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| **2014-2015 MYP MATHEMATICS DESIGN RUBRIC YEAR 3 (GRADE 8) NAME: Date:** |
| **MYP CRITERIA**  | **DESCRIPTORS** |
| **A. KNOWING AND UNDERSTANDING** | **MYP** |  | **ACHIEVEMENT LEVEL DESCRIPTOR** |
| At the end of year 3, students should be able to:* **select** appropriate mathematics when solving problems in both familiar and unfamiliar situations
* **apply** the selected mathematics successfully when solving problems
* **solve** problems correctly in a variety of contexts.
 | **0** |  | * The student does not reach a standard described by any of the descriptors below.
 |
| **1-2** |  | The student is able to:* **select** appropriate mathematics, when solving simple problems in familiar situations
* **apply** the selected mathematics successfully when solving these problems
* generally **solve** these problems correctly.
 |
| **3-4** |  | The student is able to:* **select** appropriate mathematics, when solving more *complex* problems in familiar situations
* **apply** the selected mathematics successfully when solving these problems
* generally **solve** these problems correctly in a variety of contexts.
 |
| **5-6** |  | The student is able to:* **select** appropriate mathematics, when solving *challenging* problems in familiar situations
* **apply** the selected mathematics successfully when solving these problems
* generally **solve** these problems correctly in a variety of contexts.
 |
| **7-8** |  | The student is able to:* **select** appropriate mathematics, when solving challenging problems in both familiar and *unfamiliar* situations
* **apply** the selected mathematics successfully when solving these problems
* generally **solve** these problems correctly.
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| **B. INVESTIGATING PATTERNS** | **MYP** |  | **ACHIEVEMENT LEVEL DESCRIPTOR** |
| At the end of year 3, students should be able to:* **select** and **apply** mathematical problem-solving techniques to discover complex patterns
* **describe** patterns as relationships and/or general rules consistent with findings
* **verify** and **justify** relationships and/or general rules.
 | **0** |  | * The student does not reach a standard described by any of the descriptors below.
 |
| **1-2** |  | The student is able to: * **apply** with teacher support, mathematical problem-solving techniques to discover simple patterns
* **state** predictions consistent with patterns.
 |
| **3-4** |  | The student is able to: * **apply** with mathematical problem-solving techniques to discover simple patterns
* ***suggest*** *relationships and/or general rules consistent with findings****.***
 |
| **5-6** |  | The student is able to: * ***select*** and **apply** with mathematical problem-solving techniques to discover *complex* patterns
* ***describe*** *patterns as relationships* and/or general rules consistent with findings**.**
 |
| **7-8** |  | The student is able to: * **select** and **apply** with mathematical problem-solving techniques to discover complex patterns
* **describe** patterns as relationships and/or general rules consistent with *correct* findings**.**
* ***verify*** *and* ***justify*** these relationships and/or general rules.
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| **C. COMMUNICATING** | **MYP** |  | * **ACHIEVEMENT LEVEL DESCRIPTOR**
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| At the end of year 3, students should be able to:* **Use** appropriate mathematical languages (notation, symbols and terminology) in both oral and written *explanations*
* **Use** different forms of mathematical representation to present information
* Move between different forms of mathematical representation
* **Communicate** complete and coherent mathematical lines of reasoning
* **Organize** information using a logical structure.
 | **0** |  | * The student does not reach a standard described by any of the descriptors below.
 |
| 1-2 |  | The student is able to: * **use** limited mathematical language
* **use** limited forms of mathematical representation to **present** information
* **communicate** through lines of reasoning that are difficult to *interpret.*
 |
| 3-4 |  | The student is able to: * **use** *some appropriate* mathematical language
* **use** *different* forms of mathematical representation to **present** information *adequately*
* **communicate** through lines of reasoning that are *able to be understood*, *although these are not always clear*
* *adequately* ***organize*** *information using a logical structure.*
 |
| 5-6 |  | The student is able to: * *usually* **use** appropriate mathematical language
* **use** different forms of mathematical representation to **present** information *correctly*
* **communicate** through lines of reasoning that are able to be understood, although these are not always *coherent or complete*
* *present* work that is *usually* **organized** in a logical structure.
 |
| 7-8 |  | The student is able to: * *Consistently* **use** appropriate mathematical language
* **use** different forms of mathematical representation to *consistently* **present** information correctly
* move effectively between different forms of mathematical representation
* **communicate** through lines of reasoning that are complete and coherent
* present work that is *consistently* **organized** in a logical structure.
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| **D. APPLYING MATHEMATICS IN REAL-LIFE** | **MYP** |  | **ACHIEVEMENT LEVEL DESCRIPTOR** |
| At the end of year 3, students should be able to:* **identify** relevant elements of authentic real-life situations
* **select** appropriate mathematical strategies when solving authentic real-life situations
* **apply** the selected mathematical strategies successfully to reach a solution
* **explain** the degree of accuracy of a solution
* **explain** whether a solution makes sense in the context of the authentic real-life situation.
 | **0** |  | * The student does not reach a standard described by any of the descriptors below.
 |
| **1-2** |  | **The students is able to:** * **Identify** some of the elements of the authentic real-life situation
* **Apply** mathematical strategies to find a solution to the authentic real-life situation, with limited success.
 |
| **3-4** |  | **The students is able to:** * **Identify** the *relevant* elements of the authentic real-life situation
* ***select****, with some* success, *adequate* mathematical strategies to model the authentic real-life situation
* **apply** mathematical strategies to find a solution to the authentic real-life situation
* ***describe*** *whether the solution makes sense in the context of the authentic real-life situation*
 |
| **5-6** |  | **The students is able to:** * **Identify** the relevant elements of the authentic real-life situation
* **select**, appropriatemathematical strategies to model the authentic real-life situation
* **apply** mathematical strategies to *reach a valid solution* to the authentic real-life situation
* ***discuss*** whether the solution makes sense in the context of the authentic real-life situation.
 |
| **7-8** |  | **The students is able to:** * **Identify** the relevant elements of the authentic real-life situation
* **select**, appropriatemathematical strategies to model the authentic real-life situation
* **apply** the selectedmathematical strategies to reach a *correct* solution
* ***explain*** *the degree of accuracy of the solution*
* ***explain*** whether the solution makes sense in the context of the authentic real-life situation.
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## Mathematics Glossary

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| Term |  Definition |

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| Authentic real-life  | Relevant, meaningful and grounded in reality  |
| Challenging  | Demanding problems of high complexity that require students to have mathematical insight to be able to use knowledge and/or skills taught  |
| Context  | The setting of the problem  |
| Familiar situations  | Problems similar to those seen previously in which students are required to use knowledge and/or skills they have been taught  |
| Form  | This concept refers to the understanding that the underlying structure and shape of an entity is distinguished by its properties. Form provides opportunities for students to appreciate the aesthetic nature of the constructs used in mathematics.  |
| Forms of mathematical representation  | Words, formulae, diagrams, tables, charts, graphs and models used to represent mathematical information  |
| Investigation  | A task where, to varying degrees, students are given opportunities to pose questions, select problem-solving techniques, discover patterns, make generalizations and communicate their findings  |
| Justification  | Valid reasons or evidence that support the conclusion and explain why the rule works  |
| Lines of reasoning  | A connected sequence of steps  |
| Logic  | This concept is the basic tool used in mathematics to make conclusions about numbers, shapes and variables. Logic structures the reasoning process through which knowledge is built. It enables students to assess the truth of conclusions and transfer mathematical learning to other situations.  |
| Logical structure  | A general layout that prevents the need for going back and forth (between the task sheet and the student work and within the student work) in order to understand and follow the work  |
| Mathematical language  | The use of notation, symbols, terminology and verbal explanations  |
| Pattern  | The underlining order, regularity or predictability of the elements of a mathematical system. The repetitive features of patterns can be identified and described as relationships or general rules.  |
| Problem-solving techniques  | Strategies students use to solve problems (for example, make a table or chart, solve a simpler problem, work backwards, draw a picture, guess and check, and so on)  |
| Relationships  | This concept refers to the connections between quantities, properties or concepts; these connections may be expressed as models, rules or statements. Relationships provide opportunities for students to explore patterns in the world around them.  |
| Teacher support  | Advice given by the teacher to aid students with elements of the task (for example, to allow a student to start solving the problem)  |

## Command terms

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| Term | Definition |
| Apply  | Use knowledge and understanding in response to a given situation or real circumstances. Use an idea, equation, principle, theory or law in relation to a given problem or issue.  |
| Communicate  | Express oneself in such a way that one is readily and clearly understood. Convey information about the exchange of thoughts, messages, or information through, for example, speech, signals, writing or behaviour.  |
| Describe  | Give a detailed account or picture of a situation, event, pattern or process.  |
| Discuss  | Offer a considered and balanced review that includes a range of arguments, factors or hypotheses. Opinions or conclusions should be presented clearly and supported by appropriate evidence.  |
| Explain  | Give a detailed account including reasons or causes.  |
| Identify  | Provide an answer from a number of possibilities. Recognize and state briefly a distinguishing fact or feature.  |
| Justify  | Give valid reasons or evidence to support an answer or conclusion.  |
| Organize | Arrange into a structured order. |
| Present | Offer for display, observation, examination or consideration. |
| Select  | Choose from a list or group.  |
| Solve  | Obtain the answer(s) using algebraic and/or numerical and/or graphical methods.  |
| Use | Apply knowledge or rules to put theory into practice. |
| Verify | To confirm the truth, accuracy or correctness of something. |
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