LOCALLY DEVELOPED COURSE OUTLINE

ESL Introduction Mathematics (2020

Submitted By:

The Calgary School Division

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Course Basic Information

Outline Number	Hours	Start Date	End Date	Development Type	Proposal Type	Grades
15-5	125.00	09/01/2020	08/31/2024	Developed	Authorization	G10

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Course Description

The primary goal of ESL Introduction to Mathematics 15 is to provide English Language Learners (ELLs) with the opportunity to build communicative competence with academic English language while developing key foundational mathematical ideas and basic math content (numeracy) necessary for entry into grade-level mathematics classes. This course is appropriate for those English Language Learners who enter high school without the pre-requisite skills necessary for entry into Math 10-3, Math 10-4, or Math 10C.

Communicative Competence

Communicative Competence is the ability to communicate successfully in any context, be it social, academic, oral, or written (Alberta Education). Communicative competence is required for success in life, work, and continued learning. Canale and Swain (1980) offer a model of language proficiency that outlines the four communicative areas that contribute to communicative competence: linguistic, strategic, sociolinguistic, and discourse for each of the four language strands: listening, speaking, reading and writing.

Please note that the following descriptions and examples are not exhaustive. Visit LearnAlberta for a more detailed explanation and examples of communicative competence.

Linguistic Competency:

Understanding and using vocabulary, language conventions (grammar, punctuation, spelling), and syntax (sentence structure).

Strategic Competency:

Using techniques to overcome language gaps, plan and assess the effectiveness of communication, achieve conversational fluency and modify text for audience and purpose.

Socio-Linguistic Competency:

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Having an awareness of social rules of language (e.g., formality, politeness, directness), nonverbal behaviours and cultural references (e.g., idioms, expressions, background knowledge).

Discourse:

Understanding how ideas are connected through patterns of organization and cohesive and transitional devices.

Additionally, each language strand has a strand-specific competency. The strand- specific competencies are as follows:

Listening: auditory discrimination Speaking: pronunciation

Reading: fluency

Writing: editing

The English Language Development (ELD) Framework

The English Language Development (ELD) framework (Dutro & Moran, 2003) provides a pedagogical structure to support the development of communicative competence within content area learning. Explicit language instruction based on the function (purpose) of language in the lesson or task forms the foundation of this instructional approach. Linguistic functions are often identified through the learning outcomes of the course (e.g., describe, analyze, justify). Vocabulary (subject-specific and academic) and forms (grammar, sentence structures, and text organization) required to communicate these functions are explicitly taught and practiced in meaningful and authentic learning experiences to develop fluency in usage.

The ELD framework is applied to intellectually engaging tasks that are situated within a broader instructional approach of personalized learning and cultural responsiveness. ELD

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is comprised of the following components:

1. Explicit language instruction

a. Targets the communicative competencies outlined in the Alberta K-12 ESL Proficiency Benchmarks.

b. Focuses on the language function, vocabulary, and forms necessary to access the content objective/task demands and provides practice and ongoing language-specific feedback to build fluency.

2. Frontloading challenging vocabulary and linguistic structures to render content understandable.

3. Capitalizing on the teachable language learning moments.

4. Ongoing assessment based on the Alberta K-12 Proficiency Benchmarks that informs next steps in teaching and learning.

Note: Possible linguistic functions have been identified for the specific learning outcomes for this course.

Adjusting Scaffolds as Language Develops

As students gain autonomy in using academic language fluently and accurately, language instruction and learner scaffolds are adjusted accordingly. For example, a beginner ELL may rely strongly on visuals, realia, and first language translation when acquiring subject-specific vocabulary, whereas an intermediate ELL may be able to understand the meaning of the word through a description of the target word that uses familiar English synonyms.

Academic Language – The Language of Success for All

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Academic language is the language used to access and engage with Programs of Study. Proficiency in academic language requires students to comprehend and produce increasingly complex vocabulary, grammar, sentence structures and text organization. Students who acquire a high level of proficiency in academic language experience greater success in school and beyond. As such, explicit instruction in academic language benefits all learners, both ELLs and native English speakers.

Course Prerequisites

No pre-requisites.

Sequence Introduction (formerly: Philosophy)

ESL Introduction to Mathematics 15 develops students' academic English language proficiency through mathematical numeracy and literacy, mathematical reasoning, and ways of communicating mathematically. This goal is achieved through the implementation of the English Language Development (ELD) framework, an instructional approach to explicit language instruction within content area learning. Students will use their growing proficiency with language functions, forms, and vocabulary to explore and develop a range of mathematical concepts and skills. Targeted language functions in this course are drawn from and connected to Alberta Mathematics Programs of Study.

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Student Need (formerly: Rationale)

Mathematics is not a universal language. ELLs face language-related barriers to achievement in mathematics. Some barriers may include the extensive use of technical terms, including homonyms and synonyms (e.g., the many different ways to say “add” such as plus, combine, and, sum, increase by); words whose mathematical meaning is vastly different from their everyday meanings (e.g., fix, plane); and logical connectors used in mathematical problems (e.g., therefore, consequently, if, however, because). ELLs may also face content-related barriers due to limited mathematical knowledge or western ways of doing mathematics (e.g., the use of manipulatives or the process for long division).

ESL Introduction to Mathematics 15 supports ELLs who are attempting to catch up to a moving target, namely, to native- English speakers whose academic language, numeracy, and literacy skills are continuing to increase significantly from one grade level to the next.

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Scope and Sequence (formerly: Learner Outcomes)

This course is intended to support students who require scaffolded support in the acquisition of competencies in language, literacy, and the content of mathematics to successfully transition into the Alberta Education High School Mathematics Programs of Study. More specifically, this course is meant for Language Proficiency (LP) 1 students who, due to limited or interrupted schooling in their first language, need explicit language, literacy, and numeracy instruction. It is also intended for LP Level 1 and 2 students who are approaching grade level in their mathematical understanding but would benefit from explicit language instruction to access the mathematical content in higher grades.

The structure of the course is designed to offer multiple years of math instruction in a condensed period of time by compacting learning outcomes for the mathematical strands found in the grades 6 through 9 Programs of Study. The course focuses on essential pre-requisite skills from the mathematical strands of Number, Patterns and Relations, Shape and Space, and Statistics and Probability

The course helps students generate multiple approaches to learning numeracy, mathematical reasoning, and mathematical communication. As students develop stronger language and mathematical skills, they become familiar with classroom routines, instructions, processes, and assessments related to typical high school mathematics classrooms. Students integrate background knowledge and real-life experiences into mathematics, practice cooperative learning skills in flexible learning groups, use manipulatives to deepen understandings of big ideas, and investigate problem solving steps and strategies. Students are also introduced to technologies that enhance their ability to learn and communicate mathematical understandings.

ESL Introduction to Mathematics 15 focuses on multiple approaches to learning language functions, forms, and vocabulary specific to mathematics and challenges students to increase their receptive and expressive language skills. Developing communicative competence supports students in developing their academic English language proficiency as well as their mathematics-related knowledge, skills, literacy, attitudes, understanding, critical thinking, and reasoning thereby empowering students to make informed decisions, solve problems, and critically address mathematics-related societal, economic, ethical and

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environmental issues.

Guiding Questions (formerly: General Outcomes

1 Receptive Language: How does development of receptive language skills (listening and reading) enable students to comprehend information and ideas related to course content?

2 Expressive Language: How does development of expressive language skills (speaking and writing) enable students to communicate information and ideas related to course content?

3 Number: How does having number sense (flexible thinking and intuition about numbers) help us understand and interact with our environment?

4 Patterns and Relations: How does the ability to recognize, describe, and work with numerical and non-numerical patterns contribute to our understanding of and interaction with our environment?

5 Shape and Space: How does having spatial sense and spatial reasoning help us understand mathematics as well as our environment?

6 Statistics and Probability: How do having knowledge of and skills in statistics and probability help us deal with uncertainty, predictability, and interpretation of data in our lives?

7 Technology: How does technology enhance our understanding of mathematics and our understanding of and interaction with our environment?

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Learning Outcomes (formerly: Specific Outcomes)

1 Receptive Language: How does development of receptive language skills (listening and reading) enable students to comprehend information and ideas related to course content?	**15-5**
1.1 LP1 – Linguistic Vocabulary | L – Understand some words, approximately 5000, including utility words, descriptive words, subject-specific words, and academic words with visual support	X
1.2 LP1 – Linguistic Vocabulary | R – Understand some words, approximately 5000, including utility words, descriptive words, and subject-specific vocabulary	X
1.3 LP2 – Linguistic Vocabulary | L – Understand more words, approximately 15,000, including utility words, descriptive words, subject-specific words, and academic words.	X
1.4 LP2 – Linguistic Vocabulary | R – Understand more words, approximately 15,000, including utility words, descriptive words, and subject-specific vocabulary	X
1.5 LP1 – Linguistic Syntax | L – Understand subject–verb–object sentence structure in familiar contexts.	X
1.6 LP1 – Linguistic Syntax | R – Understand simple sentences	X
1.7 LP2 – Linguistic Syntax | L – Understand compound sentences in familiar contexts.	X
1.8 LP2 – Linguistic Syntax | R – Understand compound sentences and simple detailed sentences.	X
1.9 LP1 – Strategic | L – Respond to literal questions with “what,” “where,” “when,” “who” and “how many.”	X
1.10 LP1 – Strategic | R – Decode familiar words and sight words.	X
1.11 LP1 – Strategic | L – Seek clarification by using familiar expressions.	X

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1.12 LP1 – Strategic | R – Rely on pictures, familiar phrases, patterned sentences, context, shared experiences, and first language and culture to comprehend simple texts on familiar topics.	X
1.13 LP2 – Strategic | L – Respond to open-ended questions.	X
1.14 LP2 – Strategic | R – Decode word families, consonant blends, and long- and short-vowel sounds.	X
1.15 LP2 – Strategic | L – Seek clarification by restating, paraphrasing	X
1.16 LP2 – Strategic | R – Use rereading, reading on, contextual cues, and root-word recognition to comprehend texts on familiar topics.	X
1.17 LP1 – Socio-Linguistic | L – Respond appropriately to common social expressions in formal and informal contexts.	X
1.18 LP1 – Socio-Linguistic | R – Understand the literal meaning of simple texts on familiar topics.	X
1.19 LP2 – Socio-Linguistic | L – Respond appropriately to common social expressions, intonation, idiomatic expressions in formal and informal contexts.	X
1.20 LP2 – Socio-Linguistic | R – Understand common social expressions and figurative language in texts on familiar topics.	X
1.21 LP1 – Discourse | L – Understand familiar commands, two-step instructions, the gist of discussions and presentations containing phrases and simple related sentences connected with “and” and “then” on familiar topics with visual support.	X
1.22 LP1 – Discourse | R – Understand simple narratives and descriptive texts containing common conjunctions.	X
1.23 LP2 – Discourse | L – Understand the gist of discussions and presentations containing simple related sentences connected with common conjunctions, time markers, and sequence markers on familiar topics	X
1.24 LP2 – Discourse | R – Understand ideas in simple explanations and procedural texts connected with conjunctions, time markers, and sequence markers.	X

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1.25 LP1 – Auditory Discrimination | L – Recognize common contractions and distinguish minimal pairs in speech spoken at a slower rate.	X
1.26 LP2 – Auditory Discrimination | L – Understand contractions and familiar reduced speech.	X
1.27 LP1 – Fluency | R – Read word-by-word with some phrasing.	X
1.28 LP2 – Fluency | R – Read with some phrasing, rereading, sounding out of words, pausing to refer to visuals; substitution of unknown words with familiar words.	X

2 Expressive Language: How does development of expressive language skills (speaking and writing) enable students to communicate information and ideas related to course content?	**15-5**
2.1 LP1 – Linguistic Vocabulary | S – Use some words, approximately 5000, including utility words, descriptive words, and subject-specific words to express needs, express feelings, express preferences and respond to questions.	X
2.2 LP1 – Linguistic Vocabulary | W – Use some words, approximately 5000, including utility words, descriptive words and subject-specific words.	X
2.3 LP2 – Linguistic Vocabulary | S – Use more words, approximately 15,000, including utility words, descriptive words, subject-specific words to express ideas, ask and answers questions and make statements.	X
2.4 LP2 – Linguistic Vocabulary | W – Use more words, approximately 15,000, including utility words, descriptive words and subject-specific words.	X
2.5 LP1 – Linguistic Grammar | S – Use common pronouns, adjectives, nouns, and verbs in present tense with errors and omissions.	X
2.6 LP1 – Linguistic Grammar | W – Use familiar nouns, pronouns, adjectives, adverbs, prepositions, articles and verbs with tense errors and omissions	X
2.7 LP2 – Linguistic Grammar | S – Use regular plurals, possessives, prepositions, and verbs in continuous and simple past tenses with agreement and tense errors	X

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2.8 LP2 – Linguistic Grammar | W – Use regular plurals, possessive pronouns, prepositional phrases, regular verbs in continuous and simple past tenses, and irregular verbs in continuous and simple past tenses with tense and usage errors.	X
2.9 LP1 – Linguistic Syntax | S – Follow patterned sentences, phrases and subject–verb–object sentences.	X
2.10 LP1 – Linguistic Syntax | W – Write simple declarative sentences, negative sentences and question sentences using sentence frames.	X
2.11 LP2 – Linguistic Syntax | S – Use patterned and predictable affirmative and negative statements, questions and commands.	X
2.12 LP2 – Linguistic Syntax | W – Write simple compound sentences and simple detailed sentences.	X
2.13 LP1 – Strategic | S – Use known phrases, simple questions and first-language translation.	X
2.14 LP1 – Strategic | W – Use copying, spelling from memory, words with similar sounds, sentence frames to spell familiar words, write ideas, complete patterned sentences and use basic punctuation.	X
2.15 LP2 – Strategic | S – Use message replacement, everyday expressions and everyday questions.	X
2.16 LP2 – Strategic | W – Use familiar vocabulary, known phrases, common expressions, cognates, word lists, templates and models, and personal dictionary to find appropriate words, spell irregularly spelled words, distinguish homophones and homonyms and increase use of punctuation.	X
2.17 LP1 – Socio-Linguistic | S – Use greetings, common courtesy expressions, and familiar social expressions to participate in social and classroom situations.	X
2.18 LP1 – Socio-Linguistic | W – Produce texts using familiar words, familiar phrases, sentence frames to complete forms, create graphic organizers and label diagrams.	X
2.19 LP2 – Socio-Linguistic | S – Use common expressions, slang, idioms and gestures to communicate with peers.	X

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2.20 LP2 – Socio-Linguistic | W – Produce texts for specific purposes using templates, samples, story plans or graphic organizers.	X
2.21 LP1 – Discourse | S – Connect familiar phrases and simple sentences with “and” to express needs, feelings and opinions.	X
2.22 LP1 – Discourse | W – Connect ideas in simple sentences using common conjunctions, common time markers and common sequence markers.	X
2.23 LP2 – Discourse | S – Connect ideas using common conjunctions, time markers, and sequence markers to share ideas, ask questions, describe and explain.	X
2.24 LP2 – Discourse | W – Connect ideas in a basic paragraph using common conjunctions, time markers and sequence markers.	X
2.25 LP1 – Pronunciation | S – Approximate English rhythm and intonation in familiar and rehearsed activities, although pronunciation errors may interfere with meaning.	X
2.26 LP2 – Pronunciation | S – Demonstrate comprehensible pronunciation and appropriate intonation in familiar and rehearsed activities, although pronunciation errors may still occur.	X
2.27 LP1 – Editing | W – Edit sentences for capitalization of names and words at the beginning of sentences, periods and regular spelling of familiar words.	X
2.28 LP2 – Editing | W – Edit and revise paragraphs for regular spelling, end punctuation, commas in lists and addition of detail.	X

3 Number: How does having number sense (flexible thinking and intuition about numbers) help us understand and interact with our environment?	**15-5**
3.1 Describe order or relative position using ordinal numbers such as 1st, 10th, 32nd. Possible linguistic functions: describe, sequence, compare and contrast.	X
3.2 Describe, represent, and compare quantities from 0.01 to 10 000, as whole numbers, fractions, and decimals. Possible linguistic functions: describe, compare and contrast.	X

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3.3 Compare quantities from 0.01 to 10 000 using the terms more, fewer, as many as, and the same as, using whole numbers, fractions, and decimals. Possible linguistic functions: compare and contrast, analyze, justify.	X
3.4 Express, construct, and deconstruct numbers based on their place value from 0.01 to 10 000. Possible linguistic functions: inquire/seek information, analyze, synthesize.	X
3.5 Describe, represent, and compare integers. Possible linguistic functions: describe, compare and contrast.	X
3.6 Express numerals as found in addresses, phone numbers, dates, prices, temperature, and time using the appropriate vocabulary and in the correct context. Possible linguistic functions: inquire/seek information, problem solve.	X
3.7 Demonstrate addition with answers to 10 000 and corresponding subtraction to solve problems. Possible linguistic functions: justify, compare and contrast, cause and effect.	X
3.8 Demonstrate multiplication, up to 2-digit by 2-digit, and division, up to 3 digit by 1-digit, using strategies to solve problems. Possible linguistic functions: justify, compare and contrast, cause and effect.	X
3.9 Identify the monetary values of Canadian currency and solve problems involving currency such as making change. Possible linguistic functions: inquire/seek information, classify, problem solve, analyze.	X
3.10 Identify when GST should be applied and calculate GST in various situations. Possible linguistic functions: inquire/seek information, solve problems, justify.	X

4 Patterns and Relations: How does the ability to recognize, describe, and work with numerical and non-numerical patterns contribute to our understanding of and interaction with our environment?	**15-5**
4.1 Identify, reproduce, extend, and create repeating patterns from daily experiences. Possible linguistic functions: inquire/seek information, sequence/order, analyze, infer and predict.	X

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4.2 Demonstrate an understanding of increasing and decreasing numerical and non-numerical patterns. Possible linguistic functions: analyze, compare and contrast, infer and predict.	X
4.3 Describe equality and record using symbols. Possible linguistic functions: compare and contrast, classify, summarize/inform	X
4.4 Explore numerical and non-numerical patterns in daily experience. Possible linguistic functions: inquire/seek information, sequence/order, analyze.	X
4.5 Represent, describe, and extend patterns and relationships using charts and tables. Possible linguistic functions: describe, compare and contrast, cause and effect.	X
4.6 Determine the pattern rule to make predictions about subsequent elements. Possible linguistic functions: analyze, predict, cause and effect, problem solve.	X
4.7 Demonstrate and explain the meaning of equality concretely, pictorially, and symbolically. Possible linguistic functions: classify, summarize/inform, cause and effect, justify.	X
4.8 Express problems in one-step equations with a single variable and solve. Possible linguistic functions: inform, cause and effect, justify.	X

5 Shape and Space: How does having spatial sense and spatial reasoning help us understand mathematics as well as our environment?	**15-5**
5.1 Use direct measurement to compare two objects based on a single attribute. Possible linguistic functions: compare and contrast, summarize/inform.	X
5.2 Sort, build, and classify real-world objects. Possible linguistic functions: classify, compare and contrast.	X
5.3 Demonstrate an understanding of measurement. Possible linguistic functions: summarize/inform, cause and effect, justify.	X
5.4 Sort 2-D shapes and 3-D objects using one attribute. Possible linguistic functions: classify, compare and contrast.	X

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5.5 Estimate, measure, compare, and order using referents, i.e., nonstandard units of measurement. Possible linguistic functions: compare and contrast, analyze, infer / predict / hypothesize.	X
5.6 Describe, compare, and construct 2-D shapes and 3-D objects. Possible linguistic functions: describe, compare and contrast.	X
5.7 Relate the passage of time to common activities. Possible linguistic functions: summarize/inform.	X
5.8 Estimate, measure, and record using whole numbers and standard measurement units. Possible linguistic functions: summarize/inform, hypothesize, synthesize.	X
5.9 Describe 3-D objects according to faces, edges, and vertices. Possible linguistic functions: describe, compare and contrast, analyze.	X
5.10 Sort regular and irregular polygons. Possible linguistic functions: summarize/inform, classify, compare and contrast.	X
5.11 Read and record time and dates. Possible linguistic functions: inquire/seek information, classify.	X
5.12 Determine area of regular and irregular 2-D shapes. Possible linguistic functions: inquire/seek information, solve problem / problem solve.	X
5.13 Demonstrate understanding of measuring length, volume, and capacity. Possible linguistic functions: analyze, solve problems/problem solve	X
5.14 Use formulas to calculate area, surface area, perimeter, circumference, diagonals, and metric conversions. Possible linguistic functions: analyze, solve problems/problem solve, evaluate.	X
5.15 Identify and create line symmetries on various 2-D shapes. Possible linguistic functions: analyze, synthesize.	X

6 Statistics and Probability: How do having knowledge of and skills in statistics and probability help us deal with uncertainty, predictability, and interpretation of data in our lives?	**15-5**

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6.1 Gather and record data about self and others. Possible linguistic functions: inquire/seek information, classify.	X
6.2 Construct and interpret concrete graphs and pictographs. Possible linguistic functions: analyze, summarize/inform.	X
6.3 Collect first-hand data and organize it to answer questions. Possible linguistic functions: inquire/seek information, classify, analyze.	X
6.4 Construct, label, and interpret bar graphs to solve problems. Possible linguistic functions: analyze, summarize/inform.	X
6.5 Construct and interpret pictographs. Possible linguistic functions: analyze, infer/predict/hypothesize, summarize / inform.	X
6.6 Represent, display, and interpret double bar graphs to draw conclusions. Possible linguistic functions: analyze, infer/predict/hypothesize, summarize/inform, evaluate.	X

7 Technology: How does technology enhance our understanding of mathematics and our understanding of and interaction with our environment?	**15-5**
7.1 Effectively use common measuring devices such rulers, measuring tapes, and thermometers. Possible linguistic functions: evaluate, summarize/inform, justify/persuade.	X
7.2 Effectively use calculators, simple to scientific, to solve problems. Possible linguistic functions: evaluate, summarize/inform, justify/persuade.	X

Facilities or Equipment

Facility

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Facilities:

Equipment

Learning and Teaching Resources

Sensitive or Controversial Content

Issue Management Strategy

Health and Safety

Risk Management Strategy

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Statement of Overlap with Existing Programs

Student Assessment

No identified student assessments.

Course Approval Implementation and Evaluation

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