Step-by-step robot recipes and floor-grid paths (5 lessons)

Computing, grade K - by Gemini 4 Argon - status: written (unreviewed)

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Unit: Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)

> **Unreviewed AI draft.** Written by Gemini 4 Argon (2026-11-05). No human teacher has reviewed this unit. All content is CC0 1.0 Public Domain.

Overview

How does a toy robot or a computer know what to do? It cannot guess—a person must give it a clear, ordered list of steps called an **algorithm**.

Across five 30-minute unplugged movement and picture-card lessons, Kindergarten students (`ages 5–6`) learn the foundations of computational thinking through whole-body play. Students put 3-card daily routines into `First → Next → Last` order, guide a "Walking Robot" partner across a 3×3 floor grid using physical arrow cards (`↑ Step Forward`, `↺ Turn Left`, `↻ Turn Right`), notice when a missing or extra arrow makes the robot miss the target (**a bug**), act out simple action patterns (`Clap, Tap, Clap, Tap`), and press paper "buttons" to make a partner perform a matching sound or motion (connecting to Kindergarten Science: Pushes and Pulls).

Prior knowledge

- No reading or writing is required; all activities use picture cards, arrows, and spoken/movement commands.
- Students can count to 5 and follow one-step classroom directions.
- Helpful cross-link: Pushes and pulls (Science, Kindergarten) explores how pushing a button or object causes a motion.
- Leads to: Symbols, signals, sorting, and step-by-step recipes (Computing, Grade 1) and Computing & systems progression.

Learning goals

By the end of this unit, a student can:

1. Arrange 3 picture cards into **`First → Next → Last`** order for a familiar routine and tell what happens if the first and last cards are switched (Lesson 1).
2. Follow a 3-arrow floor-grid path (`↑ Step Forward` one square at a time) without jumping over squares (Lesson 2).
3. Spot the **bug** (mistake) when a 3-arrow path lands on a mud-puddle square instead of the treasure star, and swap in the card that fixes it (Lesson 3).
4. Continue a 2-part repeating action pattern (`Clap, Stomp, Clap, Stomp, ...`) and name the core part that repeats (Lesson 4).
5. Match a button press (**input**) to the action or sound a machine makes (**output**) in a partner game (Lesson 5).

Lesson sequence

Lesson	Title	Time	Core idea
Lesson 1	First, Next, Last: Putting Daily Routines in Order	30 min	Instructions happen one step at a time in order (**sequence**)
Lesson 2	Walking the Floor Grid: One Square at a Time	30 min	A robot follows arrow cards (↑) literally, moving one square per card
Lesson 3	Oops, Wrong Square! Fixing a Bug on the Rug	30 min	When a robot lands in the wrong place, we check the arrow cards and fix the **bug**
Lesson 4	Do It Again! Repeating Action Patterns	30 min	Many dances, songs, and computer tasks repeat a small pattern over and over
Lesson 5	Push a Button, Make It Go: Buttons and Actions	30 min	Pushing a button gives a machine an instruction to start an action or sound

Materials for the whole unit

- Masking tape or painter's tape to mark a 3×3 grid of large squares on the classroom floor (each square big enough for a child to stand inside)
- Large printed or hand-drawn picture cards:
- 3-step routine sets (Washing Hands, Building a Snowman, Getting Ready for Rain)
- 6 large Arrow Cards (`↑ Step Forward`, `↺ Turn toward the Window`, `↻ Turn toward the Door`)
- 1 paper **Gold Star** (goal) and 1 paper **Mud Puddle** (obstacle)
- 3 paper "Button Circles" (Blue Star Button, Yellow Bell Button, Purple Frog Button) and 1 large `[ ▯ PUSH BUTTON ]` action card (Lesson 5)
- Large tabletop robot tokens (oversized wooden blocks or plush toys at least 5 cm wide for Lesson 3's pair strip; avoid coins, small erasers, or small linking cubes that could pose a choking hazard for 5-year-olds)

Assessment summary

Each lesson finishes with a 3-question oral, thumbs-up/thumbs-down, or physical card-pointing check with worked teacher answers. In Lesson 5, students guide a plush toy or classmate across a 3-square path to press a paper button and trigger the matching class action.

Sources

These references provide teacher background for the concepts introduced in Kindergarten. All links were checked to load on 2026-11-05.

- Sequence (ordered list of elements or steps): https://en.wikipedia.org/wiki/Sequence — background for Lesson 1's `First → Next → Last` ordering.
- Algorithm (step-by-step procedure): https://en.wikipedia.org/wiki/Algorithm — background for Lessons 1–2.
- Grid (spatial index / square floor grid navigation): https://en.wikipedia.org/wiki/Grid_(spatial_index) — background for Lesson 2's 3×3 floor-grid movement.
- Debugging (finding and correcting faults in instructions): https://en.wikipedia.org/wiki/Debugging — background for Lesson 3's arrow-card repair.
- Pattern (repeating regularity in actions or shapes): https://en.wikipedia.org/wiki/Pattern — background for Lesson 4's repeating movement patterns.

- Bell, T., Witten, I. H., & Fellows, M. (2015). CS Unplugged (pedagogical reference for screen-free early computing activities; all lesson text and games in this unit are original CC0 work): https://www.csunplugged.org/

Known gaps and cautions

- **Unreviewed AI draft:** This unit has not yet been reviewed by a human Kindergarten educator or tested with 5-year-old students.
- **Left/Right vs. Classroom Landmarks (Lesson 2):** Many 5-year-olds are still developing automatic left/right recall. In Lessons 2 and 3, pair turn arrows with concrete **classroom wall landmarks** (for example, "Turn toward the Window wall" vs. "Turn toward the Bookshelf wall", or tape a blue circle on the robot's left shoe and a yellow square on the right shoe).
- **Safe spacing on the floor grid:** Have only one "Robot" student stand inside the 3×3 tape grid at a time while the rest of the group sits around the perimeter as "Programmers" and "Bug Checkers" so students do not bump into each other.

Lesson 1: First, Next, Last — Putting Daily Routines in Order

- **Unit:** Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)
- **Time:** 30 minutes
- **Grouping:** Whole class on the circle rug, then pairs

Learning objective

Students will arrange 3 picture cards into **`First → Next → Last`** order for an everyday routine and explain what happens when the order is mixed up.

Materials

- 3 large demonstration picture cards for **Building a 3-Ball Snowman**:
- **Card A (First):** Roll a big bottom snowball on the ground
- **Card B (Next):** Lift a middle snowball on top of the big one
- **Card C (Last):** Put a small head snowball and carrot nose on top
- Per pair of students: a 3-card picture set for **Getting Ready for Rain**:
- Put on rain boots and raincoat
- Open the umbrella outside
- Walk through the rain staying dry

Vocabulary

- **First:** The step that happens at the very beginning (`Step 1`).
- **Next:** The step that happens in the middle (`Step 2`).
- **Last:** The step that finishes the job (`Step 3`).
- **Recipe (Algorithm):** A list of steps in the right order to do a job.

Lesson flow

✎ 1. Opening: The Upside-Down Snowman (6 min)

1. Hold up the 3 Snowman cards in the **wrong order**:
2. **First:** Put the tiny head snowball in the air (`Card C`)!
3. Pretend to hold a tiny snowball high in the air with nothing underneath it and let it drop ("Plop!").
4. Ask: "Why did my snowman head fall on the ground? Which snowball has to go **First** on the bottom so it can hold up the others?"
5. Students point to the big bottom snowball (`Card A`).

✎ 2. Main activity: Ordering `First → Next → Last` (15 min)

1. **Whole-class Snowman Line-Up (5 min):**
2. Invite 3 volunteers to hold `Card A`, `Card B`, and `Card C` at the front of the rug.

3. The class helps them stand in left-to-right order: `First` **(Big bottom ball)** → `Next` **(Middle ball)** → `Last` **(Head and nose)**.
4. Everyone acts out rolling the big ball, lifting the middle ball, and placing the head and carrot nose.
5. **Partner Rainy-Day Sort (10 min):**
6. Hand each pair the 3 **Getting Ready for Rain** picture cards shuffled face-up.
7. Partners talk together and line their 3 cards up from left to right:
    1. **First:** Put on boots and coat inside.
    2. **Next:** Open the umbrella at the door.
    3. **Last:** Walk in the rain staying dry.
8. Ask pairs to test a silly swap: "What happens if you do Card 3 (Walk in the rain) **First**, and Card 1 (Put on raincoat) **Last**?" (You get soaked before your coat is on!)

✓ 3. Discussion questions (4 min)

- **Question 1:** "When you eat a bowl of cereal, which comes **First**: pouring the cereal and milk into the bowl, or scooping with your spoon?"
- Example good answer: Pouring the cereal and milk into the bowl comes **First**, or else your spoon scoops an empty bowl!
- **Question 2:** "Why do machines and robots need their steps in the right order?"
- Example good answer: Because a robot only does the exact step you tell it, so mixed-up steps make a silly mess.

✓ 4. Closing check (5 min)

Read 3 quick checks; students point or hold up 1, 2, or 3 fingers:

1. Look at these 3 pictures for painting a picture:
2. **(1)** Wash the paint off the brush at the end
3. **(2)** Dip the clean brush into the paint cup
4. **(3)** Paint a bright sun on the paper Which picture happens **First**?
5. Which of those 3 pictures happens **Last**?
6. What happens if you wash the brush and put it away **before** you paint on the paper?

Worked answers for closing check

1. **(2) Dip the clean brush into the paint cup** happens **First**.
2. **(1) Wash the paint off the brush at the end** happens **Last**.
3. The paper stays blank because you put the brush away before painting!

Differentiation

- **Extra support:** Place a 3-box mat labeled with dots (`•`, `••`, `•••`) on the floor so students can place one card in each box from left to right.
- **Extra challenge:** Give pairs a 4th blank card to draw what happens after coming back inside from the rain (Take off wet boots and close the umbrella).

Teacher notes

- **Common misconception:** Some students place cards from right to left or in a vertical pile. Point to the green dot on the left side of the rug/table as the starting spot so everyone reads the sequence in the same direction.

Lesson 2: Walking the Floor Grid — One Square at a Time

- **Unit:** Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)
- **Time:** 30 minutes
- **Grouping:** Whole class seated around a 3×3 floor tape grid

Learning objective

Students will guide a classmate ("the Walking Robot") from a Start square to a Gold Star square on a 3×3 floor grid by lining up `↑ Step Forward` and `Turn` arrow cards one step at a time.

Materials

- A 3×3 floor grid made with painter's tape on the rug: `[ ★ ] [ ] [ ]` (Row 3: Top — ★ starts at Top-Left for Opening & Path 1; moves to Row 2 Col 2 for Path 2 and Top-Right Row 3 Col 3 for Path 3) `[ ] [ ] [ ]` (Row 2: Middle) `[ R ] [ ] [ ]` (Row 1: Bottom — R = Robot Start at Bottom-Left facing UP ↑)
- 6 large Arrow Cards:
- 4 cards showing `↑ Step Forward 1 Square`
- 2 cards showing `↻ Turn Toward the Door (Right)` / `↺ Turn Toward the Window (Left)`
- 1 paper **Gold Star (★)**

Vocabulary

- **Grid:** Squares lined up in neat rows so we can count exact steps.
- **Command Card:** An arrow card that tells the robot one exact move.
- **Step Forward (↑):** Move 1 square straight ahead in the direction your toes are pointing.
- **Turn In Place (↺ / ↻):** Spin your feet inside the **same square** to face a new wall (without stepping into a new square yet!).

Lesson flow

✎ 1. Opening: How Does a Floor Robot Move? (6 min)

1. Stand inside the bottom-left corner square `[R]` of the 3×3 tape grid with your toes pointing toward the top row. Place the **Gold Star (★)** two squares straight ahead in the top-left corner.
2. Ask: "If I want to walk from my Start square to the Gold Star without stepping outside the lines, how many squares forward do I need to step?"
3. Count together as you step: `1` **step forward** (into the middle-left square), `2` **steps forward** (onto the Gold Star!).
4. Show that **2** `↑ Step Forward` **arrow cards** (`[ ↑ ] [ ↑ ]`) write down that exact recipe!

✎ 2. Main activity: Human Robot & Programmer Teams (15 min)

1. **Practice the "Turn in Place" Rule (5 min):**
2. Have all students stand up on their spot around the rug.
3. Hold up `↑ Step Forward`: everyone takes 1 small step forward (and steps back).
4. Hold up `↻ Turn Toward the Door`: everyone pivots their feet inside their spot so their nose and toes point toward the classroom door—**without** stepping forward!
5. Emphasize: "A turn card only spins our toes inside our square. To move into the next square, we still need a `↑ Step Forward` card!"
6. **3-Challenge Grid Game (10 min):**
7. For each round, choose 1 **Robot** (stands on `[R]` facing North/Up) and 2 **Programmers** (lay the arrow cards in a row beside the grid while the class checks):
    - **Path 1 (Straight Line):** Star is 2 squares straight ahead (`Row 3, Col 1`).
    - Recipe: `[ ↑ ] [ ↑ ]` (2 cards).
    - **Path 2 (One Corner Turn):** Move the Star to `Row 2, Col 2` (1 square up, 1 square toward the door/right).
    - Recipe: `[ ↑ ] [ ↻ Turn Toward Door ] [ ↑ ]` (3 cards).
    - **Path 3 (All the Way to the Top-Right Corner ★):** Star is at `Row 3, Col 3` (2 squares up, 2 squares right).
    - Recipe: `[ ↑ ] [ ↑ ] [ ↻ Turn Toward Door ] [ ↑ ] [ ↑ ]` (5 cards).
8. For each path, the class chants the cards in order while the Robot performs one card per chant.

✓ 3. Discussion questions (4 min)

- **Question 1:** "In Path 2, why did we need THREE cards (`↑`, `↻ Turn`, `↑`) even though the Robot only stepped into TWO new squares?"
- Example good answer: Because one card had to turn the Robot's toes toward the door before the Robot could step sideways into the Star square!
- **Question 2:** "Is there a second road of squares that also reaches the Top-Right Star (`Row 3, Col 3`)?"
- Example good answer: Yes! You could turn toward the door first, walk 2 squares across the bottom row, turn up, and walk 2 squares up!

✓ 4. Closing check (5 min)

Place the Robot on the bottom-left square facing **Up (`↑`)** and place the **Gold Star (`★`)** just **1 square straight ahead** (`Row 2, Col 1`).

1. How many `↑ Step Forward` cards does the Robot need to land right on the Gold Star?
2. What happens if we give the Robot **two** `↑ Step Forward` cards (`[ ↑ ] [ ↑ ]`) instead of one?
3. When the Robot sees a `↻ Turn` card, does the Robot move into a new square or spin its toes inside the same square?

Worked answers for closing check

1. **One card** (1 `↑ Step Forward` card) to reach the Gold Star 1 square ahead.
2. **Two cards (`[ ↑ ] [ ↑ ]`):** The Robot walks **right past** the Gold Star into the top-left square (`Row 3, Col 1`)!
3. **Turn card (↻):** It **spins its toes inside the same square** (it does not step into a new square).

Differentiation

- **Extra support:** Give the Robot a paper steering wheel or tape a big paper arrow onto the top of their shoes so everyone can see which way the Robot is facing before reading the next card.
- **Extra challenge:** Place a plush puppy on one square as a "Sleeping Puppy" obstacle and ask students to build a path to the Star that walks around the puppy without waking it up.

⚠ Safety

- Walk slowly one square at a time inside the tape grid; never run or jump across squares.

Teacher notes

- **Common misconception:** Just like in Grade 3 grid algorithms, young children naturally combine "Turn and step" into one motion. Practicing **"Glue your heels to your square while you turn"** makes the distinction between `Turn` and `Step Forward` crystal clear and fun.

Lesson 3: Oops, Wrong Square! — Fixing a Bug on the Rug

- **Unit:** Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)
- **Time:** 30 minutes
- **Grouping:** Whole class around the 3×3 floor tape grid, then pairs

Learning objective

Students will watch a Robot follow a broken arrow-card path, point to the exact card that caused the Robot to miss the Gold Star or step in a Mud Puddle (**a bug**), and fix the path.

Materials

- The 3×3 floor tape grid from Lesson 2
- 6 large Arrow Cards (`↑ Step Forward`, `↻ Turn Toward Door`, `↺ Turn Toward Window`)
- 1 paper **Gold Star (★)** and 1 brown paper **Mud Puddle (▯)**
- Per pair (for Mystery 3): a 3-square paper strip (`[ Start ] [ Middle ] [ ★ ]`), 3 paper `[ ↑ ]` cards, and 1 **large wooden block or plush robot token** (at least 5 cm wide; do not use coins or small erasers)

Vocabulary

- **Bug:** A mistake in our arrow cards that sends the Robot to the wrong square.
- **Fix (Debug):** Finding the wrong card and trading it for the right card so the Robot reaches the goal.
- **Test:** Having the Robot walk the cards from the beginning to check if our fix worked.

Lesson flow

✎ 1. Opening: The Mud-Puddle Mistake (6 min)

1. Set up the 3×3 floor grid with:
2. **Robot (R)** at Bottom-Left (`Row 1, Col 1`), facing **Up (↑)**
3. **Gold Star (★)** at Middle-Left (`Row 2, Col 1`, 1 square straight ahead)
4. **Mud Puddle (▯)** at Top-Left (`Row 3, Col 1`, 2 squares straight ahead)
5. Lay down **two** `↑ Step Forward` cards: `[ ↑ ] [ ↑ ]`.
6. Act out the Robot:
7. Card 1 (↑): Step onto the Gold Star (`Row 2, Col 1`)—"Yay!"
8. Card 2 (↑): "Wait, there is still another card! Robots must follow every card!" Step forward off the Star and SPLASH! right into the Mud Puddle (`Row 3, Col 1`)!
9. Ask: "Oh no! Why did the Robot step into the Mud Puddle? Which card was the **bug**?"
10. Students point to the **extra second ↑ card**! Take away the second ↑ card and **test** again—now the Robot stops safely on the Gold Star.

✎ 2. Main activity: Three Bug-Fix Mysteries (15 min)

Invite student **Bug Detectives** to solve three broken programs on the rug:

1. **Mystery 1 — The Too-Short Recipe (Missing Card Bug):**
2. **Goal (★):** Top-Left (`Row 3, Col 1`, 2 squares straight ahead from Start).
3. **Broken Cards on Rug:** `[ ↑ ]` (only 1 card!).
4. **Test:** Robot takes 1 step to the middle square and stops one square short of the Star.
5. **How to Fix:** Add one more **`[ ↑ ]`** card at the end (`[ ↑ ] [ ↑ ]`) and re-test!
6. **Mystery 2 — The Wrong-Way Turn Bug:**
7. **Robot (R):** Starts in the **Bottom-Middle square (`Row 1, Col 2`)**, facing **Up (↑)**.
8. **Goal (★):** Middle-Right square (`Row 2, Col 3`, toward the Door).
9. **Mud Puddle (▯):** Middle-Left square (`Row 2, Col 1`, toward the Window).
10. **Broken Cards on Rug:** `[ ↑ ] [ ↺ Turn Toward Window ] [ ↑ ]`.
11. **Test:** Robot steps up to the center square, turns toward the Window, and steps into the Mud Puddle!
12. **How to Fix:** Which card was the bug? **Card 2 (`↺ Turn Toward Window`)!** Swap Card 2 for **`[ ↻ Turn Toward Door ]`**, then re-test from the start to watch the Robot land on the Gold Star!
13. **Mystery 3 — Pair Tabletop Bug Fix (5 min):**
14. Each pair gets a small 3-square strip drawn on paper (`[ Start ] [ Middle ] [ ★ ]`) and 3 paper arrow cards placed on the side: `[ ↑ ] [ ↑ ] [ ↑ ]`.
15. Partners slide their large wooden block or plush robot token along the 3 squares, see that 3 steps goes off the end of the paper strip, and remove 1 `↑` card so their token lands right on `[ ★ ]`.

✓ 3. Discussion questions (4 min)

- **Question 1:** "When our Robot stepped in the Mud Puddle, was the Robot being naughty, or was it just following our cards?"
- Example good answer: The Robot was doing its job following the cards! The mistake (**bug**) was in the cards, not the Robot.
- **Question 2:** "Why do we always walk the path again from the Start square after we change a card?"
- Example good answer: To **test** our fix and make sure the new cards really reach the Gold Star!

✓ 4. Closing check (5 min)

1. A Robot needs to move **2 squares forward** to reach the Gold Star (`[ Start ] → [ Square ] → [ ★ ]`), but the programmer only put down **1 `↑` card**. Where will the Robot stop, and how do you fix the bug?
2. What do computer scientists call a mistake in a list of instructions?
3. After you fix a bug in your arrow cards, what should you do next to be sure your fix works?

Worked answers for closing check

1. The Robot stops **1 square too early** (on the middle square). Fix it by **adding one more `↑ Step Forward` card** (`[ ↑ ] [ ↑ ]`).
2. A **bug**.
3. **Test it** by having the Robot walk the arrow cards from the Start square.

Differentiation

- **Extra support:** Touch each arrow card with a pointer stick at the exact moment the Robot takes that step so students see the 1-to-1 match between the card on the floor and the Robot's footstep.
- **Extra challenge:** Give pairs a path with **two** bugs (wrong turn AND one missing forward step) to fix one bug at a time.

⚠ Safety

- Use only **large wooden blocks, plush toys, or large paper cards** (at least 5 cm across) as tabletop robot tokens; never use coins, beads, or small erasers that could be a choking hazard for 5-year-olds.
- Keep only one student walking inside the 3×3 floor tape grid at a time while classmates sit around the outside edge.

Teacher notes

- **Building a warm debugging culture:** Celebrate bugs with a cheerful class phrase like "Hooray, we found a bug! Now we can fix it!" so 5-year-olds view mistakes as normal, fixable puzzles rather than personal failures.

Lesson 4: Do It Again! — Repeating Action Patterns

- **Unit:** Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)
- **Time:** 30 minutes
- **Grouping:** Whole class on the rug, then pairs

Learning objective

Students will identify the repeating unit in a 2-step or 3-step movement/picture **pattern**, perform a pattern a counted number of times (**a loop**), and say what action comes next.

Materials

- Picture cards for action moves:
- **Clap Hands (👏)**
- **Pat Knees (🙌)**
- **Touch Head (🗣️)**
- **Jump Up (⬆️)**
- Number cards `2` and `3` (to show "Do this pattern 2 times" or "3 times")

Vocabulary

- **Pattern:** Steps or pictures that repeat in the exact same order over and over.
- **Repeat (Loop):** Doing the same small group of steps again and again.

Lesson flow

✎ 1. Opening: The Echo Dance (6 min)

1. Without explaining first, perform a steady, slow movement pattern while saying the words: `Clap — Pat Knees — Clap — Pat Knees — Clap — Pat Knees ...`
2. Pause with your hands in the air after `Clap` and ask: "What move comes next?" (`Pat Knees`!)
3. Tape the 6 picture cards on the board: `[ 👏 Clap ] [ 🙌 Pat ] [ 👏 Clap ] [ 🙌 Pat ] [ 👏 Clap ] [ 🙌 Pat ]`
4. Ask: "Look at this long line of 6 cards! Which two cards keep happening over and over?"
5. Draw a big circle around the first two cards **`( [ 👏 Clap ] [ 🙌 Pat ] )`** and put the number **`3`** beside the circle: "Do *`Clap, Pat`* **3 times**!"

✎ 2. Main activity: Shrinking Long Recipes with "Repeat" (15 min)

1. **Counted Loops with Our Fingers (5 min):**
2. Show how we can do a 2-card pattern **`3 times`**:
    - Pattern inside the circle: **`( [ 🗣️ Touch Head ] → [ 👏 Clap ] )`**
    - Number card outside: **`3 times`**

3. One student stands by the board as the **Counter**, holding up 1 finger for Round 1 (`Touch Head, Clap`), 2 fingers for Round 2 (`Touch Head, Clap`), and 3 fingers for Round 3 (`Touch Head, Clap` — "STOP!").
4. **Grid Walk Connection (4 min):**
5. Look back at our floor tape grid: if a Robot wants to walk **3 squares straight ahead**, instead of saying "Step forward, Step forward, Step forward", we can circle **one** `[ ↑ Step Forward ]` card and put the number `3` next to it ("Step forward 3 times").
6. **Partner Dance-Loop Inventors (6 min):**
7. Each pair picks **2 action cards** (for example, `[ Pat Knees ]` and `[ Jump Up ]`) and a number card (`2` or `3`).
8. Partner A points to the cards and counts the rounds (`1... 2... 3!`) while Partner B acts out the repeating robot dance, then they switch!

✓ 3. Discussion questions (4 min)

- **Question 1:** "Why is it easier to say 'Clap and Pat 3 times' than to tape 6 separate cards across the whole wall?"
- Example good answer: Because it uses fewer cards and takes less space while telling the robot the exact same dance!
- **Question 2:** "Where else in our day do we do the same small pattern over and over?"
- Example good answer: Walking (`Left foot, Right foot, Left foot, Right foot`), brushing teeth (`Up, Down, Up, Down`), or singing the chorus of a song!

✓ 4. Closing check (5 min)

1. Look at this action pattern: **`Clap – Stomp – Clap – Stomp – Clap – ?`** What action comes next?
2. If our circled pattern is **`( Touch Nose → Wave Hand )`** and the number card says **`2 times`**, how many times will you wave your hand in total?
3. What does the word **repeat** mean?

Worked answers for closing check

1. **`Stomp`** comes next.
2. **2 times** (`Touch Nose, Wave Hand` [1], `Touch Nose, Wave Hand` [2]).
3. To do the same step or group of steps **again**.

Differentiation

- **Extra support:** Use **large two-color paper cards or oversized wooden blocks** (`Red, Blue, Red, Blue, Red, Blue`, at least 5 cm wide; avoid small linking cubes or beads that could be a choking hazard) that students can group into three matching `(Red-Blue)` pairs to see and hold the repeating unit.
- **Extra challenge:** Try a **3-step pattern** (`Clap → Pat Knees → Jump`) repeated `2 times` (6 moves total).

⚠ Safety

- Ensure students have an arm's-length of clear floor space around them before doing standing movement patterns (`Pat Knees`, `Jump Up`), and offer seated hand/card alternatives for any student who prefers not to jump.
- Use only large paper cards or oversized wooden blocks (`≥ 5 cm`); do not use small linking cubes or beads with 5-year-olds.

Teacher notes

- **Connection to Grade 2 and Grade 3:** This physical "Circle the pattern + Number card" notation prepares students directly for Grade 2 repeating pattern blocks and Grade 3 `REPEAT n TIMES` loops.

Lesson 5: Push a Button, Make It Go — Buttons and Actions

- **Unit:** Step-by-Step Robot Recipes and Floor-Grid Paths (Computing, Kindergarten)
- **Time:** 30 minutes
- **Grouping:** Whole class and pairs

Learning objective

Students will connect a physical **button push** (input) to the specific **sound or action** (output) a machine performs, and combine a 3-square floor-grid walk with a button press in the unit finale.

Materials

- 3 large paper "Buttons" taped to the board or easel:
- **Blue Star Button (⋆):** Makes the machine do **2 Star Jumps**
- **Yellow Bell Button (□):** Makes the machine sing **"Ding-Dong!"**
- **Purple Frog Button (□):** Makes the machine say **"Ribbit!" and crouch low**
- The 3×3 floor tape grid and Arrow Cards (↑, ↺, ↻) from Lessons 2–3
- 1 large `[ □ PUSH BUTTON ]` command card (tells the Robot to press the paper button on its square)

Vocabulary

- **Button (Input):** Something you push or tap to tell a machine what to do.
- **Action / Sound (Output):** What the machine does, shows, or plays after you push the button.

Lesson flow

✎ 1. Opening: Pushes That Send a Message (6 min)

1. Connect to Kindergarten Science: Pushes and Pulls:
2. In Science, we learned that a **push** moves an object away from you—like pushing a toy car across the floor.
3. Ask: "What happens when you **push** the doorbell button beside someone's front door? Does the house roll down the street, or does something else happen?"
4. Students answer: It rings a bell ("Ding-dong!") inside the house!
5. Explain: On machines and computers, pushing a **button** sends a message telling the machine which **action or sound** to do!

✎ 2. Main activity: The Three-Button Machine & Grid Finale (15 min)

1. **Whole-Class Sound & Action Machine (6 min):**
2. Point to the 3 paper buttons on the board (**Blue Star ⋆**, **Yellow Bell □**, **Purple Frog □**).

3. Tell the class: "All of you are the Classroom Computer! Do NOT make a sound until a human finger pushes one of your buttons!"
4. Invite a student up to gently press:
    - **Yellow Bell Button (🔔)** → Class sings "Ding-dong!"
    - **Purple Frog Button (🐸)** → Class says "Ribbit!" and crouches
    - **Blue Star Button (★)** → Class does 2 Star Jumps
5. Ask: "Why didn't the computer say 'Ribbit' when I pushed the Yellow Bell button?" (Because each button has its own matching rule!)
6. **Partner Button Pads (4 min):**
7. Pairs draw 2 buttons on a sheet of paper (for example, a **Cat Button** and a **Drum Button**).
8. Partner A taps one paper button; Partner B acts out the matching sound or move, then they switch.
9. **Unit Finale — Walk the Grid and Push the Button! (5 min):**
10. Place the **Yellow Bell Button (🔔)** on one corner of the 3×3 floor grid and the **Purple Frog Button (🐸)** on another corner.
11. Show the new `[ 🔔 PUSH BUTTON ]` command card, then together lay down the cards (`[ ↑ ]` `[ ↑ ]` `[ 🔔 PUSH BUTTON ]`) to guide the Robot 2 squares forward onto a button and press it. When the Robot reads `[ 🔔 PUSH BUTTON ]` and taps the button on its square, the whole class performs that button's sound!

✓ 3. Discussion questions (4 min)

- **Question 1:** "Name one real button you push at home or school, and tell what happens right after you push it."
- Example good answer: Pushing the wall switch turns on the classroom lights; pushing the crosswalk button makes the walk sign light up; pushing the water fountain button makes water bubble up.
- **Question 2:** "What did we learn across all five of our Robot Recipe lessons?"
- Example good answer: We learned to put steps in `First, Next, Last` order (Lesson 1), follow arrow cards on a grid (Lesson 2), fix **bugs** when we miss the star (Lesson 3), **repeat** patterns (Lesson 4), and push **buttons** to make actions happen (Lesson 5)!

✓ 4. Closing check (5 min)

1. In our classroom game, **Yellow Bell Button = "Ding-Dong!"** and **Purple Frog Button = "Ribbit!"**. If a student pushes the **Yellow Bell Button**, what sound comes out?
2. Put these 3 steps for using a toy music box in `First → Next → Last` order:
3. **(A)** Listen to the music play
4. **(B)** Walk over to the table where the music box sits
5. **(C)** Push the green Start button on top of the box
6. On our floor grid, the Robot is 1 square away from the Blue Star Button, facing straight at it. Which card does the Robot need to reach the button square: `↑ Step Forward` or `↻ Turn`?

Worked answers for closing check

1. **"Ding-Dong!"**
2. **First: (B)** Walk over to the table → **Next: (C)** Push the green Start button → **Last: (A)** Listen to the music play.
3. `↑ Step Forward`.

Differentiation

- **Extra support:** Use real tactile props (such as a tap-light puck or three upside-down paper cups of different colors/shapes) for students to press.
- **Extra challenge:** Add a **"Power Switch (ON / OFF)"** paper card next to the 3 buttons: if the Power Switch is turned to `OFF`, pressing any of the 3 buttons produces **silence** until a programmer flips the Power Switch back to `ON`!

Teacher notes

- **Preparing for Grade 1 and Grade 3:** This lesson plants the seed for Grade 1's two-state signals (`ON / OFF`) and Grade 3's formal **Input → Processing → Output** model through playful, concrete cause-and-effect.