REQUEST FOR PROPOSALS:

Evaluation of the IB Middle Years Mathematics Skills Framework

PROJECT OVERVIEW

About the International Baccalaureate Organization

The International Baccalaureate (IB) is a non-profit educational foundation, motivated by its mission to develop inquiring, knowledgeable and caring young people who help create a better and more peaceful world through intercultural understanding and respect. The organization has built a hard-earned reputation for quality, high standards and pedagogical leadership in the field of international education, encouraging students across the world to become engaged world citizens who are active, compassionate and lifelong learners.

Founded in 1968, the IB currently works with more than 4,335 schools in over 150 countries to develop and offer four programs to over a million students aged 3 to 19 years. The organization also provides professional development workshops for more than 70,000 teachers and administrators annually.

Project Background

Over the past decade IB programmes across the world have grown substantially. Current projections estimate 10,000 authorized schools and 2 million IB students by the year 2020. To support the growth and development of the organization’s programmes, the IB Research Department commission studies that seek to identify the impact and value of an IB education, and contribute to the next iteration of its curriculums. As part of this agenda, the current project will examine the IB Middle Years Programme (Students ages 11-16) Mathematics Skills Framework. This means ensuring the skills framework;

1. is a useful tool for curriculum mapping when designing and planning mathematics courses in IB schools.
2. adequately matches its four specified branches of mathematical study to current research about middle school students’ mathematical knowledge, understanding and problem solving learning needs.
3. has sufficient curricular breadth across its specified four branches of mathematical study
4. has sufficient depth within each of its specified four branches of mathematical study
5. adequately describes mathematical skills at both standard and extended levels
6. links sufficiently to IB’s Diploma mathematics programmes at both standard and higher levels.

Schools are ultimately responsible for defining the distinction between standard and extended mathematics courses, however the Middle Years Programme Mathematics Guide defines a topic as ‘extended’ if it prepares students for advanced study when they feature depth and complexity of key topics, develop independent mathematical problem solving, and extend students’ mathematical knowledge and skills to other applications.
This document provides further details about the IB Middle Years programme and outlines the study’s goals, budget, and timelines.

**The International Baccalaureate Middle Years Programme**

The IB Middle Years Programme (MYP), for students aged 11 to 16, provides a framework of learning which encourages students to become creative, critical and reflective thinkers. The programme consists of eight subject groups (including languages, humanities, sciences, mathematics) integrated through six global contexts for learning. The MYP emphasizes intellectual challenge, encouraging students to make connections between their studies in traditional subjects and to the real world. It fosters the development of skills for communication, intercultural understanding and global engagement, qualities that are essential for life in the 21st century. The MYP is designed to accommodate the demands of most national or local curriculums and, like all IB programmes, seeks to support the social, emotional and physical well-being of students. More than 1100 IB World schools globally offer the MYP.

**Curriculum Review**

In 2010, the IB reviewed the design of the entire MYP programme (Harrison, 2015) with the aim of providing a structure that more clearly enables students to be successful in further IB studies while also facilitating schools in combining the MYP with the requirements of national/state systems. This review meant significant changes to each of its curriculums. Subsequent to this programme level review each of the subject groups will continue to undergo a curriculum level review to ensure they remain relevant, and reflect current educational thought in their disciplines. This research is meant to inform the launch of the MYP Mathematics curriculum review cycle.

**The MYP Mathematics Curriculum**

In order to situate the mathematics skills framework, there are four curriculum aspects which need to be taken into account. These curricular aspects are used in conjunction with the Mathematics skills framework to assist teachers and IB world schools in planning and implementing MYP Mathematics. These aspects are infused in all MYP subject groups but are described within the mathematics curriculum specifically below:

- **Conceptual teaching and learning.** All MYP subject groups’ written curriculums are designed to promote a conceptual teaching and learning pedagogical approach. This means the written curriculum focuses on the ‘big ideas’ in a discipline. Within the MYP Mathematics curriculum the big ideas of mathematics translate into key and related concepts. Key concepts are specified in the MYP Mathematics curriculum as form, logic and relationships. Related concepts are specified as change, justification, patterns, simplification, equivalence, measurement, quantity, space, generalization, models, representation and systems.

- **Global Contexts.** These broad contexts direct learning towards independent and shared inquiry into our common humanity and shared guardianship of the planet. Using the world as the broadest context for learning, MYP mathematics aim to develop students’ meaningful explorations of: identities and relationships, orientation in space and time, personal and cultural expression, scientific and technical

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2 Interested vendors can obtain a copy documents relevant to this proposal. These documents are listed in Appendix B. Contact information can be found on page 7.
innovation, globalization and sustainability and fairness and development. These global contexts for teaching and learning are used by teachers to establish statements of inquiry.

- **Statements of Inquiry.** Teachers and students use statements of inquiry to help them ask ‘why it matters’ questions. They are meant to help teachers and students identify factual, conceptual, and debatable inquiry questions within the subjects. Within the MYP Mathematics programme these statements set conceptual understanding in a global context to frame classroom inquiry and direct purposeful learning. An example of a statement of inquiry for mathematics is shown in figure 1 below.

<table>
<thead>
<tr>
<th>Statement of Inquiry</th>
<th>Key concept</th>
<th>Possible project/study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architects and engineers must use finite resources responsibly when they design new structures.</td>
<td>• Form</td>
<td>Geometry and trigonometry—volume</td>
</tr>
<tr>
<td></td>
<td>• Space</td>
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<td>• Quantity</td>
<td></td>
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<td></td>
<td>• Fairness and development</td>
<td></td>
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*Figure 1: Example Statement of Inquiry (International Baccalaureate, 2014a, p. 21)*

- **Approaches to learning (ATL) skills.** As is well understood metacognitive and social skills play a big part in any teaching and learning activities. As such the MYP programme has developed a set of ATL skills that cross all subject groups broadly. Specific subject group guides develop more specifically these skills within their written curriculum. The skills fall into five categories; thinking, social, communication, self-management, and research. An example of a thinking skill from the MYP Mathematics guide is ‘use prioritization and order of precedence in problem-solving’.

**The MYP Mathematics Skills Framework**

The framework for MYP mathematics outlines four branches of mathematical study. These branches are; (1) Number, (2) Algebra, (3) Geometry and Trigonometry, and (4) Statistics and Probability. Each of these branches is linked in the written curriculum to key and related concepts. The written curriculum then further divides the concepts into suggested standard and extended mathematics skills. In the prior version of the MYP Mathematics course this framework included an additional branch, discrete mathematics. For this review the IB is specifically interested in rationales for its inclusion or exclusion as a branch in the current course.

Interested vendors can receive a full copy of both the current and previous mathematics guides upon request. Please see the list of documents that can be given in appendix B. Please see the contact information on page 7 of this proposal to request these documents.

As stated in the beginning of this proposal, the MYP Skills framework is meant to aid teachers and schools in their vertical and horizontal planning across the five years. “Schools are not expected to address all the branches of the framework in each year of the programme, nor are they required to teach every topic or skill suggested in the framework. However, over the five years (or complete duration) of the programme, students should experience learning in all four branches of the framework for mathematics. (International Baccalaureate, 2014, p. 24)”
Mathematics across the IB Programmes

As a part of the larger MYP Programme review, efforts were made to ensure better connections across the continuum of IB programmes; Primary Years to Diploma programmes. It is critical that as a part of this research the vendor examines the extent to which the MYP Mathematics skills framework adequately addresses this continuum. Figure 2 below illustrates this continuum. Further information can be obtained from the list of documents in appendix B which a vendor can receive upon request.

![IB continuum pathways to DP courses in mathematics](image)

**Figure 2:** IB continuum pathways to DP courses in mathematics (International Baccalaureate, 2014a p. 6)

**PROJECT GOALS**

**Research Objective**

This Request for Proposals document issued by the Hague branch offices of the International Baccalaureate invites interested vendors to submit proposals for an evaluation of:

- The MYP mathematics skills framework
- The development of a detailed evaluation framework for investigating the breadth, depth and fit for purpose of the Mathematics skills framework.

**Research Questions**

Research questions for this project may include but are not limited to the following:

**Written Curriculum**

1. How fit for purpose is the MYP Mathematics Skills Framework?
a. Do the four branches as specified reflect current thinking in educational research with regards to middle year’s education mathematical preparation for current and future learners?

b. Is there sufficient breadth across the four branches in the skills framework?

c. Is there sufficient depth in each of the four branches of the skills framework?

d. Are there any gaps in skill coverage the written curriculum should address?

(2) How well does the MYP Mathematics Skills Framework ensure a smooth transition and links between other IB Mathematical studies SL, Mathematics Standard Level and Higher level.

Programme Implementation

(3) What are school perceptions of the MYP Mathematics Skills Framework?
   - Do schools generally feel the skills framework has sufficient depth and breadth to meet the needs of current and future students?

(4) How are schools and teachers using the MYP Mathematics Skills Framework in their planning?
   - Is there sufficient information in the written curriculum to allow schools and teachers in differing contexts to plan horizontally and vertically for a robust mathematics programme in the middle years (ages 10-16)?

(5) What facilitates school success, or acts as stumbling blocks, when implementing the MYP Mathematics Skills Framework?
   - To what extent do schools perceive curriculum materials and related supports provided by the International Baccalaureate to be aiding MYP Mathematics Skills Framework implementation?

(6) Are changes or refinements needed to aspects of the MYP Mathematics skills framework to maximize successful Mathematics programme implementation?

PROJECT DESIGN

To ensure that all components of this research closely reflect organizational needs it is a mandatory requirement of this project that it is conducted in a highly interactive manner.

Regarding the project design, as a general guide, the vendor is expected to employ appropriate mixed-methods approaches to obtain and analyze both quantitative and qualitative data in order to address the study’s key questions in a comprehensive manner. Relevant procedures and methods for this project could include:

- Upon project signing early discussion and activities should focus on fully clarifying and documenting the purpose and needs underpinning the evaluation of the skills framework. This early stage should also be used to make clear the roles and responsibilities of the vendor team and IB staff. Efforts will also be directed to setting out reporting formats and reporting timelines that will have maximal use for the IB and other identified stakeholders.

- In tandem with the above activities, the successful vendor will review relevant MYP documentation and undertake key informant interviews with IB Mathematics Curriculum staff to establish specific details regarding their mathematics programmes.
• Next, research questions 1 and 2 could be addressed through an expert review panel of relevant MYP and IB programme documents. The IB will supply a list of MYP practitioners and desirable organizational representatives that could be considered as part of this review.

• Questions 3 through 6 can be undertaken through a variety of means but due to the time constraints of this call, the IB would like to minimize time consuming methods such as a large scale survey. Suggestions to offset time constraints include conducting a targeted survey, or using virtually conducted structured interviews and/or field data collected at one of our teacher professional development workshops. Additionally collection of teacher responses from within online platforms could also be fruitful, such as running a discussion forum, or questionnaire form which the IB could host. Important points to underline for this and all aspects of the project are that IB MYP schools exist in a wide-range of private and public education settings, and different educational and cultural contexts, which must be reflected in data collection, analysis and reporting.

• Lastly, the successful vendor will be expected to document the processes, activities and learnings that take place throughout the entire project. This documentation will serve to provide a body of evidence upon which the MYP Mathematics review team can draw on for subsequent activities in their review.

Please note that the vendor is expected to consult with the IB research department in the development of the final research plan and choice of data collection instruments (questionnaires, interview questions etc.), as well as the identification of an appropriate sample of IB schools for participation in different aspects of the project. For example, school selection will need to encompass: state supported and independent schools; schools that have been authorized for different time periods, and; schools that also offer the DP and those that do not. Readers with access to the internet can click this text to access a search engine to locate MYP schools in all IB regions.

PROJECT BUDGET

The project budget for the proposed study is approximately US $45,000

KEY PROJECT DELIVERABLES

Key deliverables for this project include:

1. A comprehensive research plan
2. A literature review of the current state of mathematics skills in the middle years
3. Expert panel review report on the MYP Skills Framework
4. An interim report will be needed by November 1st 2016
5. A final report adhering to the highest academic publishing standards
6. A Webinar or suitable presentation of results.

Detailed timelines for project deliverables will be negotiated with the successful vendor following contract signing and the vendor’s familiarization with the i) MYP, and ii) needs and purposes of the evaluation of the mathematics skills framework. However it is expected that most research is consolidated in a draft report by October 20th 2016. This is because the curriculum review committee will be meeting in November and will be using the research to guide
SUBMISSION REQUIREMENTS

All proposals should include the following:
1. A one-page cover letter describing the vendor’s interest in the project and the vendor’s capacity to undertake the project.
2. Description of the services that the vendor will provide.
3. Research design and methodological approach: Descriptions should detail how the research design and methodological approach (including analysis of resulting data) will address the research questions outlined in the RFP.
4. Key personnel and their qualifications: Concise abstract of experiences that explains the background and expertise the vendor will bring to this project. Include CVs or resumes as attachments.
5. Itemized budget.
6. Indicative timeline of evaluation activities and deliverables.

REVIEW PROCESS & CRITERIA

Proposals will be evaluated on their methodological rigor, the feasibility of proposed timelines, and the proposed budget. Members of IB’s research team will review proposals, and will seek input from external research advisors when appropriate. All applicants will be notified of the IB’s decision within a month.

DEADLINES

Review of proposals will begin immediately upon receipt. All proposals received on or before March 12, 2016 will be considered. The project should be completed by December 2016.

Please submit proposals by mail or electronically to:

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References


Appendix A

**Key changes introduced by the Middle Years Programme ‘Next Chapter’**

For institutional, educational and pragmatic reasons, the IB launched a broad review of the MYP in 2010 (Harrison, in press). The MYP ‘Next Chapter project’ resulted in significant changes with respect to the Middle Years Programme’s structure and implementation, curriculum framework and assessment. Major drivers of the review were:

i) A perception in the IB school community that the MYP was difficult and complex to implement (Nicolson and Hannah, 2011, p.35). This was especially true with state sponsored schools which had to contend with local context requirements that did not match easily with the MYP;

ii) Recognition considerations where the MYP programme was under pressure to maintain reliability and manageability in its external assessment model;

iii) The need for developing a programme that fully reflected the IB’s principles of teaching and learning, and was more explicitly integrated within the IB continuum and better supported student transition to the Diploma Programme.

Through cycles of action and reflection, involving the participation of international curriculum experts and MYP practitioners, the following major changes were introduced to the Middle Years Programme:

- The MYP’s concept driven curriculum framework was refined to specify a list of concepts and a two-level structure of conceptual understanding that includes interdisciplinary ‘Key concepts’ and ‘Related concepts’ for selected subjects. MYP ‘Key concepts’ identify certain ideas as having special relevance or resonance for disciplinary subjects.

- The MYP now includes an explicit requirement that collaborative planning and reflection facilitates interdisciplinary learning; In the MYP Guide to school Authorization (International Baccalaureate, 2015) schools must show that they have at least one interdisciplinary unit that includes more than one subject group in each year of the MYP.

- MYP’s former ‘Areas of interaction’ were subsumed within specified ‘Global contexts’ that provide shared starting points for inquiry into what it means to be internationally-minded.

- The MYP’s original ‘fundamental concepts’ were re-cast to more fully reflect the IB’s adoption of the Learner Profile across all programmes in 2006.

- The programme’s inquiry cycle was re-worked to more clearly represent a simpler statement of (social) constructivist learning expressed by the troika of inquiry-action-reflection. This change is intended to make inquiry learning more explicit and reflective of constructivist learning principles.

- The IB’s Approaches to Teaching in Learning (ATL) has become more explicitly incorporated within the MYP. Subsequently, ATL skill categories within the MYP Principles to Practice including Communication, Social, Self-Management, Research, and Thinking are integrated within MYP unit planners. This change has been introduced to provide schools greater pedagogical guidance and to better facilitate the integration of these skills in pedagogical planning and implementation.

- Whereas previously schools were required to offer courses from all eight MYP subject groups, for Years 4-5 schools can now offer six courses consisting of one course from each of the following five subject
groups; Mathematics, Sciences, Language and Literature, Language acquisition and the Humanities. The sixth course can be offered from either ‘Arts’, ‘Design’, or ‘Physical and health education’ subject groups.

- Where formerly the MYP’s external assessment was based solely on school-selected, moderated coursework, the MYP Next Chapter now offers a certification via e-assessments for select courses, in addition to re-vamped moderation requirements for the ‘MYP Project’.
Appendix B

The following documents may be relevant when developing proposals for the current RFP. Vendors can use the contact details provided on page 7 to request the documents.


