



Unit Planner: Trigonometry

Mathematics 10

Tuesday, 30 June 2015, 11:29AM



MYP New Chapter > 2015 > Year 10 > Mathematics > Mathematics 10 > Week 9 - Week 13

Last Updated: [Sunday, May 3, 2015](#) by Ali Harba

Fatima, Shabih; Gupta, Abhijeet; Harba, Ali; Hotin, Serpil; Khalil, Khadijeh; Taher, Ragaie

Inquiry: Establishing the purpose of the unit

Key Concept(s)	Related Concept(s)	Global Context
Key Concepts	Related Concepts	<ul style="list-style-type: none"> Identities and relationships
MYP	MYP	
Key Concepts	Mathematics	
Key Concepts	Mathematics	
Logic <input type="checkbox"/> Show details	Equivalence <input type="checkbox"/>	
Logic	Equivalence	
Relationships <input type="checkbox"/> Show details	Justification <input type="checkbox"/>	
Relationships	Justification	
	Pattern <input type="checkbox"/>	
	Pattern Show details	

Statement of Inquiry

Where is Trigonometry used in our daily lives?

Inquiry Questions - Factual
Guiding Questions

Inquiry Questions - Conceptual

Inquiry Questions - Debatable

How can we use Trigonometry to measure things that we can't reach?

How accurate is our results when we use Trigonometry?

Can we rely on our results when we use Trigonometry?

MYP Objectives

MYP: Mathematics (For use from September 2014/January 2015)

Year 5

Aims

The aims of MYP mathematics are to encourage and enable students to:

enjoy mathematics, develop curiosity and begin to appreciate its elegance and power

communicate clearly and confidently in a variety of contexts

develop logical, critical and creative thinking

develop confidence, perseverance, and independence in mathematical thinking and problem solving

apply and transfer skills to a wide range of real-life situations, other areas of knowledge and future developments

appreciate how developments in technology and mathematics have influenced each other

develop the ability to reflect critically upon their own work and the work of others.

Objective A: Knowing and understanding

In order to reach the aims of mathematics, students should be able to:

i. select appropriate mathematics when solving problems

ii. apply the selected mathematics successfully when solving problems

iii. solve problems correctly in both familiar and unfamiliar situations in a variety of contexts.

Objective B: Investigating patterns

In order to reach the aims of mathematics, students should be able to:

i. select and apply mathematical problem solving techniques to discover complex patterns

ii. describe patterns as general rules consistent with findings

Objective C: Communicating

In order to reach the aims of mathematics, students should be able to:

i. use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations

iv. communicate complete, coherent and concise mathematical lines of reasoning

Objective D: Applying mathematics in real-life contexts

In order to reach the aims of mathematics, students should be able to:

i. identify relevant elements of authentic real-life situations

iii. apply the selected mathematical strategies successfully to reach a solution

v. justify whether a solution makes sense in the context of the authentic real-life situation.

Assessment Criteria

Criterion

Criterion A: Knowing and understanding

∨ [Show details](#)

Criterion A: Knowing and understanding

Criterion B: Investigating patterns

▼ [Show details](#)

Criterion B: Investigating patterns

Criterion D: Applying mathematics in real-life contexts

▼ [Show details](#)

Criterion D: Applying mathematics in real-life contexts

Summative

Summative Assessment

Outline of summative assessment task(s) including assessment criteria:

Summative Assessment Tasks & Statement of Inquiry

Relationship between summative assessment task(s) and statement of inquiry:

Topic Test

Summative: Test: Standardised

 [Trigonometry.docx](#)

▼ [1 Standard Assessed](#)

-

Common Assessment Task ""

CAT

Summative: Test: Common

 [2014 Trigonometry.docx](#)

▼ [3 Standards Assessed](#)

-

Approaches to Learning (ATL)

IB Learner Profile

Approaches to Learning

MYP

Skill Category: Self Management

Skill Clusters:

III. Organization skills

Managing time and tasks effectively

▼ [Show details](#)

- Inquirers
- Knowledgeable
- Thinkers
- Communicators
- Reflective

Plan short- and long-term assignments; meet deadlines 

Create plans to prepare for summative assessments (examinations and performances) 

- Set goals that are challenging and realistic ⊗
- Bring necessary equipment and supplies to class ⊗
- Keep an organized and logical system of information files/notebooks ⊗
- Understand and use sensory learning preferences (learning styles) ⊗

Skill Clusters:

IV. Affective skills

Managing state of mind

~ [Show details](#)

- Mindfulness – Practise focus and concentration ⊗
- Mindfulness– Practise strategies to overcome distractions ⊗
- Perseverance – Demonstrate persistence and perseverance ⊗
- Resilience – Practise “bouncing back” after adversity, mistakes and failures ⊗
- Resilience – Practise dealing with disappointment and unmet expectations ⊗

Skill Clusters:

V. Reflection skills

(Re-)considering the process of learning; choosing and using ATL skills

~ [Show details](#)

- Develop new skills, techniques and strategies for effective learning ⊗
- Consider content – What did I learn about today? – What don't I yet understand? – What questions do I have now? ⊗
- Consider ATL skills development – What can I already do? – How can I share my skills to help peers who need more practice? – What will I work on next? ⊗
- Consider personal learning strategies – What can I do to become a more efficient and effective learner? – How can I become more flexible in my choice of learning strategies? – What factors are important for helping me ⊗

learn well?

Action: Teaching and learning through inquiry

Central Idea / Content

Year 10

The proficiency strands Understanding, Fluency, Problem Solving and Reasoning are an integral part of mathematics content across the three content strands: Number and Algebra, Measurement and Geometry, and Statistics and Probability. The proficiencies reinforce the significance of working mathematically within the content and describe how the content is explored or developed. They provide the language to build in the developmental aspects of the learning of mathematics.

At this year level:

Understanding includes applying the four operations to algebraic fractions, finding unknowns in formulas after substitution, making the connection between equations of relations and their graphs, comparing simple and compound interest in financial contexts and determining probabilities of two and three step experiments.

Fluency includes factorising and expanding algebraic expressions, using a range of strategies to solve equations and using calculations to investigate the shape of data sets.

Problem Solving includes calculating the surface area and volume of a diverse range of prisms to solve practical problems, finding unknown lengths and angles using applications of trigonometry, using algebraic and graphical techniques to find solutions to simultaneous equations and inequalities, and investigating independence of events.

Reasoning includes formulating geometric proofs involving congruence and similarity, interpreting and evaluating media statements and interpreting and comparing data sets

The aims of the teaching and study of MYP mathematics are to encourage and enable students to:

- enjoy mathematics and to develop curiosity as well as an appreciation of its elegance and power
- develop an understanding of the principles and nature of mathematics
- communicate clearly and confidently in a variety of contexts
- develop logical, critical and creative thinking, and patience and persistence in problem solving
- develop power of generalization and abstraction
- apply and transfer skills to a wide range of situations including real life, other areas of knowledge and future developments
- appreciate how developments in technology and mathematics have influenced each other
- appreciate the moral, social and ethical implications arising from the work of mathematicians and the applications of mathematics

- appreciate the international dimension in mathematics through an awareness of the universality of mathematics and its multicultural and historical perspectives
- appreciate the contribution of mathematics to other areas of knowledge
- develop the knowledge, skills and attitudes necessary to pursue further studies in mathematics
- develop the ability to reflect critically upon their own work and the work of others.

TRIGONOMETRY

- Trigonometric ratios (Sine, Cosine and Tangent)
- Use of a scientific calculator to find trigonometric ratios and angles
- Solving triangles to find missing lengths using Trigonometry
- Solving triangles to find missing angles using Trigonometry
- Angles of elevation and depression
- Bearings (Compass & True)
- Solving two-dimensional problems in Trigonometry
- Solving three-dimensional problems in Trigonometry

ACARA Achievement Standards

ACARA: F-10: Mathematics

ACARA: Year 10

Achievement Standard

By the end of Year 10,

Students use trigonometry to calculate unknown angles in right angled triangles. ⊗

ACARA Content Descriptors

Content: Measurement and Geometry

Pythagoras and trigonometry ⊗

Solve right-angled triangle problems including those involving direction and angles of elevation and depression ([ACMMG245](#))



[Show details](#)

Solve right-angled triangle problems including those involving direction and angles of elevation and depression ([ACMMG245](#))



ACARA General Capabilities

ACARA: GC: Personal & Social Capability Continuum

Level 6 (End of Year 10)

Social awareness

Contribute to civil society



plan, implement and evaluate ways of contributing to civil society at local, national regional and global levels ⊗

Learning Process

Learning Experiences and Teaching Strategies

Standards

- Solve right-angled triangle problems including those involving direction and angles of elevation and depression

Instructional Strategies & Activities

Elaboration

Applying Pythagoras' Theorem and trigonometry to problems in surveying and design.

Teachers will:

At the start of each unit, teachers will allocate an oral discussion to clarify the expectation of the given task with a direct reference to the published assessment criteria. Teachers specify the expected outcomes at the beginning of individual task so that students are aware of what it is required.

Students will receive a copy of weekly planner. All common assessment tasks and relevant criteria, date and dead lines for each task.

Teachers will organise a pre-test to test students' prior knowledge Using AssessOn software provided by jacplus

Students will be taught the following concepts:

- Pythagora's Theorem in 2 dimensions and 3 dimensions
- Trigonometric ratios (Sine, Cosine and Tangent)
- Using trigonometry to calculate side lengths
- Using trigonometry to calculate different angle size
- Angles of elevation and depression and how to apply those concepts in real life
- Conventional and true bearings
- Application of Trigonometry to real life problems

Lessons 1 & 2

- Assign a test on AssessOn to test students prior knowledge on trigonometry
- Use power point slides or board work to explain Pythagoras' theorem
- Use examples to highlight and consolidate students learning
- Summarise the concept by posing questions at the end of the session
- Do examples of more challenging questions and real life problems

Lessons 3 to 6

- Use power point slides or board work to explain how to use Pythagoras' theorem in 3 dimensional shapes.
- Use examples to highlight and consolidate students learning.
- Summarise the concept by posing questions at the end of the session.
- Do examples of more challenging questions and real life problems.
- Help students and make sure that the concepts are understood.
- Assign AssessOn tests and monitor the results to work out students' weaknesses in order to help them

Lessons 7 & 8

- Use power point slides or board work to explain the meaning of different Trigonometric ratios.
- Give examples to differentiate between Hypotenuse, Opposite and Adjacent sides.
- Teach students how to use their scientific calculator to workout different Trigonometric ratios.
- Use examples to highlight and consolidate students learning
- Summarise the concept by posing questions at the end of the session
- Solve examples on the board to emphasise the concepts
- Show YouTube clips to teach students how to find the sides and solve the equations.

Students will work on Exercise 5.2, and 5.3 of

their Textbook according to the program that will be provided to them.

Special worksheets will be provided to students with special needs.

Lessons 9 to 12

- Use Power point to explain how to workout unknown side lengths using different Trigonometric ratios.
- Do examples to help students differentiate between the Trigonometric ratios when finding lengths.
- Teach students how to use their scientific calculator to workout the different Trigonometric ratios.
- Use examples to highlight and consolidate students learning
- Summarise the concept by posing questions at the end of the session
- Solve examples on the board to emphasise the concepts

Students will work on Exercise 5.4 and 5.5 of their Textbook according to the program that will be provided to them.

Special worksheets will be provided to students with special needs.

Lessons 13 to 18

- Explain to students how to use Trigonometric ratios to find different angles
- Introduce students to degrees, minutes and seconds and show students how to convert to degrees using their calculators
- Do simple examples on the board
- Introduce students to angles of elevation and depression and show them how to interpret worded problems
- Use examples to highlight and consolidate students learning.
- Summarise the concept by posing questions at the end of the session
- Solve more complicated examples on the board

Students will work on Exercise 5.6 and 5.7 of

their Textbook according to the program that will be provided to them.

Special worksheets will be provided to students with special needs.

(A short test will be given during this week which covers up to 5.6)

Lessons 19 to 24

- Introduce students to compass bearing and conventional bearing
- Do simple and complex examples on the board
- Assign some AssessOn questions and check students progress and their errors in order to rectify their mistakes.
- Summarise the concept by posing questions at the end of the session
- Help students who needs help
- Do some of the application problems

Students will work on Exercise 5.8 and 5.9 of their Textbook according to the program that will be provided to them.

Special worksheets will be provided to students with special needs.

Lessons 25 to 30

Use this week to assess students according to the different IB criteria.

Formative Assessment

AssessOn will be used every week as a formative assessment tool to assess students prior and ongoing learning. Students will be able to make a judgement about where they are at and what areas they need to work on. The teacher will also go around to each student and check their progress. As well as getting students involved in class discussions.

Differentiation

More capable students will be identified and asked to help less able students.

Consolidations worksheets will be given to some students who require extra help

Students will be grouped together according to their abilities in order to be supported or extended

Capable students will be given more challenging problems to solve

AssessOn will be used where different tasks will be given to different students according to their abilities

Resource(s)

- Computer
- LCD Projector
- Smart Board
- White Board

Reflection: Considering the planning, process and impact of the inquiry

Prior to teaching the unit

During teaching

After teaching the unit

Unit Reflections

Assign an AssessOn task to see what students already know about the unit.

Analyse students results on the AssessOn task

Keep in mind the inquiry questions that will be addressed in this unit.

Keep track of repeated mistakes that students are making during class discussions

Keep in mind that students will struggle with this unit and look for ways to make it easy for them to understand.

Keep track of students engagement and address any demotivated students.

Try to connect the unit to the real world that we live in so that students can relate to the concepts that are being taught.

Make sure that you are covering the areas of ATL and keeping track of students progress in the above areas.