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**CODE/MOE/UOIT Makerspaces Project—**

**Making a Maze Game on Scratch Jr.**

**School Board: Limestone District School Board**

**Grade(s): 2**

**Subject(s): Mathematics**

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| **BIG IDEAS:**  **Students will use Scratch Jr. to create a maze game. They will explore directional language and manipulate and describe the movement of the objects on a graph.**  **Curriculum Expectations:**  **OVERALL:**  Mathematics: Grade 2 – Geometry and Spatial Sense :  -describe and represent the relative locations of objects, and represent objects on a map.  **SPECIFIC:**  Location & Movement:  **-**describe the relative locations (e.g., beside, two steps to the right of) and the movement of objects on a map.  **-** draw simple maps of familiar settings, and describe the relative locations of objects on the maps | |
| **Learning Goals:**  “We are learning to…”  **-describe where an object is using appropriate terminology**  **-create maps and describe where something is on a map.** | **Success Criteria:**  “We will be successful when…”  **-we have created a maze game using Scratch Jr.**  **-we can describe the path that our sprite needs to take to reach the end using appropriate language.** |
| **Lesson Overview:**  **Students will use Scratch Jr. to create a maze game. Students will work collaboratively to problem solve and create their games. Students will host an arcade where other classes will be invited to try their games.** | |
| **Materials and Technology:**  -iPads with Scratch Jr. | |
| **Student Accommodations/Modifications:**  **-students will be paired in homogenous groupings.**  **-as outlined in IEPs** | **Lesson will be differentiated by:**   * **Content, specifically:** * **Process, specifically:** * **Product, specifically: reduction in the number of scenes created, if needed** * **Environment, specifically: alternate/quiet space could be provided.** |
| **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.**  **\*note, an instructional youtube video for this type of game is available here:** [**https://www.youtube.com/watch?v=Je7Auy91b4s**](https://www.youtube.com/watch?v=Je7Auy91b4s)  We will begin by talking about video games that they may have played.  “How do you make a character move on a screen?”  I will have already prepared a Scratch Jr. document that has direction arrows. I will show them how when I tap the arrows, I can make a dot move.  We will review the language around how to describe the movement of an object.  **What key questions will you ask?**   * How can you tell your sprite how to move on the screen? * Can you think of what message needs to be sent to the sprite? (think if, then)   **How will you gather diagnostic or formative data about the students’ current levels of understanding?**  -think, pair, share to discuss.  -checking for understanding with questioning throughout.  **How will students be grouped? How will materials be distributed?**  **-**students will be in homogenous pairs. They will be provided with an iPad to share between them. | |
| **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.**  The students will be using Scratch Jr. to create a maze game. The goal of the game will be to move a dot through a maze to a finish area. The dot will be moved using directional arrows on the screen. Once the dot arrives at the end it will then jump to another screen to either continue onto another maze or to receive a congratulatory message. A sample version of the maze could be created by the teacher to kick off the activity (this will not be necessary for all groups). Be sure not to show the students all of the code at the beginning. Encourage students to add twists to the game.  Students will be released in pairs to create the directional arrows and dot and to try to use the “Start on MESSAGE” and the “Send Start Message” yellow tiles to get their dot to move. After an appropriate amount of time, get students to come back and share their code. Experts are identified who can then assist students struggling to ensure that everyone has grasped this part of the activity.  Next, have students create their maze. Make sure that the maze is created as a character and not the background. This means that the maze walls can later be coded to send the dot back to the beginning of the maze (extension).  Program it so that once the dot reaches the end of the maze it then jumps to another screen (this could be a 2nd maze or simply a “You win” page.)  Students will need to create a written list of directions that describes how to move the dot from the beginning of the maze to the end. They will need to use appropriate vocabulary that was discussed at the beginning of the lesson.  **What misconceptions or difficulties do you think they might experience?**  Using the yellow SEND and START tiles (they look like pieces of mail). These can be tricky and need some experimentation to get to work properly.  Ensure that students create their maze as a character and not as a background. Otherwise they will not be able to make the player return to the beginning if they hit the maze wall (a popular extension).  **How will they demonstrate their understanding of the concept?**  After completing their mazes, students will have to write (or dictate) a solution using appropriate directional language discussed at the beginning of the lesson.  **How will you gather your assessment data (e.g., checklist, anecdotal records)?**  All games will be shared via Airdrop. Students will complete the checklist to ensure that all required components have be completed. Students will submit the “answer” key.  **What extension activities will you provide?**  -how can you code the walls of the maze to send the dot back to the beginning?  -can you create another type of game? A 2D side scroller? | |
| **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)?**  Everyone who wants to will be provided an opportunity to share. We will share throughout the activity to build knowledge as a community. Once all projects are complete we will create a “Scratch Jr. Arcade”. We will invite classes in to try our games and to give us feedback.  **What key questions will you ask during the debriefing?**  -Is your game easy to use?  -Can you describe the location of your dot using positional language?  -What challenges did you encounter and how did you overcome them? | |