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**CODE/MOE/UOIT Makerspaces Project**

**Lesson Plan: Grade 5 Mathematics:**

**LEGO Perimeter Measurement**

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| **BIG IDEAS:**  ***Developing and applying perimeter relationships for a rectangle—the length of the sides of objects have a relationship to the shape’s overall measurements and its perimeter.***  **Curriculum Expectations:**  **Grade 5 Measurement**  **-estimate and measure the perimeter and area of regular and irregular polygons using a variety of tools**  **-create through investigation using a variety of tools and strategies, two-dimensional shapes with the same perimeter or the same area**  **-determine, through investigation using a variety of tools, the relationships between the length and width of a rectangle and its area and perimeter and generalize to develop the formulas** | |
| **Learning Goals:**  “We are learning to…”  Measure and calculate perimeter using LEGO | **Success Criteria:**  “We will be successful when…”  We have built a structure with a perimeter of 400 units |
| **Lesson Overview:**  **Students will be ‘making’ using LEGO to demonstrate their understanding of perimeter and its relationship to side lengths.** | |
| **Materials and Technology:**  -LEGO bins (borrowed from the Makerspace)  -paper  -pencils/markers  -calculators (optional) | |
| **Student Accommodations/Modifications:**  **-quiet space**  **-teacher/EA support**  **-alter the expectations (number of units in the perimeter for certain students)** | **Lesson will be differentiated by:**   * **Content, specifically: change the goal of 400 units perimeter to a more manageable number for students with learning difficulties (e.g. a perimeter of 40)** * **Process, specifically: Teacher/EA support** * **Product, specifically: same as content** * **Environment, specifically: Quiet space** |
| **MINDS ON: Getting Started** | |
| During this phase, the teacher may ask:  What does perimeter mean?  How do we find it?  • activate students’ prior knowledge;  • engage students by posing thought-provoking questions;  • gather diagnostic and/or formative assessment data through observation and questioning;  • discuss and clarify the task(s). | During this phase, students may:  • participate in discussions;  • propose strategies;  • question the teacher and their classmates;  • make connections to and reflect on prior learning. |
| Students will be asked to work in pairs or small groups of 3-4 (ability grouping).   * Use the LEGO to build a structure with a perimeter of 400 units.   This task can be used as a diagnostic assessment to see what kids already know about perimeter, or in the middle of a unit to see where they are at with the expectations and what next steps you may need to take. | |
| **ACTION: Working on it** | |
| During this phase, the teacher may:  • ask probing questions;  • clarify misconceptions, as needed, by redirecting students through questioning;  • answer students’ questions (but avoid providing a solution to the problem);  • observe and assess;  • encourage students to represent their thinking concretely and/or pictorially;  • encourage students to clarify ideas and to pose questions to other students. | During this phase, students may:  • represent their thinking (using numbers, pictures, words, manipulatives, actions, etc.);  • participate actively in whole group, small group, or independent settings;  • explain their thinking to the teacher and their classmates;  • explore and develop strategies and concepts. |
| **Students may have difficulty deciding what a ‘unit’ is when building with the LEGO (eg. Is it each circle on the LEGO, or a 4x4 piece?). They will demonstrate their understanding by building a structure with the proper perimeter. This will take some time, problem solving, and different strategies to complete. They will write/draw what they did on paper using pictures, numbers, words so that others can understand their process/ product when we do a gallery walk. Data can be taken using a checklist, with anecdotals. Also, you can keep the paperwork and take pictures of the buildings.** | |
| **CONSOLIDATION: Reflecting and Connecting** | |
| During this phase, the teacher may:  • bring students back together to share and analyse strategies;  • encourage students to explain a variety of learning strategies;  • ask students to defend their procedures and justify their answers;  • clarify misunderstandings;  • relate strategies and solutions to similar types of problems in order to help students generalize concepts;  • summarize the discussion and emphasize key points or concepts. | During this phase, students may:  • share their findings;  • use a variety of concrete, pictorial, and numerical representations to demonstrate their understandings;  • justify and explain their thinking;  • reflect on their learning. |
| We will do a gallery walk first, so students can share their work and see different strategies that others may have used. We will do a circle share at the end to debrief.  What worked? What didn’t? Why were some of the structures different shapes and sizes even thought they had the same perimeter?  What were some strategies that helped you to find the perimeter? Could you use any of these strategies to help you calculate the area?  This lesson can be extended to include the concept of area. | |