School Bishkek Chyngyz Aitmatov
High School
Year 2023-2024

Mathematics

Course Designer:
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Describe the course
This course is intended to help students strengthen their comprehension of pure mathematical ideas and methods, and it covers the first half of the Cambridge International AS and A Level Mathematics curriculum. Each chapter of the course content is focused to a certain topic and is followed by a set of related activities and examples designed to strengthen the learnings.

Describe the schedule
The duration of the course is one week. 4 hours a week is separated for this course with one course covered every day. Each session will take 45 minutes. Assignments are given after each lesson.

Describe the school or learning environment
The school is a private high school. Students who want to move to the next IGCSE level have a wide range of practicing materials. The school also have purchased the "save my test" platform as well and students having formative assessments after each topic.

Describe the learners
Students are 10th graders and all of them are among 15-17 ages. They are all boys and all Kyrgyz nations. They are all planning to study abroad and they also get preparation for the SAT exam as well alongside their IGCSE curriculum.

Describe the learners'' prior knowledge
Its accepted by teachers that they have already finished and comprehended the "Core and Extended Coursebook" of IGCSE curriculum and they start to follow the topics of the book "Pure Mathematics 1" for Cambridge international AS and A level.

Describe the learners'' prior skills
Students have already learned critical thinking, analytical thinking, analyzing, and persevere in problem in problem solving skills in 8th and 9th grades. In grade 10, with this book that we follow we will work on the strengthening these skills and also preparing students for the international placement exams.

Special Needs Design
From my own students, there is no one who need special accommodation.

Theoretical Background
Teaching students to think critically and creatively is a primary focus of the IGCSE program. The course's activities are designed to align with findings from cognitive psychology and learning theory to help student achieve this objective.
According to studies in cognitive psychology, students retain more of what they learn when they put their new learning to use in meaningful ways. Problem-solving activities, class debates, and collaborative projects are just a few of the ways that the IGCSE curriculum encourages students to be actively engaged in their own education

Outcomes

1. Recall: Memorizing definitions, theorems, and formulas acquired for placement exams.

2. Understand: Explain the meaning of concepts and terms they study in their specified book.

3. Apply: Solve problems and apply concepts to real life situations.

4. Analyze: compare and contrast different patterns and break down complex problems into smaller sub-problems.

5. Evaluate: Evaluate the reliability and effectiveness of various mathematics approaches.

6. Create: -

Assessment Design	What will learners do to show that they have reached the outcomes above? Their performances in the formative and summative assessment, end of semesters exams, assignments, projects and presentations. Furthermore, after each semester there are pre-assessment and post assessment tests taken and designed by the school that I am currently working.
Motivation Design	What will you do to ensure that learners are engaged at the beginning, middle, and end of the course/ module? Throughout the lessons that are held with pupils, I will begin by presenting the techniques of evaluation with some uncomplicated question to get things started. After that, we will make certain that each student has questions that are tailored to their ability level and that they are able to answer, in addition to some questions that are more challenging, which will ensure that they are placed in a position that is challenging for them.
Social Learning Design	What will you do to ensure that students collaborate effectively? 1. Group working and collaborative work during the sessions among students. 2. Assigning projects, presentations, and surveys that can be conducted in school. 3. Also, in our school we have platforms that boost the students enthusiasm for collaborate works like E-sapat and alcumes.
Technical Design	In our school students are not allowed to bring their telephones, tablets, or computers. However, we have smart boards in our classes and Internet. We widely use GeoGebra, Desmos, and some other platforms in our sessions.

Activity Design

Date/s	Objective	Activity	Tech Used/ Notes
Monday, 45 min	-Students will be able to define the gradient of the tangent and differentiate it from other mathematical concepts such as slope and rate of change. -Students will be able to understand the relationship between the gradient of the tangent and the rate of change of a function at a specific point.	● We will start the lesson with a presentation and a video from khan academy. Also, for visualization and a better conceptualization we will widely use GeoGebra and Desmos graph calculator. ● Then 4 problems will be provided for students as a group work. They will discuss with their group members and solve problems collaboratively. Then they will compare their solutions with other groups by passing their papers to each other among groups. ● Eventually, there will be a formative assessment in Bamboozle.	● https://www.youtube.com/watch?v=IePCHjMeFkE&ab_channel=KhanAcademy ● https://www.geogebra.org/calculator ● https://www.desmos.com/calculator/woigw9qykh ● https://www.baamboozle.com/pricing

| Wednesday, 45 min | Gradient of a tangent as a limit. Students will be able to conceptualize better the reason that why we take h as it approaches to zero. | We will watch a video on YouTube related to the topic. The teacher will conduct his presentation and solve 3 problems on the board with help of students and do many cold calls. Then 4 problems will be provided for students as a group work. They will discuss with their group members and solve problems collaboratively. Then they will compare their solutions with other groups by passing their papers to each other among groups. Finally, there will be a formative assessment in Kahoot and students will have 4 colors of papers and for each problem they will show their answers indicated with colors on the board. | *https://www.youtube.com/watch?v=ktOYbZ8CpLA&ab_channel=ProfessorDaveExplains*

https://kahoot.it/ |

Thursday, 45 min	-Students will be able to define differentiation and differentiate polynomials of any degree using the power rule. -Students will be able to use the product rule and quotient rule to differentiate polynomials that are the product or quotient of two or more functions	• We will watch a video from khan academy related to the new topic. • The teacher will conduct his presentation and solve 3 problems on the board with help of students and do many cold calls. • Then 4 problems will be provided for students as a group work. They will discuss with their group members and solve problems collaboratively. Then they will compare their solutions with other groups by passing their papers to each other among groups. • Eventually, Students will be divided into 4 groups and for tablets/laptops will be provided and there will be a formative assessment on quizizz and students this time will do this assessment collaboratively.	https://www.youtube.com/watch?v=-CTaxKTzbEI&ab_channel=KhanAcademy https://quizizz.com/admin/quiz/5ea07197999ef0001bb486cc/a3-trig-ratios-open-ended
Friday, 45 min	End of chapter Exam	• EXAM	

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Contingency Plans	• One of the biggest problems I face with this module is the luck of motivation of some pupils in the class which sometimes causes some small issues in groups works and activities. Pupils come from families with high income and they say we don't need to study. We may go to some private universities and get our diplomas and will work on our own companies. We tried to overcome these problems with having some meeting with their parents but we couldn't solve it.
Formative Evaluation of the Course	• Exit ticket that I collect at the end each session. • Asking from HoD of mathematics to participate my lessons and give feedbacks.

Summative Evaluation of the Course

- The results of students from summative assessments and the exams that are designed and taken by department of mathematics.

- The rate of participation of students in collaborative works and group activities during the lesson.

Summative Evaluation of