

Grade 3: Patterns & Likelihood of Events

“Exploring Loops in Coding”

(From: Mathology)

Students are introduced to loops to show repeated steps in a dance. In groups, students create their own dance, then record the steps using loops. Students trade dances with another group and try each other's dance. To consolidate, students share examples of loops found in real life.

Big Idea	Curriculum expectations
Consolidating mapping and coding	C3. Coding: solve problems and create computational representations of mathematical situations using coding concepts and skills • Coding Skills: C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves sequential, concurrent, and repeating events • Coding Skills: C3.2 read and alter existing code, including code that involves sequential, concurrent, and repeating events, and describe how changes to the code affect the outcomes
Learning Goals	Success Criteria
We want students to... • Use loops to show repeated steps in a dance	I can...

• Explore loops in real life • Consider perspectives when writing code	• When giving directions, it is important to consider the perspective of the person following them (e.g., directions depend on the way the person is facing). • When describing a route, it is important that each step includes a command, a direction, and an amount (e.g., translate forward 3 squares). • We can use a loop to show actions or steps that repeat.
Materials	Math Language / Vocabulary
• Math Mat 1: Thinking Space • Master 69: Code the Vacuum • Student Card 29: Neighbourhood Errands • Counters • Show What You Know <i>(All Line Masters, Math Mats and Student Cards can be accessed by logging into your Mathology / Mathologie account)</i>	• Below / beside / in front / between / on top of / under • Perspective • Visualize • View • Flip / slide / turn • Orientation • Reflect / rotate • Loop
Prior Knowledge	
Students may benefit from prior experience with: • using spatial and geometric language to describe the location of shapes on a grid • describing movement on a grid map • writing codes to describe paths on a grid	

- using loops to describe actions that repeat

Key concepts

- Loops make code more readable and reduce the number of instructions that need to be written. Loops can also help to emphasize the repetitive properties of some mathematical tasks and concepts.
- Using loops helps students organize their code and provides a foundation for considering efficiencies in program solutions.

Note

- Coding can support students in developing a deeper understanding of mathematical concepts.
- Loops provide an opportunity to experience the power of code and the process of automating algorithmic components.
- By manipulating conditions within a loop and the number of times that the loop will be repeated, students can determine the relationship between variables in lines of code.
- Coding can include a combination of pseudocode, block-based coding programs, and text-based coding programs.
- Students can program for various agents, such as a pixelated image on a screen, a classmate acting out the code when appropriate, or a physical device (e.g., robot, microcontroller).

Minds On

Have students stand. Call out instructions and have them move accordingly. For example: translate 2 tiles left, rotate one quarter-turn right, translate 4 tiles forward. Watch for students who confuse left and right. If your classroom floor is not tiled, have students count steps instead of tiles.

Discuss the words you used in your instructions. For each word, have students give an example of how they could use it in their daily routine (e.g., when we get home from school, my sister rotates the key in the door lock to open the door; when I get home from school, I walk forward through the doorway, then rotate left one quarter-turn and go

up the stairs).

Brainstorm a list of exercises that students might do in a workout.

Action!

Give each pair Math Mat 1: Thinking Space, Student Card 29A: Neighbourhood Errands, and a counter. For the first task, display the list of exercises from *Before*. Use the workout routines students create with the class over the next few days.

For the second task, have students sit across from each other so they are on opposite sides of the map.

Task 1: Workout Routines

What To Do

- Choose 5 exercises.
Create a workout routine that uses a loop and turns.
- Record a code of your routine on the *Thinking Space*.
- Run through the routine to make sure the code is clear and accurate.
- How did using a loop make recording easier?

Task 2: Navigation Challenge

What To Do

- **Player A:** Tell your partner where you are starting and where you want to go.
 - **Player B:** Choose a route that your partner could take and give directions.
Remember to think about your partner's perspective.
 - **Player A:** Follow the instructions to move the counter along the route.
 - Discuss and correct instructions along the way.
- Switch roles and repeat.

Probing Questions:

- *Why do we use a "loop" to help us code a routine?*
- *When you ran through the routine, did you have to make any changes to the code? Explain.*
- *Why did sitting across from each other make the task more challenging?*
- *Did you have to make any changes to your directions as your partner was following the route? Explain.*

Look-Fors

- Are students using loops to show exercises that repeat? Do they include the number of repetitions?
- Are students able to follow a code to perform a workout routine created by other students?
- Are students able to give/interpret instructions using positional and directional language to accurately describe/follow a route?
- Are students considering perspective when giving directions, especially when they are sitting on opposite sides of the map?

Consolidation

Have students look at the word wall and think back to the activities they just completed. Discuss the words or phrases they used, how they were used, and why it is important to use mathematical language when giving instructions or describing actions.

Have students talk with an elbow partner about what they have learned in this unit. Invite them to share one key learning with the class. You might also consider having students create Mind Maps to show what they have learned.

When your students seem ready, use some or all of the questions in **Show What You Know** to see what your students have learned in this unit.

Connections: Master 69: Code the Vacuum

Highlight for Students

- When giving directions, it is important to consider the perspective of the person following them (e.g., directions depend on the way the person is facing).

- When describing a route, it is important that each step includes a command, a direction, and an amount (e.g., translate forward 3 squares).
- We can use a loop to show actions or steps that repeat.

Supports for Student Learning

Accommodations: Task 1: Use fewer exercises and omit turns. Task 2: Use Student Card 29B and sit on the same side of the map.

Extension: Task 1: Add more exercises and use more than 1 loop. Task 2: One student records directions to get from one place to another on the map, purposely making an error. Partner finds and corrects the error.

Independent Tasks / Assessment Opportunities

All assessments, in the moment feedback/prompts, and independent tasks can be accessed by logging into your Mathology account.

SEL Self-Assessments ([English](#)) and [Teacher Rubric](#)

Extension Activities

Log in to your Mathology.ca / Mathologie.ca account to access Intervention and Extension activities, Professional Learning Videos and Assessment tools.

Technology



If you require support logging into your Mathology/Mathologie account, please contact Kerry Stack or Erica Doucet.

<https://etr.mathology.ca/>