

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

**School Board: Grand Erie District School Board**

**Grade(s): Grade 6**

**Subject(s): Mathematics/Science**

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| **BIG IDEAS:**  **Math:** Both quantitative and qualitative attributes of a geometric object can impact measurements associated with that object.  **Science:** Electrical energy can be transformed into other forms of energy.  Other forms of energy can be transformed into electrical energy.  **Curriculum Expectations:**  **OVERALL:**  **Math:**   * estimate, measure, and record quantities, using the metric measurement system; * determine the relationships among units and measurable attributes, including the area of a parallelogram, the area of a triangle, and the volume of a triangular prism.   **Science**   * demonstrate an understanding of the principles of electrical energy and its transformation into and from other forms of energy.   **SPECIFIC:**  **Math**   * solve problems requiring conversion from larger to smaller metric units; * solve problems involving the estimation and calculation of the surface area and volume of triangular and rectangular prisms; * determine, through investigation using a variety of tools (e.g., nets, concrete materials, dynamic geometry software, Polydrons) and strategies, the surface area of rectangular and triangular prism.   **Science**   * explain the functions of the components of a simple electrical circuit; * describe series circuits (components connected in a daisy chain) and parallel circuits (components connected side by side like the rungs of a ladder), and identify where each is used. | |
| **Learning Goals: We are learning to...**  ...scale the measurements of the house we are creating.  ...estimate and then calculate the surface area of the house we create.  ...create and describe the circuits we make to put in the house we create. | **Success Criteria: We will know we are successful when...**  ...we can change metres into centimeters.  ...we can measure 3-D objects, compare 3-D objects, to find the surface area of 3-D objects.  ...we can label the circuits we create.  ...we can discuss why we used specific circuits for specific tasks. |
| **Lesson Overview: Students will create 3-D houses that will be decorated and wired with LED diodes and other electronic aspects (if available). Students will need to plan the size of their house in real life and scale it to a smaller version.** | |
| **Materials and Technology:**   * Materials to construct houses (tape, glue, string, popsicle sticks, cardboard, construction paper, etc) * Lilypad kits OR * Copper Tape * Coin Cell batteries * Other conducting material * LED diodes | |
| **Student Accommodations/Modifications:**  Accommodations will range from:   * Different real-life layouts * Pre constructed bases for houses * Conversion examples   Modifications will range from:   * Pre constructed bases * Circuit layouts * Matching conversions | **Lesson will be differentiated by:**   * **Content, specifically:** Houses to be pre-made or smaller, fewer circuits (one type) * **Process, specifically**: Circuits can be premade, houses premade * **Product, specifically:** Reflections orally given * **Environment, specifically:** Working with a guided group |
| **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.**  Students will explore the size of their own classroom. They will practise measuring and then scaling the measurements and then creating nets.  **What key questions will you ask?**  How large is our classroom?  If we wanted to cover it with paper how much paper would we need?  What unit will we use to measure our classroom? What tool will we use?  If I wanted to make a model of our classroom, would I make it the same size? How would I change it?  **How will you gather diagnostic or formative data about the students’ current levels of understanding?**  Review how the students are measuring and recording measurements, scaling their measurements  **How will students be grouped? How will materials be distributed?**  Individual  Guided group for those who are modified | |
| **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 be constructing homes out of a material of their choice. They need to have plans of how large it would be in real-life. Students will then wire lights and other electronics into the house. They should be using different circuits--parallel and series.  **What misconceptions or difficulties do you think they might experience?**  Students may not know which electronics should be parallel or series.  Students may have difficulty with scaling and changing their ideas from metre to centimeters.  Students may have trouble visualizing their nets.  **How will they demonstrate their understanding of the concept?**  Students will write their understanding of the science concepts. They may also present their findings.  They will need to explain their thought process through the math. They should also be recording their calculations.  **How will you gather your assessment data (e.g., checklist, anecdotal records)?**  Anecdotal records, this in a inquiry process/project  Rubric | |
| **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)?**  There will be a gallery walk to view all of the houses. Students may choose to explain their ideas to the class.  A community circle about the difficulties would be a good way of reflecting.  **What key questions will you ask during the debriefing?**  When did you use series/parallel circuits?  Was it difficult to create a scale?  What are nets?  When do you think people need to do these tasks in the real world? | |