

**CODE/MOE/UOIT Makerspaces Project**

**Lesson Plan: Grade 2 Mathematics: Estimation**

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| **Lesson Objectives:**  **Students will be working towards knowledge of Attributes, Units and Measurement Sense.**  **Mathematics Curriculum Expectations:**  **Grade 2:**  **Students will:**   * **estimate and measure length, height, and distance, using standard units (i.e., centimetre, metre) and non-standard units;** * **record and represent measurements of length, height, and distance in a variety of ways (e.g. written, pictorial, concrete).** | |
| **Learning Goals:**  “We are learning to estimate distances from one point to another using non-standard and standard units of measurement”  “We are learning to measure the distance travelled from one point to another using Dash and Dot.” | **Success Criteria:**  “We will be successful when we have estimated and measured the distance that Dash will be travelling accurately.” |
| **Lesson Overview:**  Students will set out a “road” for Dash to travel. They will need to estimate and measure the distance that Dash travels using non-standard and standard units of measurement. | |
| **Materials and Technology:**  iPad  Blockly App  Dash and Dot Robots (Dot will not be used for this activity)  Masking tape to create “road”  Non-standard units of measurement materials (linking cubes, paperclips, links, etc…)  Ruler/Measuring tape | |
| **Student Accommodations/Modifications:**  **If Accommodation/Modifications are needed**   * **students will measure their road in order to alleviate any stress to unknown numbers** * **Students can work with a peer if needed** * **Students can use the Path app rather than Blockly.** |  |
| **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. What key questions will you ask? How will you gather diagnostic or formative data about the students’ current levels of understanding? How will students be grouped? How will materials be distributed?  **(Assuming students are familiar with Dash and Dot and the Blockly App)**  **Students will be given time to explore Dash and Dot and the Blockly app in order to see the distance that Dash will travel when given certain codes and numbers.**  **Students will create a “road” for Dash to travel IN the classroom (this will reduce road sizes).**  **Using their knowledge from the time given to explore the distances that Dash is able to travel, students will make an estimate on how far Dash will have to travel using 1 non-standard unit of measurement as well as 1 standard unit (centimeters or meters).** | |
| **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? How will they demonstrate their understanding of the concept? How will you gather your assessment data (e.g., checklist, anecdotal records)? What extension activities will you provide?  **As the students will have their estimates in place. Students will begin to code Dash to travel down the “road” using the numbers within the estimates. Students should keep track of their trial and errors on an anchor chart or graph paper in order to show their learning and problem solving.**  **Students may need some assistance reading some of the codes and should refer to an anchor chart if possible with explanations of proper coding instructions. (Visual assistance with puzzle pieces if needed).**  **Teacher will be circulating assisting students if needed, writing anecdotal notes on students ability to measure and problem solve, as well as a checklist for learning skills comments (responsibility, collaboration, problem solving etc.)**  **Extension Activities: Rather than using a straight road, challenge students to create a road that will have Dash make turns.** | |
| **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)? What key questions will you ask during the debriefing?  **Once students have completed the task, rather than showing that Dash can travel down their “road” they will instead share their graph paper/anchor chart on their trial and error data. Students will speak to the changes that they needed to make to their estimate(s) and how they were able to problem solve as a group/pairing. Students will share the various strategies that they have used in order to complete this task.**  **Key Questions:**   * **Were you able to make a plausible estimation?** * **What difficulties arose when working with Dash and the Blockly app?** * **At what point did you know that you needed to collaborate again to change your initial estimation?** * **How were you able to measure the distance Dash travelled? Why did you choose these units of measurement?** | |