

LOCALLY DEVELOPED COURSE OUTLINE

Competencies in Math (2022)15-3

Competencies in Math (2022)15-5

Submitted By:

The Red Deer School Division

Submitted On:

Mar. 15, 2022

Course Basic Information

| <u>Outline Number</u> | <u>Hours</u> | <u>Start Date</u> | <u>End Date</u> | <u>Development Type</u> | <u>Proposal Type</u> | <u>Grades</u> |
|-----------------------|--------------|-------------------|-----------------|-------------------------|----------------------|---------------|
| 15-3 | 62.50 | 09/01/2022 | 08/31/2026 | Developed | Authorization | G10 |
| 15-5 | 125.00 | 09/01/2022 | 08/31/2026 | Developed | Authorization | G10 |

Course Description

Competencies in Math 15 will cover topics including number sense, logical reasoning, measurement, algebra, graphical reasoning, statistics and probability.

The course will enhance numeracy skills in students, develop their critical thinking and problem solving abilities, and set them up for success in future courses in mathematics.

The **5-credit version** includes all learning outcomes from all topics.

The **3-credit version** includes learning outcomes from Number Sense and a minimum of two complete additional topics (Logic and Reasoning, Measurement, Algebra, Graphical Reasoning, Statistics and Probability) from the 5-credit version. This flexibility is provided to meet the learning needs of the students.

This locally developed course does not meet the mathematics requirement for graduation.

Course Prerequisites

No prerequisites.

Sequence Introduction (formerly: Philosophy)

This course aims to improve student mastery of mathematical skills, concepts and ideas. Students will extend their knowledge beyond performing routine operations and will be encouraged to explore a deeper understanding of mathematical concepts through critical thinking and exploration exercises. Students will collaborate with their teacher and peers on exploring multiple ways to solve problems. As such, students will be challenged to become engaged learners, critical thinkers, and competent problem solvers.

Student Need (formerly: Rationale)

Some students struggle to make sense of mathematics as they experience gaps in previous learning and may require additional resources and strategies to fill in these gaps. While the required help is often within reach in their school environment, the one resource often lacking is time. This course aims to give these students an opportunity to be successful in mathematics and have them reach their full potential as engaged learners by providing them with additional strategies, alternate approaches, resources and time with the ultimate goal of learners enrolling in provincial Mathematics 10 courses.

Scope and Sequence (formerly: Learner Outcomes)

The goal of this course is to enhance the numeracy skills of students. Students will use numeracy willingly and confidently in their everyday lives and will be able to communicate effectively using the language of mathematics.

Students will explore a variety of mathematical topics that will lead to an appreciation for mathematics in real-life contexts. In this course, students will discover multiple ways to solve problems and they will develop an appreciation for mathematical contributions to advancements in society.

3-credit version REQUIRED (entire topic)

- Number Sense

3-credit version REQUIRED (a minimum of two of the following additional topics - all Specific Outcomes)

- Logic and Reasoning

- Measurement

- Algebra

- Graphical Reasoning

- Statistics and Probability

5-credit version requires all topics.

Guiding Questions (formerly: General Outcomes)

1 Number Sense (Required for either 3-credit or 5-credit version)

2 Logic and Reasoning (Required for 5-credit version; Two additional Topics (General Outcomes) required for 3-credit version)

3 Measurement (Required for 5-credit version; Two additional Topics (General Outcomes) required for 3-credit version)

4 Algebra (Required for 5-credit version; Two additional Topics (General Outcomes) required for 3-credit version)

5 Graphical Reasoning (Required for 5-credit version; Two additional Topics (General Outcomes) required for 3-credit version)

6 Statistics and Probability (Required for 5-credit version; Two additional Topics (General Outcomes) required for 3-credit version)

Learning Outcomes (formerly: Specific Outcomes)

| | |
|--|------------------|
| 1 Number Sense (Required for either 3-credit or 5-credit version) | 15-3 15-5 |
| 1.1 Solve problems that involve real numbers using trial and error. | X X |
| 1.2 Solve problems that involve real numbers using patterns. | X X |
| 1.3 Solve problems that involve real numbers using estimation strategies | X X |
| 1.4 Solve problems that involve real numbers using pictorial representations. | X X |
| 1.5 Apply mental math strategies to solve problems with real numbers. | X X |
| 1.6 Explore and communicate the characteristics of a rational or irrational number and its significance in our everyday lives. | X X |
| 1.7 Explore place value, rounding, significant digits and their importance in scientific notation. | X X |

| | |
|--|------------------|
| 2 Logic and Reasoning (Required for 5-credit version; Two additional Topics (General Outcomes) required for 3-credit version) | 15-3 15-5 |
| 2.1 Solve logic puzzles using trial and error. | X X |
| 2.2 Solve logic puzzles using patterns. | X X |
| 2.3 Solve logic puzzles using graphic organizers. | X X |
| 2.4 Solve logic puzzles using process of elimination. | X X |
| 2.5 Engage in games that improve an understanding of numbers and logic. | X X |
| 2.6 Evaluate and verify reasoning strategies used in a problem solving process. | X X |

| | |
|--|--|
| | |
|--|--|

| | |
|---|------------------|
| 3 Measurement (Required for 5-credit version; Two additional Topics (General Outcomes) required for 3-credit version) | 15-3 15-5 |
| 3.1 Demonstrate an understanding of the Pythagorean Theorem by applying the formula to real life situations. | X X |
| 3.2 Demonstrate an understanding of 3 D objects and apply the relationship between surface area and volume to real life contexts. | X X |

| | |
|--|------------------|
| 4 Algebra (Required for 5-credit version; Two additional Topics (General Outcomes) required for 3-credit version) | 15-3 15-5 |
| 4.1 Apply problem solving strategies to generate possible solutions to a problem through identifying patterns. | X X |
| 4.2 Apply problem solving strategies to generate possible solutions to a problem through generating an equation. | X X |
| 4.3 Apply problem solving strategies to generate possible solutions to a problem through trial and error. | X X |
| 4.4 Apply problem solving strategies to generate possible solutions to a problem through drawing a picture. | X X |

| | |
|--|------------------|
| 5 Graphical Reasoning (Required for 5-credit version; Two additional Topics (General Outcomes) required for 3-credit version) | 15-3 15-5 |
| 5.1 Analyze circle graphs, bar graphs, double bar graphs, scatterplots, pictographs and piecewise graphs to solve problems. | X X |
| 5.2 Explore the characteristics of the coordinate plane and plot ordered pairs in all four quadrants. | X X |
| 5.3 Analyze patterns effectively to identify rules and trends to make predictions. | X X |
| 5.4 Create a graph to represent a set of data. | X X |

| | |
|---|------------------|
| 6 Statistics and Probability (Required for 5-credit version; Two additional Topics (General Outcomes) required for 3-credit version) | 15-3 15-5 |
|---|------------------|

| | | |
|--|---|---|
| 6.1 Explore the variety of uses for statistics in real life contexts. | X | X |
| 6.2 Analyze the results of tasks involving experimental probabilities of independent and dependent events. | X | X |

Facilities or Equipment

Facility

No special facilities required.

Facilities:

Equipment

This course does not require any special equipment, although access to a graphing calculators, manipulatives and the internet is strongly recommended.

Learning and Teaching Resources

No unique required resources.

Sensitive or Controversial Content

There are no sensitive or controversial issues expected within this course.

Issue Management Strategy

Health and Safety

Classroom setting - no unique health and safety issues.

Risk Management Strategy

Statement of Overlap with Existing Programs

Provincial Courses with Overlap and/or Similarity

Math 8/9

Identified Overlap/Similarity

Pythagorean Theorem, Surface Area and Volume of 3-D Shapes

Reasoning as to Why LDC Is Necessary

Students research how the Pythagorean Theorem was developed and explore, through concrete measurements that the Pythagorean Theorem is valid for all right angled triangles. Students require more time to develop and synthesize the understanding of 3-dimensional objects and the relationship between surface area and volume.

Locally Developed Courses with Overlap and/or Similarity

ESL Introduction to Mathematics

Identified Overlap/Similarity

Algebra and Interpreting Graphs

Reasoning as to Why LDC Is Necessary

The two courses are similar in that they offer an opportunity to explore mathematical concepts in a real-life context and provide multiple strategies for students to apply their acquired knowledge. Some of the outcomes for algebra and the graphing section are similar however, the algebra explored in Competencies in Mathematics extends beyond a single step process when compared to ESL Introduction to Math. In comparing the philosophies of the two courses, Competencies in Math offers scaffolded support in mathematics to all learners. ESL Introduction to Math is focused on English language acquisition for ESL Learners (LP 1 and 2) in the context of mathematics.

Student Assessment

No specific assessments required.

Course Approval Implementation and Evaluation

No specific process for local approval.

