representations
- estimating products
- solving problems.

(C, ME, PS, R, V)

N5.2 Analyze models of, develop strategies for, and carry out multiplication of whole numbers. [C, CN,ME, PS, R, V]

N4.5 Demonstrate an understanding of division by:

- using personal strategies for dividing with and without concrete materials
- estimating quotients
- explaining the results of dividing by 1
- solving problems involving division of whole numbers
- relating division to multiplication.

[C, CN, ME, PS, R, V]

N4.6 Demonstrate an understanding of fractions less than or equal to one by using concrete and pictorial representations to:

- name and record fractions for the parts of a whole or a set
- compare and order fractions
- model and explain that for different wholes, two identical fractions may not represent the same quantity
- provide examples of where fractions are used.

[C, CN, PS, R, V]

N5.3 Demonstrate, with and without concrete materials, an understanding of division (3-digit by 1-digit) and interpret remainders to solve problems.

[C, CN, PS, R]

N5.4 Develop and apply personal strategies for estimation and computation including:

- front-end rounding
- compensation
- compatible numbers.

[C, CN, ME, PS, R, V]

N5.5 Demonstrate an understanding of fractions by using concrete and pictorial representations to:

- create sets of equivalent fractions
- compare fractions with like and unlike denominators.

[C, CN, PS, R, V]

N4.7 Demonstrate an understanding of decimal numbers in tenths and hundredths (pictorially, orally, in writing, and symbolically) by:

- describing
- representing
- relating to fractions.

[C, CN, V]

N5.6 Demonstrate understanding of decimals to thousandths by:

- describing and representing
- relating to fractions
- comparing and ordering.

[C, CN, R, V]

N4.8 Demonstrate an understanding of addition and subtraction of decimals limited to hundredths (concretely, pictorially, and symbolically) by:

- using compatible numbers
- estimating sums and differences
- using mental math strategies
- solving problems.

[C, ME, PS, R, V]

N5.7 Demonstrate an understanding of addition and subtraction of decimals (limited to thousandths). [C, CN, PS, R, V]

N6.4 Extend understanding of multiplication and division to decimals (1-digit whole number multipliers and 1-digit natural number divisors). [C, CN, ME, PS, R]

Shape and Space

SS3.1 Demonstrate understanding of the passage of time including:

- relating common activities to standard and non-standard units
- describing relationships between units
- solving situational questions.

[C, CN, PS, R]

SSAE 18.1 Recognize difference between a.m. and p.m.

SS4.1 Demonstrate an understanding of time by:

- reading and recording time using digital and analog clocks (including 24 hour clocks)
- reading and recording calendar dates in a variety of formats.

[C, CN, V]

SSAE 18.2 To read and interpret a variety of tables, charts, and graphs.

SS6.4 Demonstrate understanding of the first quadrant of the Cartesian plane and ordered pairs with whole number coordinates. [C,CN, V]

SS7.4 Demonstrate an understanding of the Cartesian plane and ordered pairs with integral coordinates. [C, CN, V]

SS3.5 Demonstrate understanding of 2-D shapes (regular and irregular) including triangles, quadrilaterals, pentagons, hexagons, and octagons including:

- describing
- comparing
- sorting.

[C, CN, R]

SSAE18.3 Identify geometric shapes: circle, square, triangle, rectangle, semicircle, hexagon, octagon, pentagon, trapezoid, parallelogram, rhombus.

SS5.5 Describe and provide examples of:
- parallel lines
-intersecting lines
-perpendicular lines
-vertical lines
-horizontal lines

SS5.6 Identify and sort quadrilaterals, including:

- rectangles
- squares
- trapezoids
- parallelograms
- rhombuses

[C, R, V]

SS5.2 Demonstrate understanding of measuring length (mm) by:

- selecting and justifying referents for the unit mm
- modelling and describing the relationship between mm, cm, and m units.

[C, CN, ME, PS, R, V]

SS3.3 Demonstrate understanding of linear measurement (cm and m) including:

- selecting and justifying referents
- generalizing the relationship between cm and m
- estimating length and perimeter using referents
- measuring and recording length, width, height, and perimeter.

[C, CN, ME, PS, R, V]

SSAE 18.4 Calculate the perimeter of various shapes including circumference of circles.

SS7.1 Demonstrate an understanding of circles including circumference.

[C, CN, R, V]

SS4.2 Demonstrate an understanding of area of a square, rectangle, triangle, and circle by:

- recognizing that area is measured in square units
- selecting and justifying referents for the units cm2 or m2
- estimating area by using referents for cm2 or m2
- determining and recording area (cm2 or m2)
- constructing different rectangles for a given area (cm2 or m2) in order to demonstrate that many different rectangles may have the same area
- applying formulas.

[C, CN, ME, PS, R, V]

SS7.2 Develop and apply formulas for determining the area of:

- triangles
- parallelograms
- circles.

[CN, PS, R, V]

SS5.3 Demonstrate an understanding of volume for a rectangular prism by:
-estimating volume by using referents for cm^3 or m^3
-measuring and recording volume (cm^3 or m^3)

SS6.2 Extend and apply understanding of perimeter of polygons, area of rectangles, and volume of right rectangular prisms (concretely, pictorially, and symbolically).

SS5.4 Demonstrate understanding of capacity by:
-describing the relationship between mL and L
-selecting and justifying referents for mL or L units
-estimating capacity by using referents for mL or L
-measuring and recording capacity (mL or L).

Statistics and Probability

SP3.1 Demonstrate understanding of first-hand data using tally marks, charts, lists, bar graphs, and line plots (abstract pictographs), through:

- collecting, organizing, and representing
- solving situational questions.

[C, CN, PS, R, V]

SP4.1 Demonstrate an understanding of many-to-one correspondence by:

- comparing correspondences on graphs
- justifying the use of many-to-one correspondences
- interpreting data shown using a many-to-one correspondence
- creating bar graphs and pictographs using many-to-one correspondence.

[C, R, T, V]

SP5.1 Differentiate between first-hand and second-hand data.

SP5.2 Construct and interpret double bar graphs to draw conclusions.

SP5.3 Describe, compare, predict, and test the likelihood of outcomes in probability situations.

Consumer Math - AE 18

Money

CMAE 18.1M Identify names and values of coins and bills up to $100.00.

CMAE 18.2M Count bills and coins up to $100.00.

CMAE 18.3M Make change for $1.00, $2.00, $10.00 etc…
a) subtraction b) counting back change

Income

CMAE 18.1I Calculate daily and weekly wages involving regular pay.

CMAE 18.2I Determine the difference between gross and net pay by calculating deductions using CPP, income tax and EI charts.

Budget

CMAE 18.1BU Define and explain the purpose of a budget.

CMAE 18.2BU Determine fixed and variable expenses for the month.

CMAE 18.3BU Plan a budget based on percentages allotted to various categories as suggested by financial institutions.

CMAE 18.4BU To stay within a budget and adjust a budget as necessary.

Mathematics 28

Numbers

NAE 28.1 Identifying eqivalent fractions

N6.7 Extend understanding of fractions to improper fractions and mixed numbers. [CN, ME, R, V]

N7.5 Develop and demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like denominators, concretely, pictorially, and symbolically (limited to positive sums and differences). [C, CN, ME, PS, R, V]

N6.5 Demonstrate understanding of percent (limited to whole numbers to 100) concretely, pictorially, and symbolically. [C, CN, PS, R, V]

N7.3 Demonstrate an understanding of the relationships between positive decimals, positive fractions (including mixed numbers, proper fractions and improper fractions), and whole numbers. [C, CN, ME, R, T]

NAE 28.2 Express a fraction as a decimal and a decimal as a fraction

N7.4 Expand and demonstrate an understanding of percent [C, PS, R]

NAE 28.3 Write percent as a decimal or fraction

NAE 28.4 Write a decimal as a percent

NAE 28.5 Write a fraction as a percent

NAE 28.6 Find the percent of a number using a calculator.

NAE 28.7 Find the percent one number is of another.

NAE 28.8 Calculate sales tax.

NAE 28.9 Calculate discounts.

N6.8 Demonstrate an understanding of ratio concretely, pictorially, and symbolically. [C, CN, PS, R, V]

N8.3 Demonstrate understanding of rates, ratios, and proportional reasoning concretely, pictorially, and symbolically.
[C, CN, PS, R, V]

N6.3 Demonstrate understanding of the order of operations on whole numbers (excluding exponents) with and without technology. [CN, ME, PS, T]

N7.2 Expand and demonstrate understanding of the addition, subtraction, multiplication, and division of decimals to greater numbers of decimal places, and the order of operations. [C, CN, ME, PS, R, T]

Shape and Space

SSAE 28.1 Calculate the passing of time.

SS6.1 Demonstrate understanding of angles including:

- estimating the measure
- determining angle measures in degrees
- drawing angles

[C, CN, ME, PS, R, V]

Measurement

MAE 28.1 Read a thermometer, apply temperature reading to everyday life experiences

SS3.2 Demonstrate understanding of measuring mass in g and kg by:

- selecting and justifying referents for g and kg
- modelling and describing the relationship between g and kg
- estimating mass using referents
- measuring and recording mass.

[C, CN, ME, R]

SS5.4 Demonstrate understanding of capacity by:

- describing the relationship between mL and L
- selecting and justifying referents for mL or L units
- estimating capacity by using referents for mL or L
- measuring and recording capacity (mL or L).

[C, CN, ME, PS, R, V]

Statistics and Probability

SP6.1 Extend understanding of data analysis to include:

- line graphs
- graphs of discrete data
- data collection through questionnaires and experiments.

[C, CN, PS, R, V, T]

SP6.2 Demonstrate understanding of probability by:

- determining sample space
- differentiating between experimental and theoretical probability
- determining the theoretical probability
- determining the experimental probability
- comparing experimental and theoretical probabilities.

[C, PS, R, T]

SP7.1 Demonstrate an understanding of the measures of central tendency and range for sets of data. [C, CN, PS, R, T]

Consumer Math

Credit

CMAE 28.1C Define credit and determine its appropriate use.

CMAE 28.2C Describe how to use credit wisely.

CMAE 28.3C Find the monthly interest charges and service charges on an unpaid credit balance.

Banking

CMAE 28.1BA Know definitions for banking terms: interest, deposit overdraft, withdrawal, service charge, safety deposit box, travellers cheque, balance, debit, credit, NSF cheques, bonds, bounced cheque.

CMAE 28.2BA Know there are different types of accounts.

- saving account and passbooks
- chequing account

CMAE 28.3BA Complete a deposit slip using cheques and cash

CMAE 28.4BA Write a cheque and know how to cash it.

CMAE 28.5BA Know how to use an ATM machine and a debit card.

CMAE 28.6BA Balance a cheque book:

- opening balance
- cheques
- deposits
- importance of writing valid cheques and maintaining records

CMAE 28.7BA Calculate simple interest with the use of a calculator or chart.

Mathematics 38

Numbers

N7.5 Develop and demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators, concretely, pictorially, and symbolically (limited to positive sums and differences). [C, CN, ME, PS, R, V]

N8.4 Demonstrate understanding of multiplying and dividing positive fractions and mixed numbers, concretely, pictorially, and symbolically. [C, CN, ME, PS]

NAE 38.1 Write fractions as a percent and percents as fractions.

NAE 38.2 Calculate percent by setting up rates and ratios.

NAE 38.3 Find what percent of one number is of another.

N6.6 Demonstrate understanding of integers concretely, pictorially, and symbolically. [C, CN, R, V]

N7.6 Demonstrate an understanding of addition and subtraction of integers, concretely, pictorially, and symbolically. [C, CN, PS, R, V]

N8.5 Demonstrate understanding of multiplication and division of integers concretely, pictorially, and symbolically. [C, CN, PS, R, V]

Statistics and Probability

SP7.2 Demonstrate an understanding of circle graphs. [C, CN, PS, R, T, V]

Consumer Math

Money

CMAE 38.1M Make change using two methods: subtraction and back change.

CMAE 38.2M Estimate cost of groceries: Decide if you can make purchase.

CMAE 38.3M Compare size of items before comparing the price; if size is different, calculate unit price.

CMAE 38.4M Calculate cost: Example: If one kilogram is $10.00, how much does it cost?

Credit

CMAE 38.1C Complete a loan application forms and disc….getting a loan.

CMAE 38.2C Find out characteristics of a personal loan payment: interest

CMAE 38.3C Determine why a good credit is important.

CMAE 38.4C Describe how to establish a good credit rating.

Banking

CMAE 38.1BA Complete all banking forms.

CMAE 38.2BA Balance a cheque book.

CMAE 38.3BA Reconcile a bank statement.

CMAE 38.4BA Identify different ways to pay bills and advantages and disadvantages of each method.

CMAE 38.5BA Compare interest and compound interest.

Buying a Car

CMAE 38.1BC Chart the advantages and disadvantages of buying a used car.

CMAE 38.2BC Use a chart to calculate intest paid on a new car.

Taxes

CMAE 38.1T Identify types of taxes paid and reason why.

CMAE 38.2T Using a chart and calculations, discover taxes due, depending on when they are due.

CMAE 38.3T Using a calendar, find dates taxes are due.

Insurance

CMAE 38.1I Possess an awareness of life insurance.

CMAE 38.2I Know what health insurance is

CMAE 38.3I Compare health insurance in Saskatchewan to Alberta

Investments – RRSPs

CMAE 38.1RR Possess an awareness of ways to save money in savings account.

CMAE 38.1RR Describe importance of putting money in the bank.

Automobile Operating

CMAE 38.1A Calculate the cost of gasoline in a vehicle.

CMAE 38.2A Read the gas pump for prices, etc.

CMAE 38.3A Investigate the expenses involved in owning a vehicle.

Renting and Buying a Home

CMAE 38.1H Calculate costs involved with renting an apartment.

CMAE 38.2H Identify cost involved with the purchase of real estate, hook-up fees, etc.

CMAE 38.3H Identify costs in maintaining a home, utilities and repairs.

CMAE 38.4H Use a chart to calculate mortgage, amount of a down payment, etc.

Resources

Further resources may also be selected from Saskatchewan curriculum.

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Field Trips

Prince Albert Daily Herald

Prince Albert City Hall – Utilities

Sask Power

Sask Energy

Sasktel – Cable Service, telephone, internet

Shaw Cable – Cable Service

Scotia Bank

Conexus Credit Union

Canadian Imperial Bank of Commerce

Cash Plan

Money Mart