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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); | |
| **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.** | |
| **Materials and Technology:**   * Ozobots * iPads * Grid paper | |
| **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** |
| **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**  |  | | --- | | 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 |  * **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** | |
| **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.** | |
| **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?** | |