

**CODE/MOE/UOIT Makerspaces Project--Lesson Planning Template**

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

**Grade(s): 4**

**Subject(s): Math - Geometry**

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| **BIG IDEAS: Applying knowledge of quadrilateral properties to code a drawing of them in Scratch.**  **Curriculum Expectations:**  **OVERALL:** identify quadrilaterals and three-dimensional figures and classify them by their geometric properties, and compare various angles to benchmarks;  **SPECIFIC:** identify and compare different types of quadrilaterals (i.e., rectangle, square, trapezoid, parallelogram, rhombus) and sort and classify them by their geometric properties (e.g., sides of equal length; parallel sides; symmetry; number of right angles). | |
| **Learning Goals: “We are learning to...**  Draw a shape on scratch by using its properties to create the correct code." | **Success Criteria: “We will be successful when...**  1. we code three different quadrilaterals in Scratch: a square, rectangle, and parallelogram.  2. we can demonstrate how the properties of the shape influenced the code. (E.g. a rectangle has 2 pairs of equal sides so I moved my sprite 50 steps and 100 steps and repeated this twice.)” |
| **Lesson Overview:**  **Students will draw quadrilateral shapes using a sprite in Scratch.**  **For a simple example of a square see here:** [**https://scratch.mit.edu/projects/216756772/#editor**](https://scratch.mit.edu/projects/216756772/#editor)  **For a more complex example of other quadrilaterals, see here:**  <https://scratch.mit.edu/projects/215904777/#editor> | |
| **Materials and Technology:**   * A computer or chromebook per pair of students (or per student if you prefer) * A computer hooked up to a projector. | |
| **Student Accommodations/Modifications:**  **Goal is to code a rectangle, square and parallelogram in Scratch.**  **Some students could be tasked with only coding a square and rectangle.**  **Advanced students could be given the challenge of coding a rhombus, kite, and or trapezoid.** | **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.**  We will have already completed a lesson on sorting quadrilaterals and reviewed geometric properties of quadrilaterals.  To introduce this activity, activate students’ prior knowledge on properties of quadrilaterals and then have students provide “programming” directions so that you walk each shape.  **What key questions will you ask?**  What are some properties of a square?  What are some properties of a rectangle?  What are some properties of a parallelogram?  What instructions do you need to give me to ensure that I walk the shape of a square? Rectangle? Parallelogram? Rhombus? (Write these down on the board for at least one shape.)  How do the properties of these shapes help you understand what instructions to give?  **How will you gather diagnostic or formative data about the students’ current levels of understanding?**  The previous lesson will be useful in providing formative information.  **How will students be grouped? How will materials be distributed?**  Students should be placed in groups of two. Student who have more experience and knowledge using Scratch should be paired with students with less experience. | |
| **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.**  Students will attempt to code a square, rectangle and parallelogram in Scratch.  **What misconceptions or difficulties do you think they might experience?**   * When what students code isn’t doing what they expect, ask them to look at it carefully and try to analyze what might be wrong themselves, rather than fixing it for them. * Students might struggle with the codes related to the pen. You may want them to start with the templated linked below. The actual code for the shape would need to go in between “Pen up” and “Pen down.”   <https://scratch.mit.edu/projects/216756772/#editor>  **How will they demonstrate their understanding of the concept?**  By successfully coding these shapes.  Getting the sprite to turn 90 degrees for rectangles and squares.  Getting the sprite to move two different lengths for rectangles and parallelograms.  **How will you gather your assessment data (e.g., checklist, anecdotal records)?**  Observation  Checklists.  **What extension activities will you provide?**  Coding a rhombus, trapezoid, and kite are all a little bit more difficult but students who successfully code a rectangle, square and parallelogram could attempt them. | |
| **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)?**  By observation.  I would try to find two pairs that accomplished the goal but may have slight variations in their coding.  I would also try to find a pair that was able to code a kite, rhombus or trapezoid to show the class.  **What key questions will you ask during the debriefing?**  Why did you decide to use this code?  How did your code for the parallelogram differ from the code for the rectangle?  How did your code for the rectangle differ from the code for the square? How was it the same? Why? | |