

**CODE/MOE/UOIT Makerspaces Project-**

**School Board: Wellington Catholic District School Board**

**Grade(s): 4 - 5**

**Subject(s): Measurement: Area & Perimeter**

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| **BIG IDEAS:**  Shapes with the same area can have a much different perimeter.  **Curriculum Expectations:**  **OVERALL:**  Using units when describing a measurement makes it easier to describe and compare it to the measurements of other objects;  Some measurements of an object are independent of other measurements of that object, but some are related.  **SPECIFIC:**  Compare, using a variety of tools, two-dimensional shapes that have [the same perimeter or] the same area (4M57). | |
| **Learning Goals: “We are learning to...**  -Recognize how the meaning of perimeter and area differ.  -Explain how comparing the values for the perimeter and area of a shape provides information about what the shape looks like.  -Recognize that shapes can have the same area but look different.” | **Success Criteria: “We will be successful when...**  -we create at least two different race tracks with an area of 36cm2.  -we correctly calculate their perimeters and explain why we chose the unit and strategy we used to measure perimeter.  -we make two race tracks with perimeters that are very different in size.  -we can describe differences between race tracks with bigger perimeters and race tracks with smaller perimeters.” |
| **Lesson Overview:**  Challenge: Make two or more shapes with an area of 36cm2 .  Create two or more shapes with an area of 36cm2. (Use grid paper and an ozobot friendly marker).  Predict which shape an ozobot will be able to go around faster.  Calculate the perimeter of each shape. (adjust your predictions if necessary).  Test your predictions with the ozobot. | |
| **Materials and Technology:**   * Markers * 1cm2 grid paper or Grid chart paper. * Rulers * Ozobots * Timer | |
| **Student Accommodations/Modifications:**   * You could make the area smaller than 36 cm2. (20cm2 might be an easier number for some students.) * You could insist that the shape is a rectangle. * To make it more difficult, you could increase the area. (64cm2 for example) * Insist that they use irregular shapes. | **Lesson will be differentiated by:**   * **Content, specifically:** * **Process, specifically:** * **Product, specifically:** * **Environment, specifically:** |
| **MINDS ON: Getting Started** | |
| During this phase, the teacher may:  • 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. |
| **Describe how you will introduce the learning activity to your students.**  Minds On:  Use 4 large pieces of paper, place two of them side by side and two of side by side with one a little higher than the other.    **What key questions will you ask?**  How many steps will it take to go around each one?  Explain your estimate.  Test your prediction.  How close was your prediction?  Is the area of each shape different?  **How will students be grouped? How will materials be distributed?**  Students should be put into groups of 2 to 4 depending on the availability of ozobots**.** | |
| **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. |
| **Describe the task(s) in which your students will be engaged.**   1. Creating several shapes with an area of 36cm2 2. Use an ozobot marker to trace over the shape. 3. Predict which shape the ozobot will go around the fastest. 4. Measure the perimeter of each shape. 5. Adjust predictions if necessary. 6. Test the ozobot on the shapes. Time it.   **What misconceptions or difficulties do you think they might experience?**   1. Students may miscalculate the perimeter because they miss one of their sides. (Students could be instructed to use a different colour marker to identify each side.)   **How will they demonstrate their understanding of the concept?**  Students will answer these 3 questions orally or written:  1. What strategies did you use to determine the perimeters of your shapes?   1. Why do the perimeters of some shapes have values so much greater than the perimeters of others? 2. What is main difference between the shapes with larger perimeters compared to the shapes with smaller perimeters?   **How will you gather your assessment data (e.g., checklist, anecdotal records)?**  Observation, notes.  The key would be discuss question 3 above to see if they notice that thin shapes have larger perimeters than wider shapes.  **What extension activities will you provide?**  Students could complete the same activity with a larger area. | |
| **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. |
| **How will you select the individual students or groups of students who are to share their work with the class (i.e., to demonstrate a variety of strategies, to show different types of representations, to illustrate a key concept)?**  Ask: Who thinks they created the shape with the largest perimeter?  Who thinks they created the shape with the smallest perimeter?  Have volunteers show their work based on that question.  **What key questions will you ask during the debriefing?**  Same 3 questions that are listed above. | |