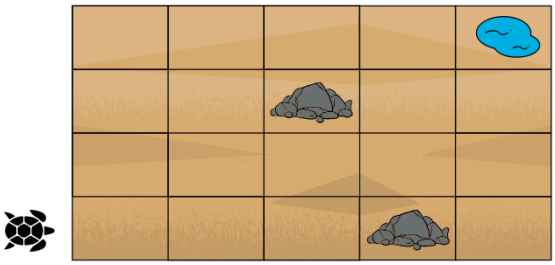
Grade 2 - Location, Movement, & Coding

Contents

📋 Developmental Tracking Sheet

What to look for from the end of Gr 1:	**Diagnostic Thinking Tasks:** (sample tasks to uncover students' current understandings)
• Describing relative positions of objects and movements needed to get from one object to another • Representing and interpreting simple concrete maps • Interpreting coded steps that describe location and movement	• Map Directions - Provide a simple map of the classroom. Challenge students to use the map to give coded directions on how to get from Point A to Point B. (step forward, step forward, turn left, step forward…) Students can test and refine their directions with a friend. (Extension, students might first draw their own map of the classroom.) • Dance, Dance, Party - Co-create a set of dance action cards with the students, ensuring that students are comfortable performing each action. (e.g. clap, step forward, step back, jump) Challenge students create a code by arranging a sequence of cards showing actions or gestures to create a dance. (This may include cards that show how many times to repeat a particular move.) Students can exchange codes and try to perform different dance patterns created by their friends. • Have students create code for the turtle to get to the pond. Then ask them to alter the sequence of instructions in their code and verify that the turtle can still get to the pond.  Why these tasks: • the tasks are open, so students can respond in a variety of ways • the complexity of the tasks could be adjusted by adding constraints or options (e.g. reduce the number of dance moves to choose from in problem 2, set a minimum number of moves in problem 1) • listen for the directional language students use as they plan, discuss, and complete these challenges • note how students follow sequential steps or events when given a simple set of directions

Next Steps for Learning:

- Based on what you saw and heard, what is next for you and your students?
- Does a starting point now stand out more clearly in the grade-level sample problems or MathUP Connections?

Resources to Address Grade-Level Expectations

MathUP Connections

Note: To ensure the links below work, first sign into MathUP in a separate tab

- Location, Movement, and Coding, Lessons 1-3

Building Fluency Lessons

- **Coded Paths:** After exploring the task Coded Paths, have students analyze some of the completed direction cards, with the start and stop locations shown (but not the pathway), along with the coded directions. Students will analyze the code to look for errors. Teachers should present codes that are accurate, as well as code cards with errors, for students to analyze, discuss and correct, if needed.
- Revisit Math Talk ideas from previous topics to provide consolidation and review opportunities for students.

Sample Problems and Explorations

Provide pairs of students with 14 (7 per student) square tiles of the same colour, and one "barrier". **Partner A**: Make a simple design with your 7 tiles, behind the barrier, so that your partner cannot see. Give instructions to your partner (the builder) so that the partner can recreate the design on the other side of the barrier. **Partner B:** Recreate your partner's design, based on the instructions you hear. Compare your designs.

A Guide to Effective Instruction - Geometry (K-3): Are We There Yet? game. Students play a cooperative game to move a marker across a simple map. (pg 115)

Create an anchor chart of positional and directional language. Model the use of these terms, and create opportunities for students to practice this language through classroom activities.

Find the Doughnut: A Guide to Effective Instruction - Geometry (K-3) pg 116. Away from students' view, place a washer, representing a doughnut, on one peg on a geoboard. Give students clues to help them locate the "doughnut". For example, you could say, "The doughnut is in the second row. It is near the right end of that row." Ask students to show where they think the doughnut is located by placing a washer on their geoboards. Use a document camera to show your geoboard, and have students check to see whether their doughnut is in the correct position. (Students could play this as a barrier game with a partner.)

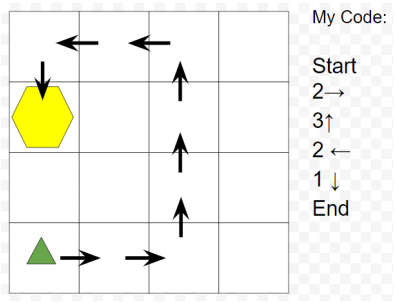
Secret Codes: Students work in pairs. Provide each student with a code sheet and cut-out cards. Partner A places symbols on a grid to create a secret pattern (behind a barrier). Then describes the location and orientation of the shapes to their partner - one piece at a time. Partner B attempts to follow the directions to recreate the code. The barrier is removed and partners compare the results. Consolidation: "What words or phrases helped you give clear directions to your partner? What words or phrases were easier for you to understand as you followed the directions?" Variations: Use different materials for the pattern (e.g. pattern blocks or geometric shape cut outs). Provide a smaller 4x4 grid for the task. (Adapted from Taking Shape, pg 189)

What Did You Make? Provide students with a 5x5 grid and a small set of colour tiles. The teacher will create a hidden design using a small set of tiles. The teacher will give precise directions for the students to follow as they work to recreate your design. (e.g. "The centre square of the grid has a red tile. Put a green tile above the red tile. Put a blue tile below the red tile...etc.) Reveal your design for students to compare. Consolidation: discuss key words and phrases that help the listener follow the directions.
When students understand the task, they can play again with a partner.
Adapted from Taking Shape, pg 193.

Designs Recipes: Provide students with a small set of pattern blocks. Model the task for the students: Create a simple design using four pattern blocks - hidden from you partner's view. Give directions, slowly, using positional language for the students to follow. (e.g. "I have a yellow hexagon in the middle of my design, with a vertex pointing up. A green triangle is on the right side of the hexagon. The hexagon and triangle are touching edge-to-edge. My shape is symmetrical, so there is another triangle on the left side of the hexagon. Finally, there is a red trapezoid at the bottom of the hexagon. The middle of the longest side of the trapezoid touches the bottom of the hexagon." When students are familiar with the game, they can play with a partner as a barrier game.

OAME's Dancing to Code / Coding to Dance Learning and Assessment Task: In this lesson, the students will create and perform a set of dances in a chosen sequence containing precise unplugged instructions for performing the dances.

Coded Paths: Students use a 4x4 grid to make a simple map with a starting point indicated by a green triangle, and an ending point indicated by a yellow hexagon. The goal of the game is to provide coded directions to move from the starting point to the end point. Students indicate the number of steps and the direction with arrow symbols. (e.g. 2→ , 3↑, 2 ← , 1 ↓)
Teachers can use completed direction cards, with the start and stop locations shown (but not the pathway), along with the code for Math Talks. Students will analyze the code to look for errors. Teachers should present codes that are accurate, as well as codes with errors to students to analyze, discuss and correct, if needed.



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iPad activity:
Using Scratch Jr, students create an obstacle course, create a character, which they then code to move successfully through the designed obstacle course.

Consider WRDSB approved sites and apps for coding: code.org, CSFirst, Kodable

Models and Tools

Concrete Learning Resources Tools:

- pattern blocks
- colour tiles
- geoboards
- grid paper

Virtual Learning Resources and Tools:

- code.org's Play Lab or Pre-reader Play Lab
- Optional: Scratch Jr on WRDSB iPads
- pattern blocks
- colour tiles
- geoboards
- grids for pseudo-coding activities

Expectation Cluster

E1 describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them

- E1.4 create and interpret simple maps of familiar places
- E1.5 describe the relative positions of several objects and the movements needed to get from one object to another

C3 solve problems and create computational representations of mathematical situations using coding concepts and skills

- C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves sequential and concurrent events
- C3.2 read and alter existing code, including code that involves sequential and concurrent events, and describe how changes to the code affect the outcomes

⭐ Connections to *Essential Key Concepts* ⭐

B1 demonstrate an understanding of numbers and make connections to the way numbers are used in everyday life

- B1.2 compare and order whole numbers up to and including 200, in various contexts
- B1.4 count to 200, including by 20s, 25s, and 50s, using a variety of tools and strategies

☼ Related Mathematical Processes

Reasoning and Proving, Connecting, Representing and Communicating

Resource List of texts referenced in the preparation of these plans, and available in all WRDSB schools.