Newsletter

Subject: Mathematics

Educational Programme:

- **Bilingual**
- **IGCSE**

Grades: 9-10

Academic Year: 2016/2017

General Supervision

Siham Ahmed Al-Riyamia

Director - Private Schools' Programs and Curricula Department

Technical Supervision

Amna Ali Al-Farsia

HOD - Private Schools' Programs

Newsletter Writing

Tauhid Bilal Khamis Al-Khaburia

Maths Curriculum Officer

نشرة توجيهية

المادة: الرياضيات

البرنامج التعليمي:

- **ثنائي اللغة**
- **IGCSE**

الصفوف: ٩-١٠

العام الدراسي: ٢٠١٦/٢٠١٧

الإشراف العام

سهام بنت أحمد الريامية

مديرة دائرة برامج ومناهج المدارس الخاصة

الإشراف الفني

آمنة بنت علي بن عيسى الفارسية

رئيسة قسم برامج المدارس الخاصة

إعداد النشرة التوجيهية

توحيد بنت بلال بن خميس الخابورية

عضو مناهج تعليمية – رياضيات

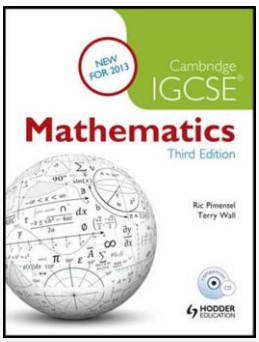
سلطنة عمان

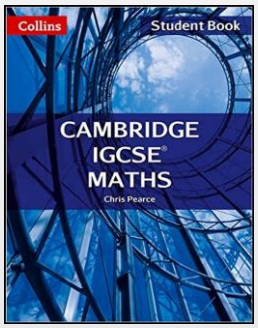
وزارة التربية والتعليم

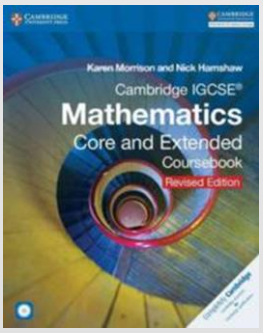
المديرية العامة للمدارس الخاصة

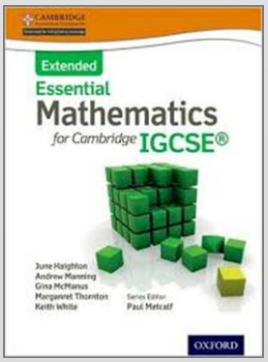
دائرة برامج ومناهج المدارس الخاصة

قسم برامج المدارس الخاصة









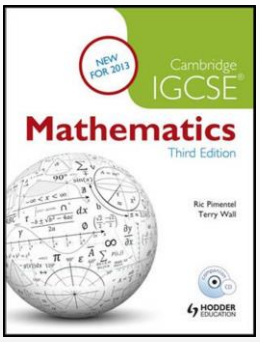
سلطنة عمان
وزارة التربية والتعليم
المديرية العامة للمدارس الخاصة
دائرة برامج ومناهج المدارس الخاصة
قسم برامج المدارس الخاصة

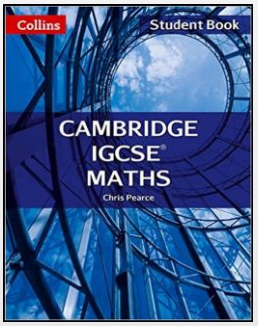
فريق الاعتماد

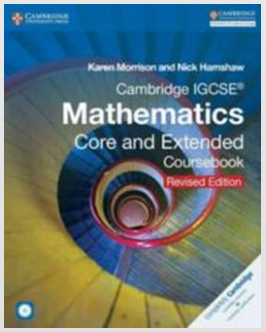
م	الاسم	الوظيفة
١	توحيد بنت بلال الخابورية	عضو مناهج تعليمية – رياضيات
٢	حنان بنت سالم الراسبية	مشرفة تربوية – رياضيات
٣	أشرف عربية	معلم رياضيات / المدرسة الوطنية الخاصة
٤	رشمي راجيش	معلمة رياضيات / مدرسة الفارابي الخاصة

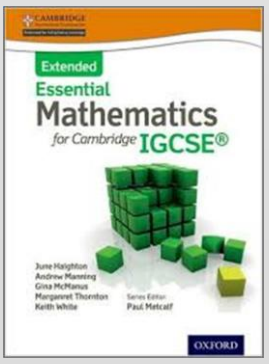
Focus Group

	Name	Occupation
1	Tauhid Bilal Al-Khaburia	Maths Curriculum Officer
2	Hanan Salem Al-Rasebia	Maths Supervisor
3	Ashraf Ariba	Maths Teacher / Al-Watania Private School
4	Reshmi Rajesh	Maths Teacher / Al-Farabi Private School

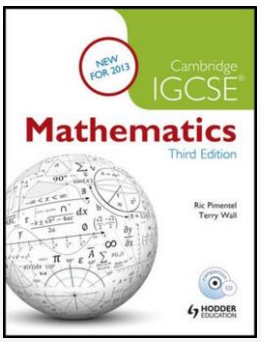


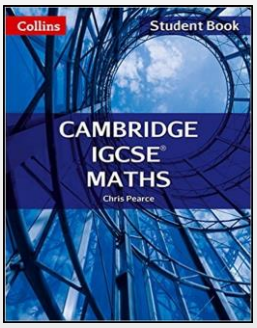


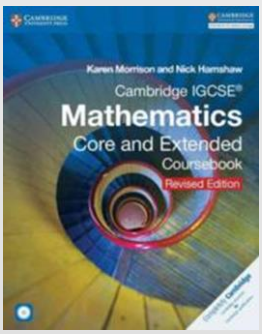


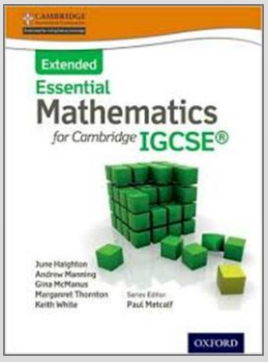


سلطنة عمان
وزارة التربية والتعليم
المديرية العامة للمدارس الخاصة
دائرة برامج ومناهج المدارس الخاصة
قسم برامج المدارس الخاصة









الفهرس

Index

توجيهات عامة

	التعليمات
اختيار وتوفير الكتب الدراسية الأساسية	١. على جميع المدارس الخاصة أن تلتزم باختيار وتطبيق الكتب الدراسية الأساسية المعتمدة من قبل الدائرة في هذه النشرة ابتداء من الصف التاسع فقط للعام الدراسي ٢٠١٦/٢٠١٧م (والصف العاشر في العام الدراسي ٢٠١٧/٢٠١٨م) . ٢. على المدرسة أن تلتزم بتوفير جميع المكونات المعتمدة من كتب دراسية وأقراص مدمجة، بالنسبة لكل طالب ولكل معلم . ٣. على المدرسة أن تلتزم بتوفير نسخ كافية من الكتب الدراسية لطلابها ومعلميها ، قبل وقت كافي من بداية العام الدراسي . ٤. على المدرسة أن تلتزم بتوفير نسخ أصلية من الكتب الدراسية التي تم اختيارها للتطبيق ويمنع منعاً باتاً نسخ الكتب بدون تصريح من دار النشر، إذ يعتبر انتهاكاً لحقوق الملكية الفكرية وتعرض المدرسة للمخالفة / الاجراءات القانونية .
الوسائل التعليمية	١. على المدرسة الخاصة أن تلتزم بتوفير الوسائل التعليمية الموضحة في هذه النشرة، وتسهيل عملية نسخ أوراق العمل بالنسبة للمعلم وذلك بتوفير الأوراق وآلات التصوير وغيرها من المستلزمات، إذ أن تطبيق المناهج بالصورة الصحيحة يتطلب ذلك .
الأهداف	١. ضرورة التزام المعلمين في المدارس المطبقة للبرنامج ثنائي اللغة بتحقيق الأهداف الواردة في بند "الإطار العام للخطط السنوية لمادة الرياضيات لبرنامج ثنائي اللغة (٩–١٠) " من هذه النشرة، لكل من الفصلين الدراسيين الأول والثاني في كل صف دراسي (الصف التاسع في العام الدراسي ٢٠١٦/٢٠١٧م ، والصف العاشر في العام الدراسي الذي يليه ٢٠١٧/٢٠١٨م)(انظر الفهرس) . ٢. ضرورة التزام المعلمين في المدارس المطبقة لبرنامج *IGCSE* بتطبيق أهداف البرنامج الدولي .
المصادر المساعدة للمعلم	١. "المصادر المساعدة للمعلم " ويعنى بها : الكتب الدراسية والمصادر التي تدعم المعلم والتي يجب على المدرسة توفيرها ، وهي حق لكل معلم، تكمن أهميتها في توفير أنشطة إضافية وأسئلة متنوعة، وأفكار تدريسية بديلة يمكن الاستعانة بها لتحقيق أهداف السلسلة الأساسية، وعند إعداد أوراق العمل الإضافية للطلاب، وعند إعداد مختلف أنواع الاختبارات، وغيرها من أوجه الاستفادة، مع الحرص على عدم نسخ محتوياتها إن لم تكن من المصادر المصممة للنسخ بدون الحصول على إذن رسمي من دار النشر المعنية بالكتب الدراسية وملحقاتها .

قاعدة البيانات والتغذية الراجعة

١. يأمل المختصون في قسم برامج المدارس الخاصة أن تقوم المدارس الخاصة بإرسال أية ملاحظات حول الأهداف المختارة أو الخطط الفصلية المذكورة أو أية أخطاء مطبعية أو مقترحات من قبل المعلمين أو الإدارات حول الكتب الدراسية الأساسية المعتمدة حتى يتسنى لأعضاء المناهج بالقسم المذكور الإلمام بها، وعلاج أية إشكاليات تتعلق بهذا الجانب.

٢. جميع المدارس المطبقة لأحد البرنامجين (ثنائي/*IGCSE*)، يرجى منها تعبئة الجدول الآتي وإرساله قبل نهاية سبتمبر ٢٠١٦م:

اسم المدرسة – الفرع:	
المحافظة:	
الهاتف:	
البريد الإلكتروني:	
نوع البرنامج (ثنائي/*IGCSE*):	
اسم الكتاب المختار:	
عدد المعلمين المعنيين بتدريس المادة للصف ٩:	
مجموع عدد الطلاب في الصف ٩:	

❖ لإرسال البيانات المطلوبة أعلاه وللتواصل بشأن المادة:

الفاضلة/ توحيد بنت بلال الخابورية

البريد الإلكتروني/ alkhaburi_t@hotmail.com

General Guidelines

	Instructions
Series Selection and Providing	1. All private schools must select and apply the approved resources in this newsletter starting with grade 9 during the academic year 2016-2017 and grade 10 during the academic year 2017-2018. 2. Schools should provide all of the components of their selection for their students and their teachers. 3. Schools should order enough quantities of the resources for their teachers and students at least two months prior the beginning of the academic year. 4. Schools must provide original copies of the selected books and resources. They should respect the intellectual property and the copyrights of all publishers and publications.
Teaching Aids	1. Schools must provide teaching aids and ancillary materials which are prescribed in this newsletter. They also should provide papers, photocopiers and other items as implementing these series requires such processes.
Outcomes	1. Teachers must adhere to the objectives according to the "The General Framework of the Annual Plans of Math subject of the bilingual program (9-10)" in this newsletter which is directed at schools implementing the bilingual program during the two semesters in each grade (for grade 9 only during the academic year 2016/2017). (see index) 2. Teachers must adhere to the learning outcomes of IGCSE Program for grades (9-10) in schools which implement the international program (IGCSE).

Teachers' Support Resources

1. "Teachers' Supplementary Resources" are those materials which assist teaching and learning. Schools should provide them for their teachers to offer students extra-curricular activities, various questions and new teaching ideas. These resources can help the teachers in implementing the main series, preparing worksheets and writing exams papers (with the consideration of copyright issues).

Database and Feedback

1. Specialists in the department encourage schools to send their feedback regarding the approved resources, the approved objectives and the general framework of the annual plane. Such processes make it easy for the department to handle any problem in this regard.
2. All targeted schools should fill out the form and send it back before end of Sep 2016.

Name of school - Branch:	
Governorate:	
Telephone:	
Email:	
Program's category (Bilingual/IGCSE):	
Name of selected textbook:	
Number of the teachers who teach grade 9:	
Total number pupils in grade 9 :	

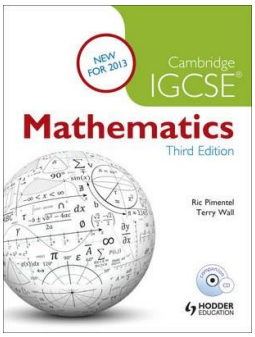
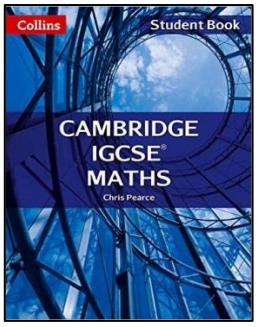
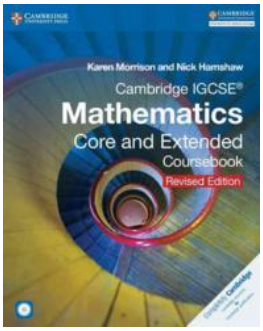
The data are necessary to contact schools regarding teachers' training programs and forming a database in the Department.

❖ For communication and sending of required data:

Tauhid Bilal Al-Khaburia
E-mail: Alkhaburi_t@hotmail.com

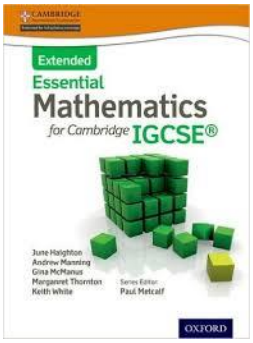
قائمة المصادر التعليمية الأساسية المعتمدة (٩-١٠)

The List of Approved Math Resources (9-10)

Publisher	Components	ISBN	Notes	Pic
Hodder Education	Cambridge IGCSE Mathematics Core and Extended (Third Edition) + CD-ROM	9781444191707	Endorsed by (CIE)	
	Cambridge IGCSE Mathematics Core and Extended - Practice Book	9781444180466		
	Cambridge IGCSE Mathematics Core and Extended - Teacher's CD-ROM	9781444191745		
Collins	Cambridge IGCSE Maths - Student book	9780008150372	Endorsed by (CIE)	
	Cambridge IGCSE Maths - Teacher Guide	9780008150365		
Cambridge University Press	Cambridge IGCSE Mathematics Core and Extended - Coursebook Revised Edition + CD-ROM	9781316605639	Endorsed by (CIE)	
	Cambridge IGCSE Mathematics Extended - Practice Book	9781107672727		
	Cambridge IGCSE Mathematics - Teacher's Resource CD-ROM Revised Edition	9781316609309		

قائمة المصادر الداعمة لمعلم مادة الرياضيات (٩-١٠)

The List of Teachers' Supplementary Resources (9-10)

Name of the book	Publisher	ISBN	Notes	Pic
Essential Extended Mathematics for Cambridge IGCSE	Oxford University Press	9781408516522	Endorsed by (CIE)	

بالإضافة إلى نسخة واحدة لأحد الكتب المعتمدة من الجدول السابق والتي لم تختاره المدرسة كمصدر أساسي

In addition to a copy of at least one unselected book from first table (of main course books)

الوسائل التعليمية لمادة الرياضيات للصفين (٩–١٠)

١. أدوات هندسية بحجم كبير لاستخدام المعلم على السبورة: المثلث الثلاثيني الستيني والمثلث متساوي الساقين، منقلة، مسطرة، فرجار.
٢. سبورة الرسم البياني (بالإضافة للسبورة العادية في الفصل).
٣. جهاز حاسوب لكل معلم.
٤. جهاز عرض.
٥. شبكة إنترنت متاحة.

The List of Required Instruments & Educational Aids in Math for Grades (9-10)

1. Master Mathematical Instruments (for teachers use): Two set squares, a 180° protractor, a ruler, a compass.
2. Grid whiteboard (In addition to the normal whiteboard).
3. Laptop for each teacher.
4. Projectors.
5. Internet connection.

الإطار العام للخطط السنوية لمادة الرياضيات لبرنامج ثنائي اللغة (٩–١٠)

The General Framework of the Annual Plans of Math Subject of the Bilingual Program (9-10)

Grade (9)

First Semester

1) Number

Indices

- Understand the meaning and rules of indices
- Use the standard form $A \times 10^n$ where n is a positive or negative integer, and $1 \leq A < 10$

Real Numbers

- Identify and use real numbers (Which includes rational & irrational numbers)
- Convert recurring decimals to fractions (And opposite)

Proportion

- Increase and decrease a quantity by a given ratio
- Use common measures of rate
- Calculate average speed

Percentages

- Calculate a given percentage of a quantity
- Express one quantity as a percentage of another
- Calculate percentage increase or decrease
- Carry out calculations involving reverse percentages

2) Algebra

Algebraic Manipulation

- Construct and transform complicated formulae and equations
- Manipulate directed numbers
- Use brackets and extract common factors
- Expand products of algebraic expressions
- Factorize where possible expressions of the form:

$ax + bx + kay + kby$

$a^2x^2 - b^2y^2$

$a^2 + 2ab + b^2$

$ax^2 + bx + c$

- Manipulate algebraic fractions
- Factorize and simplify rational expressions

3) Co-ordinate Geometry

Straight Line Graphs

- Find the gradient of a straight line
- Calculate the gradient of a straight line from the co-ordinates of two points on it
- Calculate the length and the co-ordinates of the midpoint of a straight line from the co-ordinates of its end points
- Interpret and obtain the equation of a straight line graph in the form $y = mx + c$
- Determine the equation of a straight line parallel to a given line
- Find the gradient of parallel and perpendicular lines

4) Mensuration

Arc Length and Sector Area of the Circle

- Solve problems involving the arc length and sector area as fractions of the circumference and area of a circle

Surface Area and Volume of 3D Shapes

- Carry out calculations involving the volume of a cuboid, prism and cylinder and the surface area of a cuboid and a cylinder
- Carry out calculations involving the surface area and volume of a sphere, pyramid and cone

Areas and Volumes of Compound Shapes

- Carry out calculations involving the areas and volumes of compound shapes

Grade (9)

Second Semester

1) Number

Sets

- Use language, notation and Vann diagrams to describe sets and represent relationships between sets
  Note: Including shaded parts
- Define sets in different ways

2) Algebra

Linear Equations and Inequalities

- Solve simple linear equations in one unknown
- Solve simple linear inequalities

Variation

- Express direct and inverse variation in algebraic terms and use this form of expression to find unknown quantities

3) Geometry

scale drawings

- Read and make scale drawings

Symmetry

- Recognize rotational and line symmetry (including order of rotational symmetry) in two dimensions
- Recognize symmetry properties of the prism (including cylinder) and the pyramid (including cone)
- Use the following symmetry properties of circles:
  - equal chords are equidistant from the center
  - the perpendicular bisector of a chord passes through the center
  - tangents from an external point are equal in length

Angle Properties

- Calculate unknown angles using the following geometrical properties:
  - angles at a point
  - angles at a point on a straight line and intersecting straight lines
  - angles formed within parallel lines
  - angle properties of triangles and quadrilaterals
  - angle properties of regular polygons
  - angle in a semi-circle
  - angle between tangent and radius of a circle.
  - angle properties of irregular polygons
  - angle at the center of a circle is twice the angle at the circumference
  - angles in the same segment are equal
  - angles in opposite segments are supplementary; cyclic quadrilaterals

4) Trigonometry

Bearings

- Interpret and use three-figure bearings

Trigonometry

- Apply Pythagoras' theorem and the sine, cosine and tangent ratios for acute angles to the calculation of a side or of an angle of a right-angled triangle
- Solve trigonometrical problems in two dimensions involving angles of elevation and depression
- Extend sine and cosine values to angles between 90° and 180°

5) Statistics

Reading and Displaying Data

- Construct and read histograms with equal and unequal intervals and scatter diagrams
- Understand what is meant by positive, negative and zero correlation with reference to a scatter diagram
- Draw a straight line of best fit by eye

Mean, Median, Mode and Range

- Calculate the mean, median, mode and range for individual and discrete data and distinguish between the purposes for which they are used
- Calculate an estimate of the mean for grouped and continuous data
- Identify the modal class from a grouped frequency distribution

Grade (10)

First Semester

1) Algebra

Algebraic indices

- Use and interpret positive, negative and zero indices
- Use and interpret fractional indices
- Use the rules of indices

Solving Equations

- Solve simultaneous linear equations in two unknowns
- Solve quadratic equations by factorization, completing the square or by use of the formula

Linear Programming

- Represent inequalities graphically and use this representation in the solution of simple linear programming problems

Sequences

- Continue a given number sequence
- Recognize patterns in sequences and relationships between different sequences
- Find the nth term of sequences

2) Number

Accuracy

- Give appropriate upper and lower bounds for data given to a specified accuracy
- Obtain appropriate upper and lower bounds to solutions of simple problems given data to a specified accuracy

Money and Finance

- Use given data to solve problems on personal and small business finance involving earnings, simple interest and compound interest, discount, profit and loss
- Extract data from tables and charts

Exponential Growth and Decay

- Use exponential growth and decay in relation to population and finance

3) Geometry

Similarity

- Calculate lengths of similar figures
- Use the relationships between areas of similar triangles, with corresponding results for similar figures and extension to volumes and surface areas of similar solids

Loci

- Use the following loci and the method of intersecting loci for sets of points in two dimensions which are:
  - at a given distance from a given point
  - at a given distance from a given straight line
  - equidistant from two given points
  - equidistant from two given intersecting straight lines

4) Vectors

Vectors

- Describe a translation by using a vector represented by e.g. $\begin{pmatrix} x \\ y \end{pmatrix}$, $\overrightarrow{AB}$ or **a**.
- Add and subtract vectors
- Multiply a vector by a scalar
- Calculate the magnitude of a vector $\begin{pmatrix} x \\ y \end{pmatrix}$ as $\sqrt{x^2 + y^2}$
- Represent vectors by directed line segments
- Use the sum and difference of two vectors to express given vectors in terms of two coplanar vectors
- Use position vectors

5) Statistics

Cumulative Frequency

- Construct and use cumulative frequency diagrams
- Estimate and interpret the median, percentiles, quartiles and inter-quartile range

Grade (10)

Second Semester

1) Algebra

Graphs in Practical Situations

- Interpret and use graphs in practical situations including travel graphs and conversion graphs
- Draw graphs from given data
- Apply the idea of rate of change to easy kinematics involving distance-time and speed-time graphs, acceleration and deceleration
- Calculate distance travelled as area under a linear speed-time graph

Graphs of Functions

- Construct tables of values and draw graphs for functions of the form ax^n, where a is a rational constant, and n = –2, –1, 0, 1, 2, 3, and simple sums of not more than three of these and for functions of the form a^x, where a is a positive integer
- Solve associated equations approximately by graphical methods
- Draw and interpret graphs representing exponential growth and decay problems
- Estimate gradients of curves by drawing tangents

Functions

- Use function notation, e.g. f(x) = 3x – 5, f: x⟶ 3x – 5, to describe simple functions
- Find inverse functions $f^{-1}(x)$
- Form composite functions as defined by gf(x) = g(f(x))

2) Trigonometry

Trigonometry

- Solve problems using the sine and cosine rules for any triangle and the formula area of triangle = 1/2 ab sin C
- Solve simple trigonometrical problems in three dimensions including angle between a line and a plane

3) Matrices and transformation

Matrices

- Display information in the form of a matrix of any order
- Calculate the sum and product (where appropriate) of two matrices
- Calculate the product of a matrix and a scalar quantity
- Use the algebra of 2 × 2 matrices including the zero and identity 2 × 2 matrices
- Calculate the determinant $|\mathbf{A}|$ and inverse $\mathbf{A^{-1}}$ of a non-singular matrix $\mathbf{A}$

Transformations

- Reflect simple plane figures in horizontal or vertical lines
- Rotate simple plane figures about the origin, vertices or midpoints of edges of the figures, through multiples of 90°
- Construct given translations and enlargements of simple plane figures
- Recognize and describe reflections, rotations, translations and enlargements
- Use the following transformations of the plane: reflection (M), rotation (R), translation (T), enlargement (E)
- Identify and give precise descriptions of transformations connecting given figures
- Describe transformations using co-ordinates and matrices (singular matrices are excluded)

4) Probability

Probability of Single Events

- Calculate the probability of a single event as either a fraction, decimal or percentage
- Understand and use the probability scale from 0 to 1
- Understand that the probability of an event occurring = 1 – the probability of the event not occurring
- Understand relative frequency as an estimate of probability

Probability of Combined Events

- Calculate the probability of simple combined events, using possibility diagrams and tree diagrams where appropriate