

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

**School Board: Lakehead Public Schools**

**Grade(s): Grade 7/8**

**Subject(s): Mathematics & Dramatic Arts & Science**

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| **BIG IDEAS:**  Structures have a purpose.  The form of a structure is dependent on its function.  **Curriculum Expectations:**  **OVERALL:**  **-**demonstrate an understanding of the geometric properties of quadrilaterals and circles and the applications of geometric properties in the real world;  -design and construct a variety of structures and investigate the relationship between the design and function of these structures and the forces that act on them;  -demonstrate an understanding of the relationship between structural forms and the forces that act on and within them;  -develop an understanding of similarity, and distinguish similarity and congruence.  **SPECIFIC:**  **Grade 8 Math:**  – investigate and describe applications of geometric properties (e.g., properties of triangles, quadrilaterals, and circles) in the real world;  – determine, through investigation using a variety of tools (e.g., dynamic geometry software, concrete materials), relationships among area, perimeter, corresponding side lengths, and corresponding angles of similar shapes;  – identify and describe real-life situations involving two quantities that are directly proportional;  – solve problems that require conversions involving metric units of area, volume, and capacity;  -solve problems involving the estimation and calculation of the circumference and the area of a circle.  **Grade 7 Science Structures:**  3.1 classify structures as solid structures (e.g., dams), frame structures (e.g., goal posts), or shell structures (e.g., airplane wings);  3.2 describe ways in which the centre of gravity of a structure (e.g., a child’s high chair, a tower) affects the structure’s stability;  3.3 identify the magnitude, direction, point of application, and plane of application of the forces applied to a structure;  3.4 distinguish between external forces (e.g., wind, gravity, earthquakes) and internal forces (tension, compression, shear, and torsion) acting on a structure.  **Grade 7 – Math:**  -demonstrate an understanding that enlarging or reducing two-dimensional shapes creates similar shapes. | |
| **Learning Goals:**  “We are learning to…” use mathematics and science concepts to create real world exemplars to better understand how these topics can be applied in a hands on situation | **Success Criteria:**  “We will be successful when…  … we create a pattern on fabric and sew fabric to create Donkey Ears, Fox Ears and Cat Ears to complete costumes for our musical  … we create a drawing and then help to construct 4’ by 8’ backdrops for use in the musical (using the drawing)  … we will draw an image of a whale and ship on an 8.5” by 11” piece of paper and recreate the image on a 4’ by 8’ piece of cardboard focusing on the scale and proportion |
| **Lesson Overview**: To create backdrops, props and costume pieces (Donkey ears, Fox ears and Cat ears) for ‘My Son Pinocchio Jr.’ the school musical. | |
| **Materials and Technology:**  Fabric (brown, grey, orange, black, white)  2’ by 4’ by 10’ - Spruce  2’ by 6’ by 10’ – Spruce  4’ by 8’ – ¼ “  Coaster Wheels  Black Paint  3” Screws – 2 lbs  3” Nails – 1 lb  5 Cordless Drills and 15 Robertson Bits  Hammer  Heavy duty brown paper 4’ roll  4’ by 8’ – sheets of Cardboard  4’ by 8’ – sheets of panel board | |
| **Student Accommodations/Modifications:** | **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.**  Students will be shown a brief clip of a youtube video of Pinocchio Jr. to give them an idea of the backgrounds and settings needed for the musical. Examples of required props, backgrounds and ears will be shown to the students.  **What key questions will you ask?**  Students will create 4’ by 8’ panels that will be rolled on stage. The panels will be 2 sided and have a scene painted on both sides on Brown paper. The Panel must be high enough to be seen from stage, but be able to go through doorways, horizontally and vertically. The ears must stay on the actor and actress’s heads, as well as, stick up in the air. Students will also need to recreate a ship and a whale on two 4’ by 8’ pieces of cardboard.  **How will you gather diagnostic or formative data about the students’ current levels of understanding?**  The rolling panels must be stable, not tip over, get through the doors vertically and horizontally. The ears must stand up on the animals’ heads and the pictures must fill up the 4’ by 8’ piece of cardboard (proportionally).  **How will students be grouped? How will materials be distributed?**  Students will be working in groups of four/five or six. The sewing machines will be used by the students who have become proficient with minimal practice to create the animal ears. Students who were most proficient when designing the Cardboard boats for the Race in November will be designing the panel backdrops Students who show the most artistic interest will design the boat and whale’s mouth, while students the remaining group will be the group using scale to recreate the ship and whale on the 4’ by 8’ Cardboard. | |
| **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.**  One group of students will create a pattern for the animal ears (fox, donkey and cat) and then use the sewing machines to create the ears. Students will need to find a way to fix the ears to the actor and actress’ in the musical. The ears must also stand-up so that the audience can see them.  The second group will oversee the designing of backdrop panels so that the audience can see them from the crowd and identify the different scenes in the musical. Students will come up with a design and then the wood will be purchased to build them. A teacher will cut out the wood and the students will help to build the backdrops using drills, screws, hammer, nails, coaster wheels, a level and a square.  The third group will oversee the design of the whale and ship silhouette for the musical. This group will draw an image on an 8.5” by 11” piece of paper and recreate the image on a 4’ by 8’ piece of cardboard. Scale and proportion will be the challenge for this group; no overhead projector allowed.  The forth group will be painting the ship and whale. They will establish the colour scheme of the whale and ship appropriate for the era and musical.  **What misconceptions or difficulties do you think they might experience?**  The sewing group will have difficulty creating a pattern that will work. When student went to sewing classes, they were provided with patterns.  The backdrop group will have difficulty figuring out how to design the backdrop panel so that it will fit through the doors in the school horizontally and vertically. Once they are given some instruction the design will be easy to create.  The whale and ship group will have difficulty converting measurement from inches to feet, they do not have a lot practice or schema with the Imperial method of measurement. Once they are given some instruction, they will be able to figure out the scale.  The painting group should not a have a difficult time, they will have assistance with the conversion of the scale for each image**.**  **How will they demonstrate their understanding of the concept?**  Each design or creation will be complete and will be able to be used in the musical. Drawings will have to show the thinking of the students and the creative process that they went through to come up with the design (Graph paper to make designs to scale).  **How will you gather your assessment data (e.g., checklist, anecdotal records)?**  Assessment will be based on the correct mathematical calculation when creating the backdrops, the scale drawing and the creation of patterns for the animal parts.  **What extension activities will you provide?**  The opportunity to paint the backdrops will be one of the extension activities and becoming backstage set mover in the Pinocchio musical. | |
| **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)?**  No real individual presentations.  **What key questions will you ask during the debriefing?**  How could we improve the design of the back drops to keep the background panels safe but easier to get through the doors in the school? | |