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**CODE/MOE/UOIT Makerspaces Project**

**Lesson Plan: Ozobot Coordinates & Quadrants STEAM Challenge**

**School Board: Limestone District School Board**

**Grade(s): 3**

**Subject(s): Math**

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| **BIG IDEAS:*** This ozobot coordinate challenge will help your students review coordinates and quadrants with a fun STEAM challenge. Your students will need to use ozoblockly to program their ozobot to stay inside the grid paper.

**Curriculum Expectations:****OVERALL:**Grade 3 Math:• identify and describe the locations and movements of shapes and objects**SPECIFIC:*** describe movement from one location to another using a grid map (e.g., to get from the swings to the sandbox, move three squares to the right and two squares down);
* identify flips, slides, and turns, through investigation using concrete materials and physical motion, and name flips, slides, and turns as reflections, translations, and rotations (e.g., a slide to the right is a translation; a turn is a rotation);

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| **Learning Goals:**“We are learning to…” Apply coordinates and identify quadrants using grid paper, ozoblockly and an ozobot  | **Success Criteria:** “We will be successful when…”We are able to document, describe and present our ozoblockly code to our class which will program our ozobot to stay inside the grid paper; using a variety of documentation tools such as Book Creator, Pic Collage, iMovie or Chatterpix |
| **Lesson Overview:****Question posed to students: Can you program your ozobot using ozoblockly to stay inside the provided grid paper and identify the coordinates of the shape it creates?*** **Divide students into partners**
* **Provide each group with a piece of grid paper**
* **Students must create four equal quadrants on their grid paper identifying both the y and x axis.**
* **The challenge is for students to block code their ozobot in a pattern**
* **Students must identify their starting and ending coordinates**
* **Students will then exchange their code with another group and identify their starting and ending coordinates as well.**
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| **Materials and Technology:** * Ozobots
* iPads
* Grid paper
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| **Student Accommodations/Modifications:** **Students are placed in homogenous partners and are provided with a choice board of iPad apps to present their findings and final product at the end of the challenge.** | **Lesson will be differentiated by:*** **Content, specifically: Content has been created in a way so that all can access material**
* **Process, specifically: Homogenous groupings to help with fine motor issues, voice to text is imbedded in all provided documentation apps**
* **Product, specifically: Differentiated based on individual skills**
* **Environment, specifically: Quiet work space if required**
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| **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.** * **Divide students into partners**
* **Students will have already been taught how to use blockly code as well as the ozobots prior to completing this challenge**
* **Students will be given an iPad, an ozobot, a piece of grid paper as well as the Ozobot Coordinate Challenge checklist**

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| Ozobot Coordinate Challenge Checklist:* + Your ozobot MUST stay in the grid the whole time.
	+ Your code MUST contain block code that is in a pattern
	+ You need to have your starting and ending coordinates labeled
	+ Your ozobot needs to move to each of the four quadrants. It can't stay in the same quadrant.
	+ As an extension you will attempt to code the ozobot to move in a 2-D shape of your choosing; then translate, rotate and flip your shape using all quadrants
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* **Each team will present its code and how it works.**

**What key questions will you ask?** **Can you program your ozobot using ozoblockly to stay inside the provided grid paper and identify the coordinates of the shape it creates?****How will you gather diagnostic or formative data about the students’ current levels of understanding?*** **Observations, Student-Teacher Conferencing, Checklist**
* **All data gathered will be saved in a digital portfolio for each individual students using OneNote**
* **Students orally present their process and findings using the documentation feature of choice to the whole class in a sharing circle**
* **Student presentations are blogged on our STEAM room Google Sites Account to be shared out to our broader community members**

 **How will students be grouped? How will materials be distributed?** * **Students will be grouped homogeneously**
* **Materials will be distributed to in small, organized containers**
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| **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.** * **Researching which 2-D shape they will choose to rotate, flip etc.**
* **Oral/Visual Presentation at the end of the challenge**
* **Building and Constructing using block code and grid paper**
* **Problem-solving, collaboration, ingenuity, documentation**

**What misconceptions or difficulties do you think they might experience?** * Dividing the grid paper into four equal quadrants
* Effectively coding the ozobot to construct a 2D shape; then translate, rotate etc. Into other quadrants

**How will they demonstrate their understanding of the concept?*** Students will represent their thinking (using pictures, words, technology, actions, etc.)
* participate actively in whole group, small group, or independent settings
* explain their thinking to the teacher and their classmates
* Completion of a peer and self-reflection activity at the end of this challenge

**How will you gather your assessment data (e.g., checklist, anecdotal records)?*** **All data gathered will be saved in a digital portfolio for each individual students using OneNote**
* **Students orally present their process and findings using the documentation feature of choice to the whole class in a sharing circle**
* **Student presentations are blogged on our STEAM room Google Sites Account to be shared out to our broader community members**

**What extension activities will you provide?** * **Immediately following this STEAM challenge students will participate in a sharing circle and discuss what they have learned with the group and how it might be relevant to our world.**
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| **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)?** * **All students will present using their documentation method of choice**

**What key questions will you ask during the debriefing?** * **Can you think of where we would use coordinates and quadrants in real life?**
* **What kind of challenges did you and your partner experience?**
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