

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

**School Board: CEPEO**

**Grade(s): 5**

**Subject(s): Science, Social Studies
Robotics and Canadian natural resources**

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| **BIG IDEAS:**The Ozobot must transport natural resources from Quebec City to its Vancouver destination. On the way to Vancouver, Ozobot will have to stop in Edmonton to collect more natural resources.**Curriculum Expectations:****OVERALL:**Determine the area of shapes and volume of solids using conventional measurement units.Use capacity and mass measurement units in a variety of contexts.**SPECIFIC:** Construct using cubic centimeters (cm3) different solids corresponding to a given volume or having the same volume.Estimate, measure and record the mass of objects by choosing the most appropriate unit of measure (milligram, gram, kilogram, tonne). |
| **Learning Goals:**“We are learning to…”* Build a box with a pre-established surface
* Find the maximum mass that can be pulled by an Ozobot and make sure to respect it
 | **Success Criteria:** “We will be successful when…”* Our Ozobot is successful at pulling a mass between the two locations
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| **Lesson Overview:**The Ozobot must transport as much wood as possible from Quebec City, Quebec to the destination of Vancouver, B.C. On the way to Vancouver, Ozobot has to collect 3 extra logs from Alberta's capital. When Ozobot leaves Edmonton, it will have to cross the Rocky Mountains of the West, accelerating its speed.So that Ozobot can carry a mass (logs), students are asked to build a box, using paper, with a square base having a surface of 16 cm2 and a height of 3 cm. Students are asked to attach the crate to an Ozobot with string and tape so that it can carry a mass in it.Legend:1 block of wood = 1 dice blockStudents are asked to calculate the mass of a die with the scale to determine its mass. |
| **Materials and Technology:** * Graphing paper with squares in cm3
* Tape
* Dice
* Ozobots
* Ozobot compatible markers
* Ozobot programming cheat sheet
* Map of Canada
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| **Student Accommodations/Modifications:** Students will work as a team. The teams are formed according to the interest of the students. That is, each team is made up of students with interests in social studies and students with interests in robotics. In this way, each team is balanced in order to be successful. | **Lesson will be differentiated by:*** **Process, specifically:**Collaboration and creation of the box, made to the specifications
* **Product, specifically:**Students will present their map with the programmed Ozobot
* **Environment, specifically:**

In small groups, students are asked to explore the different solutions with the tools available to them in the classroom. |
| **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.** The activity will begin with a scenario in relation to the prior knowledge of students in social studies. Importance will be given to the prominence of rail development in Canada, while putting into context the transportation of Canada's natural resources.**What key questions will you ask? How will you gather diagnostic or formative data about the students’ current levels of understanding?**Questions that students ask the teacher will be redirected through their own group in order to emphasize collaboration. Following the presentations, students and the teacher will ask questions to test the group’s understanding. The collection of formative data is done by electronic portfolio (a QR code, assigned to each student) of the student, so that the student can see his progress.**How will students be grouped? How will materials be distributed?** Groups will have access to any necessary materials found in class. |
| **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. What misconceptions or difficulties do you think they might experience?** The transfer of knowledge (inference) in relation to the fact that the die represents a block of wood. They will have to explore the different Ozobots codes to determine which ones to use.**How will they demonstrate their understanding of the concept?**The final product made by students will be evaluated, but an emphasis will be placed on the impact that the creative process has had on their final product, in order to encourage reflection and improvement of the product.**How will you gather your assessment data (e.g., checklist, anecdotal records)?**Using each student’s personal portfolio. **What extension activities will you provide?** Once the Ozobot project is completed, the same work can be done on a larger scale with the help of the Sphero programming tool. |
| **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)?** With the help of oral presentation from each group, where the teacher has a duty to highlight the strengths of each group.**What key questions will you ask during the debriefing?** How can robotics contribute to the social and geographical development of different regions while taking into account constraints, such as the relief and distribution of natural resources? |