COURSE OUTLINE: GRADE 8

MATHEMATICS

Course Description:

This course builds on the National Standard Curriculum Mathematics grades 7-9 APSE1 to further develop students' understanding of fundamental mathematical concepts by exploring topics related to number sense and numeration, geometry and spatial sense, patterning and algebra. Students will work with numbers while estimating and performing the four basic operations addition and subtraction, multiplication and division. Through investigation, students will develop an understanding of numbers, the ways they are represented and the quantities for which they stand, They will also develop accuracy, efficiency and confidence in calculating – mentally, and on paper. They also develop an ability to estimate and to make approximations and check the reasonableness of results and measurements. Students build their understanding of recognise patterns and relationships in mathematics and the real world. They will develop the ability to use symbols, notation, graphs and diagrams to represent and communicate mathematical relationships and concepts. Students will create patterns and establish an understanding of equality. Students develop knowledge and understanding of

systems of measurement and their use and interpretation. Throughout this course students will develop confidence and competence in using instruments and measuring device gain knowledge of geometrical relations in two and three dimensions and recognise and appreciate shapes in the environment. They will develop spatial awareness and the ability to recognise and make use of the geometrical properties and objects. They will also develop the ability to use geometrical models as aids to solving practical problems in time. Throughout the course, students begin developing the mathematical processes of problem-solving, reasoning and proving, reflecting, selecting tools and computational strategies, connecting, representing, and communicating at a basic level. Through investigation of real-life problems, students develop a strong foundation of mathematical knowledge and skills. Students apply mathematical processes and build transferrable critical thinking skills in varied teaching and consolidation activities that appeal to diverse learning styles. Students participate in engaging storylines along with characters that connect their learning to real-world contexts and build confidence through facilitating a positive attitude towards mathematics. Various opportunities are provided to consolidate students' learning through technology and offline activities, including tactile manipulatives, to reinforce essential mathematical strategies and tools. The course has a strong focus on reinforcing number sense and numeracy skills and provides various activities for practice throughout. This course prepares students for grade 8 mathematics.

Resources Required by the Student

This course is entirely online and does not require nor rely on any textbook. Students will require the following resources:

- A scanner, smart phone camera, or similar device to digitize handwritten or hand-drawn work.
- A smart phone camera or similar device to take pictures of student work.
- A device to record audio
- A printer
- A physical binder, folder, or notebook for offline activities
- Various household items to complete offline activities

Resource require by teachers:

- White board
- A scanner, smart phone camera, or similar device
- Printer
- markers

Teaching and Learning Strategies

Through a balance of problem-solving and direct instruction, students develop a strong foundation of mathematical processes, knowledge, and skills to apply in real-world contexts. The Course Outline: Grade 7 Mathematics course utilizes a combination of technology and offline activities, providing opportunities to develop an understanding of skills and concepts in interactive and concrete ways and engage multiple learning styles. The lessons feature a variety of intriguing storylines, materials, videos, storybooks, and interactive games to reinforce students' learning. The activities also build a foundation of mathematical models and strategies that students will use throughout the grades level. The course relies on the assistance of a learning coach to support young students through the content. The learning coach will be involved in facilitating technical aspects of the course (e.g. printing and scanning printable activities) and participating in discussion-based activities to assist students in developing communication skills.

Reporting (Courses with Qualified Teacher)

Student achievement will be communicated formally to students via progress reports and official report cards. A progress report is provided after completion of the first unit in the course. The progress report is not an evaluation of the student's achievement. Rather, the purpose is to give students and parents early and specific feedback regarding the student's general progress during the first unit of study. Report cards are issued at the midterm point in the course as well as upon completion of the course. Each report card will focus

on two distinct but related aspects of student achievement. First, the achievement of curriculum expectations is reported as a letter grade. Additionally, the course median is reported as a letter grade. The teacher will also provide written comments concerning the student's strengths, areas for improvement, and next steps. Second, the learning skills are reported as letter grades representing four levels of accomplishment. Upon completion of a course, GHS will send a copy of the report card to the student's home school where the course will be added to the ongoing list of courses on the Student Record (SR). The report card will also be sent to the student's parents.

General Objectives:

On completion of this Section, students should have/ be able to:

1. An understanding of how to use basic operation, number relationships, pattern, number facts, calculators and software to compute and estimate in order to solve real- world problems involving fractions, percentage and decimals.

2. Employ algebraic reasoning through the use of expressions, equations and formulae to interpret, model and solve problems involving unknown qualities.

3. Explore paths, geometric shapes, and space and make generalizations about geometric relationships within the environment.

4. . Collect, organize, interpret and represent data and make inferences by applying knowledge of statistics and probability.

Assessment Weighting:

Classwork:	**25%**
Tests:	**15%**
Exam:	**45%**
Attendance:	**5% (absent for 50% of classes = 0%)**
Punctuality:	**5% (late for more than 50% of classes = 0%)**
Participation:	**5% (participate in less than 50% of classes = 0%)**

Learning Outcomes:

Upon completion of this section students should be able to:

1. Express products using indices and vice versa.

2. Simplify multiplication and division of indices with different bases.
3. Know the place values of bases other than base 10.
4. Convert between bases.
5. Perform operations with bases other than base 10.
6. Write numbers in standard form.
7. Round number to a given number of decimal places.
8. Identify the following concepts:
    a) Closure
    b) Reflexive property
    c) Symmetry property
    d) Transitive property
    e) Trichotomy Law
9. Actively engage in group discussion and activities.
10. Engage in problem solving situations.
11. Complete list of inequalities accurately.
12. Solve linear inequalities correctly.
13. Apply angle properties formed from transversal and parallel lines to find missing angles.

14. Describe movement of shapes/objects.

15. Translate objects to its image and vice versa with given and objects and its image.

16. Determine the movement and direction given an object and its image.

17. Use the real numbers to represent horizontal and vertical movements and their direction.

18. Reflect an object in the x-axis or y-axis

19. Rotate objects 90^0, 180^0 and 270^0

20. Identify properties of n-sided polygons where $3 \leq n \leq 10$

21. Derive formula for the sum of interior angles of an n-sided polygons

22. Use formula to calculate the sum of interior angles of an n-sided polygon.

23. Interpret graphs

24. Conduct research

25. Engage in problem solving situations

26. Define key terms

27. Complete tables

28. Calculate measures of central tendencies.

29. Use software efficiently.

Course Details

Date	Topics	Specific Objectives	Assignments	Resources
Week One-two of October (2 weeks)	Numbers: indices, Bases & Estimations	• State the meaning of a^m, where a and m are whole numbers • Evaluate the expressions $a^m \cdot a^m$ x b^n and $\frac{am}{bm}$ where a, b,m,n are whole numbers • Write numbers greater than or equal to in standard form • Write a number to a given number of decimal places and significant figures. • Express place values of digits in all bases including base 10 • Add, subtract and multiply numbers written in base n, (where 1< n < 10) • Convert numbers written in base n, (where 1< n < 10) to base 10 and vice versa.	.	
Week three- four of October (2 weeks)	Numbers: Arithmetic Properties	• Identify and use the following concepts: i. Closure ii. Reflexive property iii. Symmetry property iv. Trichotomy Law	.	Straw, paper clips, ruler, tape.
Week one-three of November (3 weeks)	Algebra: Making Rules, Equations & inequalities, Simplification	• Identify and use the following concepts: i. Change the subject of a simple formula eg, C= 2π r, making r the subject gives $r = \frac{C}{2\pi}$ ii. Write inequalities to illustrate word Problems iii. Illustrate inequalities on a number line		

		iv. Solve simple linear inequalities and represent the solution on a number line		
Week four of November to week two of December (3 weeks)	Geometry:	• Investigate the relationship among angles form by: a) A transversal and two or more parallel lines b) Intersecting non-parallel lines • Sketch different views (top, side, etc.) of solids making use of unseen (dotted) lines • Perform translations and identify images of objects, where translation vector is given; • Find the translation vector given the object and its image; • Perform reflections and identify images of objects, where the mirror line are the x or y-axes • Perform rotations of 90^0 , 180^0, 270^0 about the origin.		
Week one of January (1 week)	Geometry: Making rules, Equation & Inequalities, Simplification	• Determine the properties of n-sided polygons, where $3 \leq n \leq 10$ • Find the angle sum (sum of the interior angles) of polygons with n interior angles (where $3 \leq n \leq 10$)		

The Final Grade (Courses with Qualified Teacher)

Student evaluation in this course is based on the student's achievement of curriculum expectations. The final letter grade represents the quality of the student's overall fulfilment of the expectations for the course and reflects the corresponding level

of achievement as described in the achievement chart for the discipline. The final grade reflects the student's most consistent level of achievement across all units in the course, although special consideration is given to more recent evidence of achievement. There are assessment, such homework assignments, quizzes, including computer activities that deepen the level of understanding, writing assignments designed to develop communication of mathematical concepts, student projects, and final examinations, in this course.

Recommended text:

A complete Mathematics Course for Secondary Schools Book 2. Author: Raymond Toolsie