

# MYP Objectives and Assessment Criteria

## Mathematics Objectives

### *A. Knowing and understanding*

Knowledge and understanding are fundamental to studying mathematics and form the base from which to explore concepts and develop skills. This objective expects students to demonstrate knowledge and understanding of the concepts and skills of the four branches in the prescribed framework (number, algebra, geometry and trigonometry, and statistics and probability). It assesses the extent to which students can select and apply mathematics to solve problems in both familiar and unfamiliar situations in a variety of contexts.

At the end of the course, students should be able to:

- i. demonstrate knowledge and understanding of the four branches of mathematics (number, algebra, geometry and trigonometry, statistics and probability)
- ii. select appropriate mathematics when solving problems
- iii. apply the selected mathematics successfully when solving problems
- iv. solve problems correctly in both familiar and unfamiliar situations in a variety of contexts.

### *B. Investigating*

Investigating patterns allows students to experience the excitement and satisfaction of mathematical discovery. Working through investigations encourages students to become risk-takers, inquirers and critical thinkers. The ability to inquire is invaluable in the MYP and contributes to lifelong learning.

At the end of the course, 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
- iii. prove, or test and justify, general rules.

### *C. Communicating*

Mathematics provides a powerful and universal language. Students are expected to use appropriate mathematical language and different forms of representation when communicating mathematical ideas, reasoning and findings, both orally and in writing.

At the end of the course, students should be able to:

- i. use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations
- ii. select appropriate forms of mathematical representation to present information
- iii. move between different forms of mathematical representation
- iv. communicate complete, coherent and concise mathematical lines of reasoning
- v. organize information using a logical structure.

### *D. Applying Mathematics*

MYP mathematics encourages students to see mathematics as a tool for solving problems in an authentic real-life context. Students are expected to transfer theoretical mathematical knowledge into real-world situations and apply appropriate problem-solving strategies, draw valid conclusions and reflect upon their results.

At the end of the course, students should be able to:

- i. identify relevant elements of authentic real-life problems
- ii. select appropriate mathematics when solving authentic real-life problems
- iii. apply the selected mathematics successfully to reach a solution
- iv. justify the degree of accuracy of a solution
- v. justify whether a solution makes sense in real life

## Mathematics Assessment Criteria

The following objectives and assessment criteria have been established by the IB for mathematics in the MYP. All assessment in each year of the MYP must be based on the age-appropriate version of these assessment criteria, as provided in this guide.

Criterion A	Knowing and Understanding	Maximum 8
Criterion B	Investigating	Maximum 8
Criterion C	Communicating	Maximum 8
Criterion D	Applying Mathematics	Maximum 8

For each assessment criterion, a number of band descriptors are defined. These describe a range of achievement levels, with the lowest represented as 0.

### Criterion A: Knowing and Understanding

Maximum: 8

At the end of the course, students should be able to:

- i. demonstrate knowledge and understanding of the four branches of mathematics (number, algebra, geometry and trigonometry, statistics and probability)
- ii. select appropriate mathematics when solving problems
- iii. apply the selected mathematics successfully when solving problems
- iv. solve problems correctly in both familiar and unfamiliar situations in a variety of contexts.

Achievement  
Level

### Level Descriptor Year 5

<b>0</b>	The student does not reach a standard described by any of the descriptors below.
<b>1–2</b>	The student: <ul style="list-style-type: none"> <li>• selects appropriate mathematics when solving simple problems in familiar situations</li> <li>• applies the selected mathematics successfully when solving these problems</li> <li>• generally solves these problems correctly.</li> </ul>
<b>3–4</b>	The student: <ul style="list-style-type: none"> <li>• selects appropriate mathematics when solving more complex problems in familiar situations</li> <li>• applies the selected mathematics successfully when solving these problems</li> <li>• generally solves these problems correctly.</li> </ul>
<b>5–6</b>	The student: <ul style="list-style-type: none"> <li>• selects appropriate mathematics when solving challenging problems in familiar situations</li> <li>• applies the selected mathematics successfully when solving these problems</li> <li>• generally solves these problems correctly.</li> </ul>
<b>7–8</b>	The student: <ul style="list-style-type: none"> <li>• selects appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations</li> <li>• applies the selected mathematics successfully when solving these problems</li> <li>• generally solves these problems correctly.</li> </ul>

**Criterion B: Investigating**

**Maximum: 8**

At the end of the course, 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
- iii. prove, or test and justify, general rules.

Achievement  
Level

Level Descriptor  
Year 5

0	The student does not reach a standard described by any of the descriptors below.
1–2	The student: <ul style="list-style-type: none"><li>• applies, with teacher support, mathematical problem-solving techniques to discover patterns</li><li>• makes predictions consistent with patterns.</li></ul>
3–4	The student: <ul style="list-style-type: none"><li>• applies mathematical problem-solving techniques to discover patterns</li><li>• suggests general rules consistent with findings.</li></ul>
5–6	The student: <ul style="list-style-type: none"><li>• selects and applies mathematical problem-solving techniques to discover complex patterns</li><li>• describes these patterns as general rules consistent with findings</li><li>• tests the validity of these general rules.</li></ul>
7–8	The student: <ul style="list-style-type: none"><li>• selects and applies mathematical problem-solving techniques to discover complex patterns</li><li>• describes these patterns as general rules consistent with correct findings</li><li>• proves, or tests and justifies, these general rules.</li></ul>

### Criterion C: Communicating

Maximum: 8

At the end of the course, students should be able to:

- i. use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations
- ii. select appropriate forms of mathematical representation to present information
- iii. move between different forms of mathematical representation
- iv. communicate complete, coherent and concise mathematical lines of reasoning
- v. organize information using a logical structure.

Achievement  
Level

### Level Descriptor Year 5

0	The student does not reach a standard described by any of the descriptors below.
1–2	The student: <ul style="list-style-type: none"><li>• attempts to use appropriate mathematical language</li><li>• attempts to use different forms of mathematical representation</li><li>• communicates lines of reasoning that are difficult to follow.</li></ul>
3–4	The student: <ul style="list-style-type: none"><li>• sometimes uses appropriate mathematical language</li><li>• uses different forms of mathematical representation</li><li>• communicates lines of reasoning that can be followed, although these are not always clear</li><li>• attempts to organize information using a logical structure.</li></ul>
5–6	The student: <ul style="list-style-type: none"><li>• generally uses appropriate mathematical language</li><li>• selects and uses appropriate forms of mathematical representation to present information</li><li>• moves between different forms of mathematical representation with some success</li><li>• communicates lines of reasoning that are complete and coherent</li><li>• presents work that is partly organized using a logical structure.</li></ul>
7–8	The student: <ul style="list-style-type: none"><li>• consistently uses appropriate mathematical language</li><li>• consistently selects and uses appropriate forms of mathematical representation to present information</li><li>• moves effectively between different forms of representation</li><li>• communicates complete, coherent and concise lines of reasoning</li><li>• presents work that is organized using a logical structure.</li></ul>

### Criterion D: Applying Mathematics

Maximum: 8

At the end of the course, students should be able to:

- i. identify relevant elements of authentic real-life problems
- ii. select appropriate mathematics when solving authentic real-life problems
- iii. apply the selected mathematics successfully to reach a solution
- iv. justify the degree of accuracy of a solution
- v. justify whether a solution makes sense in real life

Achievement  
Level

### Level Descriptor Year 5

Achievement Level	Level Descriptor
0	The student does not reach a standard described by any of the descriptors below.
1–2	The student: <ul style="list-style-type: none"><li>• identifies some of the elements of the authentic real-life situation</li><li>• attempts to apply mathematics to find a solution.</li></ul>
3–4	The student: <ul style="list-style-type: none"><li>• identifies the relevant elements of the authentic real-life situation</li><li>• selects, with some success, appropriate mathematics to model the situation</li><li>• applies the selected mathematics to reach a solution</li><li>• attempts to explain whether the solution makes sense in the context of the real-life situation.</li></ul>
5–6	The student: <ul style="list-style-type: none"><li>• identifies the relevant elements of the authentic real-life situation</li><li>• selects appropriate mathematics to model the situation</li><li>• applies the selected mathematics to reach a valid solution</li><li>• attempts to justify the degree of accuracy of the solution</li><li>• explains whether the solution makes sense in the context of the real-life situation.</li></ul>
7–8	The student: <ul style="list-style-type: none"><li>• identifies the relevant elements of the authentic real-life situation</li><li>• selects the most appropriate mathematics to model the situation</li><li>• applies the selected mathematics to reach a correct solution</li><li>• justifies the degree of accuracy of the solution</li><li>• critically explains whether the solution makes sense in the context of the real-life situation.</li></ul>