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| Instructions for Using Remote Learning Projects |
| These materials were developed with the intention of easing the transition between in-class and temporary remote learning. Learning experiences are aligned with curricular outcomes and assessment tools have been included with each project.  **Note:**   * 1. The teacher either sends a link to the appropriate project or sends the document itself.   2. The teacher ensures that parents/caregivers receive any required school supplies (bin with pencils, markers, paper, etc.).   3. The teacher reassures parents/caregivers that communication will be maintained between home and school.   4. Parents/caregivers may access additional resources at:      + My Learning at Home ([www.edu.gov.mb.ca/k12/mylearning](http://www.edu.gov.mb.ca/k12/mylearning))      + My Child in School ([www.edu.gov.mb.ca/k12/mychild/index.html](http://www.edu.gov.mb.ca/k12/mychild/index.html)) |

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| PROJECT OVERVIEW | |
| Grade: | 8 |
| Main Subject: | Mathematics |
| Big Idea: | * Patterns can be represented in a variety of ways * Algebra, with the use of symbols or variables, expressions, and equations, is a tool for generalizing and representing mathematical situations and patterns in our world * Relationships between quantities can be described using rules involving variables |
| Title: | PLAYING WITH PATTERNS |
| Strand: | Patterns and Relations |
| Duration: | 1–2 weeks |
| Materials: | Internet Accessible Device (if available), paper, pencil, non-permanent surface (personal white board), and dry erase markers |
| Short Description: | This collection of tasks is designed around the concept of patterns and relations as well as using patterns to solve problems. The sections (coloured blocks on Slide 6 of the PowerPoint presentation) represent independent sets of learning experiences that could function effectively as 45 minute to 1 hour sessions with a combination of synchronous and asynchronous parts, some of which are easily adaptable either way depending on your situation and access to technology and connectivity. |

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| Learning Outcomes |
| Mathematics: [www.edu.gov.mb.ca/k12/cur/essentials/docs/glance\_kto9\_math.pdf](http://www.edu.gov.mb.ca/k12/cur/essentials/docs/glance_kto9_math.pdf)  8.PR.1, 8.PR.2  English Language Arts: www.edu.gov.mb.ca/k12/cur/ela/index.html |

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| Assessment | | | | | | | | | | | | | |
| LANGUAGE ARTS | | | | | MATHEMATICS | | | SCIENCE | | | SOCIAL STUDIES | | |
| COMP.  Listening &  Viewing | COMP.  Reading | COMM. Speaking & Represent. | COMM. Writing | Critical Thinking | Knowledge  and  Understanding | Mental Math &  Estimation | Problem Solving | Knowledge  and Understanding | Scientific Inquiry Process | Design Process &  Problem Solving | Knowledge  and Understanding | Research  and Communication | Critical Thinking and  Citizenship |
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| Original concept created by: | T. Scott Dempster and Heather Jones |

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| Learning Experiences and Assessment |
| Overall |
| Teacher’s instructions  This collection of tasks is designed around the concept of patterns and relations as well as using patterns to solve problems. The sections (coloured blocks on Slide 6 of the PowerPoint presentation) represent independent sets of learning experiences that could function effectively as 45 minute to 1 hour sessions with a combination of synchronous and asynchronous parts, some of which are easily adaptable either way depending on your situation and access to technology and connectivity.  Each section provides a different way of engaging with the concept and is divided into three main parts:   1. **Get Ready** begins the experience with an activity meant to activate student thinking and promote rich student discourse. This activity can be delivered prior to the lesson as an asynchronous task so students have time to prepare their thinking. It can also be delivered at the beginning of the synchronous session to help the teacher pre-assess prior knowledge and prime thinking for the upcoming learning experience. 2. **Work It Out** comprises the main learning experience for the day. This is where new content is presented and individual or small-group responses are required. These activities are best completed with students working in pairs or small groups. If your platform allows for breakout rooms, this feature is a good tool that will facilitate student collaboration and discourse. 3. **Look Back** is a final culminating task that provides opportunities to check for student understanding of the concepts, consolidate different solutions, and solve problems. It allows for students to reflect on their learning and make connections.   Step-by-step instructions for students:  These will need to be provided by the teacher in terms of what parts will be student-led and those that will be teacher-led. More detailed instructions for each learning experience are included in the NOTES section under each slide. |

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| APPENDIX (Printable Support Materials Including Assessment) |
| Grade 8: Playing with Patterns.pptx Grade 8: Playing with Patterns Rubric.docx |

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| **Playing with Patterns Rubric** | | | | |
| **Student:** | ***Basic descriptors to help guide your formative assessments.*** | | | |
| **Full details of the student achievement profiles can be found here:**  [**Knowledge**](https://www.edu.gov.mb.ca/k12/assess/report_cards/grading/docs/math_knowledge_understanding.pdf) **and Understanding**  [**Mental Math and Estimation**](https://www.edu.gov.mb.ca/k12/assess/report_cards/grading/docs/mental_math.pdf)  [**Problem Solving**](https://www.edu.gov.mb.ca/k12/assess/report_cards/grading/docs/math_problem_solving.pdf) | **Requires considerable ongoing teacher support.** | **Requires occasional teacher or peer support.** | **Accurate, clear, and uses appropriate strategies and procedures. Requires occasional prompting for clarification.** | **Accurate, clear, flexible, consistent, and efficient. Justifies and explains reasoning clearly and completely, using accurate math vocabulary.** |
|  | **Limited** | **Basic** | **Good** | **Very Good/Excellent** |
| ***Tracking student data throughout these learning experiences allows the teacher to make an informed assessment  about a student’s level of achievement of these outcomes.*** | | | | |
| Understands that patterns can be represented in a variety of ways |  |  |  |  |
| Represent and describe patterns and relationships using a table of values and a linear relation |  |  |  |  |
| Demonstrates understanding of the connections that exist between visual patterns, tables of values and equations |  |  |  |  |
| Given any representation of a pattern, can produce the other representations (including a graph) |  |  |  |  |
| Describes the relationship between the variables of a graph of a linear relation |  |  |  |  |
| Gathers information from the graph of a linear relation and can represent the pattern in an alternate form |  |  |  |  |
| Determine future terms of a pattern to solve problems |  |  |  |  |
| Applies understanding of patterns to design an appropriate cost structure for the “Shiny New Company” mini-project |  |  |  |  |

**Suggested Codes for daily record keeping purposes:**

* I – Knowledge has been demonstrated individually
* H – Used when knowledge has been demonstrated individually, but with help from the teacher or a peer
* G – Used when knowledge has been demonstrated within a group
* X – Used when a question has been attempted but answered incorrectly
* N – Used when a question has not been attempted

Adapted from: Liljedahl, P. (2021). *Building thinking classrooms in mathematics, grades K-12: 14 teaching practices for enhancing learning*. Thousand Oaks, CA: Corwin Press Inc.