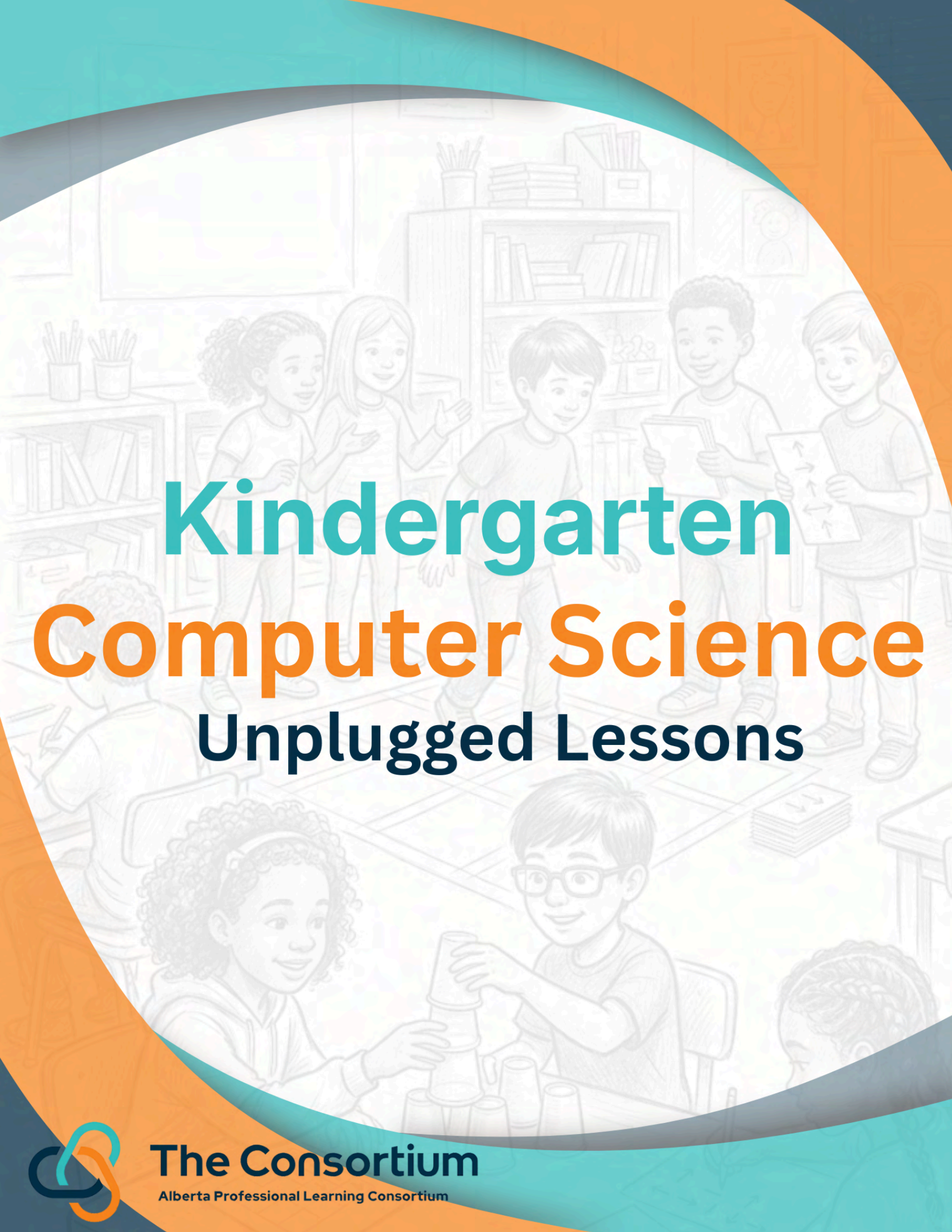




Kindergarten Computer Science Unplugged Lessons



The Consortium
Alberta Professional Learning Consortium

Unit Overview: The Power of Instructions

Organizing Idea: Computer Science (Computational Thinking & Design)

Guiding Question: How can instructions be used?

Learning Outcome: Children interpret instructions in various environments.

Lesson 1: What Are Instructions? (Foundational Knowledge)

Focus: Understanding what instructions are and why we need them (safety, task completion).

Summary: Students will explore instructions in everyday life (home, nature, games). The teacher will introduce instructions using different formats: speaking, pictures, and gestures. Students will practice matching a physical action to a visual or spoken cue (e.g., a picture of a hand stop sign means "freeze").

Assessment: Check if students can match an action to its corresponding instruction and recognize when an action *doesn't* match.

Lesson 2: Action Deck (Playing Cards Activity)

Focus: Interpreting symbols as instructions and recognizing context.

Summary: In this lesson, a standard deck of playing cards is used to symbolize physical actions. For example: Hearts = Hop, Diamonds = Clap, Spades = Stomp, Clubs = Spin. The teacher flips a card, and students must interpret the symbol and perform the correct action. The class will discuss how the game rules keep everyone safe and organized during the activity.

Assessment: Observation of students correctly interpreting the symbol instructions and engaging safely in the environment.



Lesson 3: The Order Matters! (Introduction to Sequences)

Focus: Exploring how instructions have steps, and how the order of those steps affects the outcome.

Summary: Students will practice following simple two-step instructions (e.g., "Put on your shoes, *then* tie them" vs. "Tie your shoes, *then* put them on"). Through silly physical examples and short classroom tasks, students will identify differences in outcomes when the sequence of two steps is flipped.

Assessment: Students successfully identify if a two-step sequence achieves the correct outcome or if the order causes a mistake.

Lesson 4: Grid Adventures (3×3 Grid Navigation)

Focus: Following a two-step visual sequence to reach a goal.

Summary: Students work in small groups with a physical 3×3 floor grid, a movable play piece (like a toy animal), and physical arrow coding cards (Forward, Turn). The teacher or a peer provides a precise two-step sequence of arrow cards (e.g., $\rightarrow$, $\rightarrow$). Students must move their play piece along the grid corresponding exactly to those instructions.

Assessment: Observation of students accurately following a two-step sequence on the grid.

Lesson 5: I Am the Programmer (Communicating Instructions)

Focus: Creating and communicating a sequence of instructions.

Summary: Flipping the role from Lesson 4, students will now become the "programmers". Using the 3×3 grids or a classroom path, students will select a goal destination and physically arrange or verbally communicate a sequence of two steps to guide a classmate or a toy to that spot.

Assessment: Students successfully communicate a clear, two-step sequence to achieve a specific purpose.

How does this structural flow look for your Kindergarten students? If you like this outline, we can dive into the full lesson plan for Lesson 1, or jump straight into designing the materials for the grid activities.

Kindergarten CS Lesson 1

Lesson Title: What Are Instructions?

Subject Area: Science (Computer Science)

Grade Level: Kindergarten

Duration: 50–60 minutes



Lesson Overview

This introductory lesson establishes the foundational knowledge that instructions are directions that can be followed to achieve a goal, stay safe, or complete a task. Kindergarten students learn to recognize instructions in multiple everyday environments (home, nature, games) and explore different ways instructions can be communicated: by speaking, pictures, or gestures.

Learning Objectives: By the end of this lesson, students will be able to:

- ☐ Define instructions as directions we follow.
- ☐ Match a physical action to its corresponding spoken, visual, or gestural instruction.
- ☐ Identify why following instructions keeps us safe.

Essential Questions:

- ★ What is an instruction?
- ★ How do we share and follow instructions?
- ★ Why do we need instructions?

Materials & Resources

Category	Item Description
Classroom Tools	Three large printed signal signs: A Red Octagon (Stop), a Green Arrow (Go), and a Waving Hand (Say Hello).
Technology	Document camera or projector to display pictures (Optional).
Files/Handouts	Kindergarten CS Lesson 1 Worksheet

Kindergarten CS Lesson 1

Instructional Procedure

5–10 min | The Hook

Activity Description: Activate prior knowledge using a simple game of "Teacher Says" (a variation of Simon Says).

Teacher Instructions: Have all students stand up at their mats or desks. Explain that they must only do the action if you say "Teacher says" first.

Teacher Script: > *"Good morning, everyone! We are going to play a quick game. Stand up tall! If I say 'Teacher says clap your hands,' I want you to clap. But if I just say 'Clap your hands' without the magic words, freeze like a statue! Let's try: Teacher says, touch your nose! Good. Teacher says, jump once! Great. Now... pat your head! Ah, I caught a few of you moving! Freeze!"*

Connecting to Concept: > "In our game, my words were **instructions**. Instructions are just directions that tell us what to do! Today, we are going to learn how to be excellent instruction followers and instruction detectives."

15–20 min | Direct Instruction

Activity Description: Define instructions and demonstrate the three ways they can be delivered (speaking, pictures, gestures).

Teacher Instructions: Sit students on the carpet. Use your voice, the printed signs, and body language to model the concepts.

Teacher Script:

"Computers and people both need instructions to know what to do. Instructions help us build toys, play games, and keep us safe. We can get instructions in three cool ways:

1. **Speaking:** This is when we listen to words. If your grown-up at home says, 'Please put on your coat,' that is a spoken instruction. 2. **Pictures:** This is when we use our eyes. (Hold up the Red Octagon sign). Look at this shape. What does this picture tell a car to do? Yes, it says STOP! 3. **Gestures:** This is using our bodies without talking. If I put my finger to my lips like this (model the 'shh' gesture), what is my body instructing you to do? Right, to be quiet and listen."

Modeling Incorrect Matching: > "What if I hold up this Green Arrow (Go) sign, but I sit completely still and freeze? Does my action match the instruction? No! A good instruction follower makes sure their action matches the direction exactly."

Kindergarten CS Lesson 1

20–30 min | Guided Exploration

Activity Description: "The Instruction Hunt" and "The Symbol Match" game.

Teacher Instructions: 1. Tell students you are going to call out different environments (home, nature, games). They have to call out an instruction they might hear or see there. 2. Transition to a physical game using the three printed signs.

Teacher Script (Part 1 - Discussion):

"Let's be detectives. Think about when you are out in **nature** or at the park. What is an instruction a teacher or parent gives you to keep you safe? (Expected answers: 'Don't touch that sharp stick,' 'Stay on the path') . Excellent. What about when you play a **game**? What is an instruction there? (Expected answer: 'Roll the dice,' 'Wait for your turn') ."

Teacher Script (Part 2 - Movement Practice):

"Now we are going to practice matching our actions to instructions. I am going to hold up a sign, and you must do the action immediately. If I hold up the Green Arrow, march in place! If I hold up the Red Octagon, freeze! If I hold up the Waving Hand, wave and say 'Hello!' Keep your eyes sharp!"

Teacher Note: Intentionally mix up the speed. Hold up the Red sign while saying "Go" out loud to see if they follow the visual instruction or the spoken one, testing if they recognize when actions do not correspond.

10 min |Closure

Activity Description: Reflection circle and a peek into the next lesson.

Teacher Instructions: Have students sit back in their spots. Review the core definition.

Teacher Script:

"You did an amazing job today! Who can tell me, what is an instruction? (Expected answer: Directions on what to do). Why do we need them at the crosswalk or in the kitchen? (Expected answer: To keep us safe!) Tomorrow, we are going to use a real deck of playing cards, but instead of playing a card game, the cards are going to turn into secret symbol instructions for a fitness circuit! See you tomorrow, programmers!"

Kindergarten CS Lesson 1

Differentiation

Visual Cues: Leave the physical signs (Stop, Go) visible on the board with a small drawing of the action next to them (e.g., a stick figure marching next to the green arrow) to support non-verbal or ELL students.

Peer Pairing: For the discussion portion, allow students to turn and talk to a partner first using the sentence starter: *"An instruction I hear at home is..."*

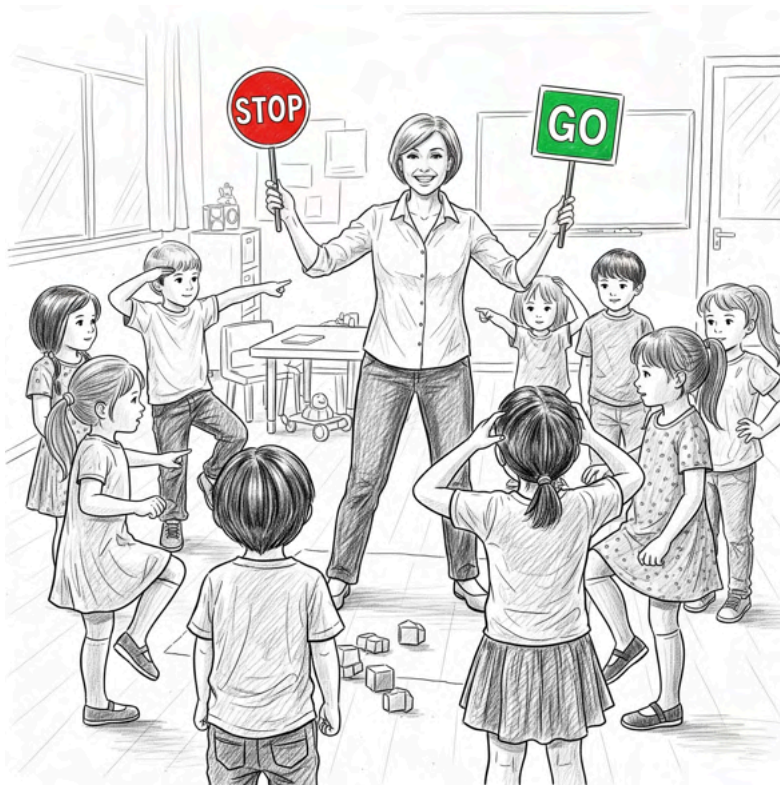
Extensions

Two-Step Challenge: For students showing immediate mastery, give them a spoken two-step instruction during the movement game (e.g., *"Touch your toes, then clap your hands"*), previewing the sequencing concepts in Lesson 3.

Assessment

Formative Assessment: During the "Symbol Match" movement activity, observe and track students who struggle to match their action to the visual sign or who fail to freeze when the action doesn't correspond to the card shown.

Summative Assessment: (Not applicable for Lesson 1; formative observation of the learning outcome is primary for this foundational knowledge step).



Instructions Detective

Name:

 Activity 1: Match the Instruction

Draw a line from the **place** on the left to the **instruction** that belongs there.

Where are you?	What is the instruction?
At the Crosswalk	 "Roll the dice" (Picture)
In your Bedroom	 STOP (Sign)
Playing a Game	 "Time to sleep" (Spoken)

 Activity 2: Stay Safe!

Instructions help keep us safe. Look at the two pictures below. Circle the picture that shows someone following a **safety instruction**.

Picture A	Picture B
 Walking on the path	 Running into the street

Instructions Detective



Activity 3: Be the Teacher

Draw a picture of an instruction you hear at home or at school.

My Instruction Drawing

Kindergarten CS Lesson 2

Lesson Title: Action Deck: Symbols as Instructions

Subject Area: Science (Computer Science)

Grade Level: Kindergarten

Duration: 50–60 minutes



Lesson Overview

In this lesson, students build on their knowledge of instructions by learning that symbols (pictures or shapes) can represent specific actions. Using a standard deck of playing cards, students will treat each suit as a code or instruction for a physical fitness action. This unplugged computer science activity introduces the concept that symbols carry meaning and rules help keep us organized and safe.

Learning Objectives: By the end of the lesson, students will be able to (SWBAT):

Identify that a symbol can stand for a specific rule or instruction.

Translate a visual card symbol into its corresponding physical action.

Engage safely in a whole-class activity by following game instructions.

Essential Questions:

How can a symbol or picture tell us what to do?

Why do games need rules and instructions?

Curriculum Standards: Alberta Science (K-6) Curriculum – Kindergarten Computer Science:

Interpret instructions in games; match an action to the corresponding instruction.

Materials & Resources

Category	Item Description
Classroom Tools	• 1 standard deck of oversized playing cards (or regular playing cards) • Whiteboard and markers to draw the suit key
Technology	Document camera (Optional, to project the drawn key or cards)
Files/Handouts	Large printed posters of the 4 card suits (available in resource pack)



Kindergarten CS Lesson 2

Instructional Procedure

5–10 min | The Hook

Activity Description: Activating Prior Knowledge with Symbols.

Teacher Instructions: Gather students on the carpet. Draw a giant heart ($\heartsuit$) and a giant smiley face ($\smile$) on the whiteboard.

Teacher Script:

"Welcome back, programmers! Yesterday we learned that instructions are directions that tell us what to do. Look at the board. I didn't write any words here, but what does this first picture mean? (Point to the heart. Expected answer: Love, a heart). What about this one? (Point to the smile. Expected answer: Happy!). Wow, look at that! You read a picture without any words. In computer science, we call these pictures **symbols**. A symbol is a drawing that stands for an instruction or an idea. Today, we are going to use a deck of cards to turn symbols into secret actions!"

15–20 min | Direct Instruction

Activity Description: Coding the Suit Key & Setting Safety Rules.

Teacher Instructions: Hold up a playing card (e.g., a King of Hearts). Point to the suit symbol. Introduce the 4 suits and define their actions on the board.

Teacher Script:

"Cards have four secret symbols on them called suits. Let's make a rule book—a code key—for our game today: • If you see a **Heart**, the instruction is to **Hop!** • If you see a **Diamond**, the instruction is to **Clap!** • If you see a **Spade**, the instruction is to **Stomp!** • If you see a **Club**, the instruction is to **Spin** around once!

Let's practice modeling! If I show you this Diamond... (Hold up a Diamond card)... what should your hands do? (Model clapping). Perfect. What if I show you a Heart, and someone starts spinning? Does their action match the instruction? No way! Remember, to play safely in our classroom game, we must stay on our own mats so we don't bump into our neighbors. Following instructions keeps us safe!"

Kindergarten CS Lesson 2

20–30 min | Guided Exploration

Activity Description: The Action Deck Game.

Teacher Instructions: Have all students stand in their own designated personal space or on individual floor mats. Shuffle the deck. Run the game in three distinct phases:

Phase 1 (Slow Motion): Pull a card, hold it high, and point to the key on the board. Let students process the symbol and perform the action.

Phase 2 (Speed Run): Increase the speed of flipping cards.

Phase 3 (The Glitch!): Purposefully pull a card and perform the *wrong* action yourself (e.g., pull a Spade but start hopping) to see if students catch the mistake.

Teacher Script (During Phase 3):

"Wait a minute! Look at what my body did. I saw a Spade, but I hopped! Did my action match the card instruction? No! You instruction detectives caught my mistake! Let's reset and try again."

10 min | Closure

Activity Description: Reflecting on Rules and Symbols.

Teacher Instructions: Have students sit down in their spaces. Bring the deck together to review the experience.

Teacher Script:

"Phew! Put your hand on your heart—is it beating fast? Mine too! We just ran a whole fitness circuit using symbols. Who can tell me, what instruction did the Diamond give us? (Expected answer: Clap!). Why was it important that we all followed the rule to stay on our own mats? (Expected answer: So we didn't crash or get hurt). You successfully followed instructions using symbols! In our next lesson, we are going to look at what happens when instructions have a first step and a second step, and why the order of those steps matters!"

Differentiation

Support/Scaffolding: Keep physical drawings of a footprint (Stomp), hands (Clap), feet bouncing (Hop), and a circular arrow (Spin) taped directly next to the card suit posters on the whiteboard as a constant visual guide.

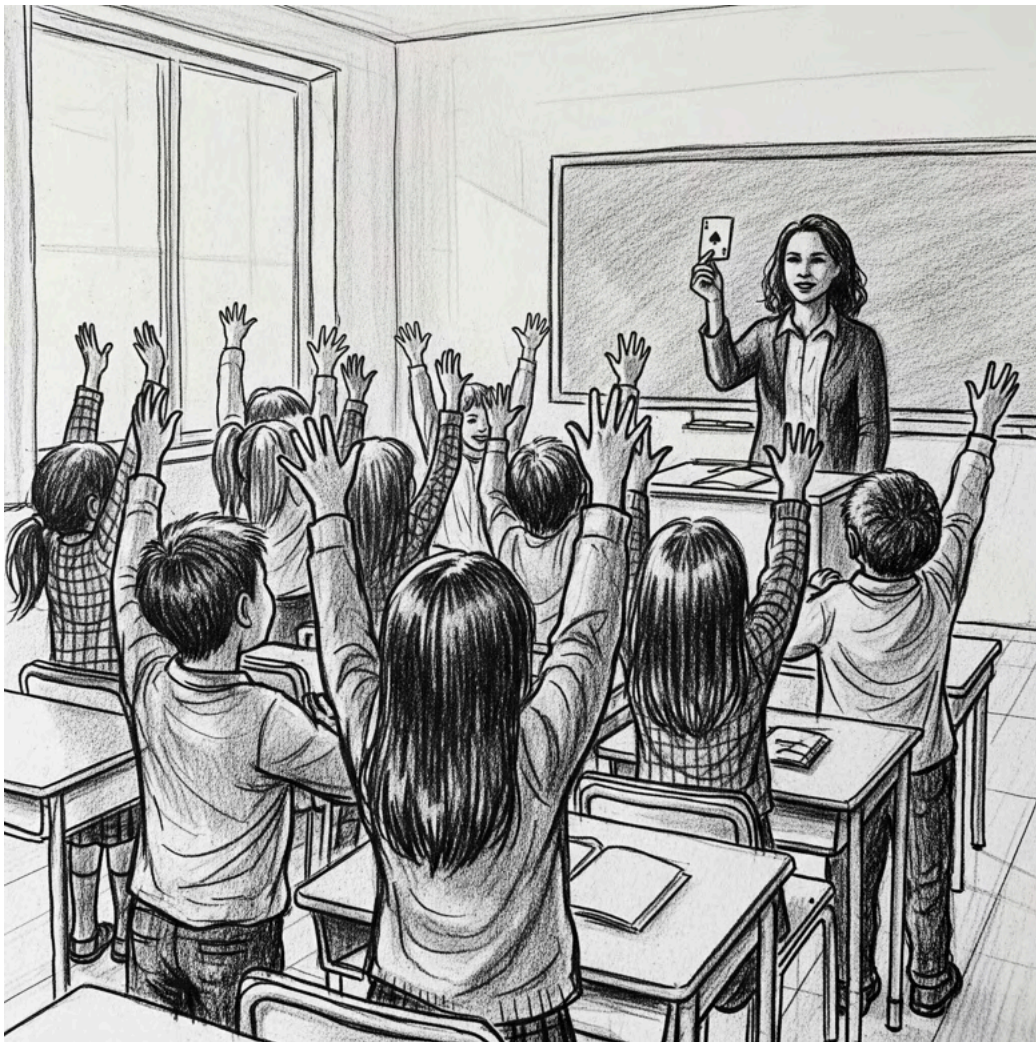
Extensions: Introduce a number challenge. Instead of doing the action just once, look at the number on the card. If the teacher pulls a 3 of Hearts, the students must follow a combined instruction: Hop exactly 3 times!

Kindergarten CS Lesson 2

Assessment

Formative Assessment: Observe the classroom during the game. Take note of any students who consistently look at their peers before executing an action, which may indicate they are struggling to decode the symbol independently. Use the "Glitch" phase to specifically check if students recognize non-corresponding actions.

Summative Assessment: None for this lesson; success is marked by active, accurate participation in translating the symbols into physical movements.



Symbols as Instructions

Name: _____

My Code Key

Look at the card symbol. Draw a line to the action it tells you to do.

			
HOP	CLAP	STOMP	SPIN
			

Draw Your Own Instruction

In the box below, draw a **NEW** symbol (like a star or a square). What secret instruction does it give? Tell your teacher or a friend!

My New Symbol	What it Means (Draw the action)

Kindergarten CS Lesson 3

Lesson Title: The Order Matters! Intro to Sequences

Subject Area: Science (Computer Science)

Grade Level: Kindergarten

Duration: 50–60 minutes



Lesson Overview

This lesson introduces the core concept of sequencing. Students will explore how many tasks (like washing hands, getting dressed, or making a sandwich) require a specific list of instructions performed in a precise order. They will learn that instructions can have one or more steps, and they will physically model what happens when that order is correct versus when it is incorrect ("glitched").

Learning Objectives: By the end of the lesson, students will be able to:

- ☐ Identify that instructions often have multiple steps.
- ☐ Follow a simple sequence of two related steps.
- ☐ Identify differences in outcomes when the order of two steps is changed

Essential Questions:

- ★ Why is the order of instructions important?
- ★ What happens if we do steps in the wrong order?

Materials & Resources

Category	Item Description
Classroom Tools	• Whiteboard and markers. • Real props for modeling: 1 jar of jelly, 1 jar of peanut butter, 1 plastic knife, 2 slices of bread (optional, can also be done visually).
Technology	(Optional) Projector to display simple, large visual icons of everyday actions.
Files/Hand outs	Large printed icons (e.g., A Shoe icon, A Sock icon).

Kindergarten CS Lesson 3

Instructional Procedure

5–10 min | The Hook

Activity Description: Activating Prior Knowledge with Silly Clothes.

Teacher Instructions: Put on your large coat *first*, then attempt (awkwardly and visibly) to put on your smaller gloves over the outside of the coat sleeves. Try to put a shoe on top of another shoe.

Teacher Script:

"Good morning, programmers! I'm trying to follow the instruction 'Get dressed to go outside,' but I'm having trouble! Look... I put my big coat on, and now I'm trying to put my gloves on. It's not working very well. (Struggle comically). Hmm. And I have two shoes on one foot! (Look confused). You are all laughing! Did I get dressed correctly? (Expected answer: No!). You're right. I followed the right steps, but I did them in the wrong order! Computer scientists call the specific order of steps a **sequence**. Today, we are going to learn how order changes the whole game!"

15–20 min | Direct Instruction

Activity Description: Explaining Sequence (The Peanut Butter Problem).

Teacher Instructions: Model a two-step sequence using props or large icons on the board. Introduce the terms "first, then."

Teacher Script:

"A lot of things we do everyday have one, two, or even more steps. When we wash our hands, we can't just get them wet. We have to follow a precise sequence: Put on soap, first, and then scrub them under the water. If we reversed that order (scrub then apply soap), our hands wouldn't get very clean!"

(Hold up the bread and the jelly prop).

Imagine I am your computer. Give me a code—two instructions—to make a jelly sandwich. Which step must happen **first**? (Expected answer: Put jelly on the bread). Okay! (Act this out precisely). What must happen **then**? (Expected answer: Put the other slice of bread on top). You got it! Our outcome is a jelly sandwich."

Now, what if I glitch? What if I try the sequence backwards? If I try to put the top slice of bread on **first** (Hold prop in mouth/hand), and **then** I try to spread jelly (Pretend to spread jelly directly onto the outside of the dry sandwich)... is this the correct outcome? (Expected answer: No, messy!). Right. When the order is changed, the outcome is different!"

Kindergarten CS Lesson 3

20–30 min | Guided Exploration

Activity Description: Reverse That Routine!

Teacher Instructions:

Invite two students (the "robots") to the front of the room. Invite a third student (the "programmer") to give the sequence.

The programmer must select an everyday routine (e.g., getting in a car, putting on shoes and socks, washing hands) and verbally give a *correct*, two-step sequence.

The robot student must execute it exactly.

Then, the programmer (with teacher help) must give the *reversed* order of those same two steps to a second robot student (e.g., "Put on your gloves, THEN put on your coat!"). The rest of the class must loudly yell "GLITCH!" if the order is broken and the outcome is different/silly.

Teacher Script (Supporting the Programmer):

"(Student Name), you are the programmer. Pick one routine: Washing Hands or Getting Dressed for winter. (Programmer picks getting dressed). Okay, pick two steps for our robot. What must happen FIRST? (Expected answer: Sock). What must happen THEN? (Expected answer: Shoe). Class, did our first robot follow the correct sequence? (Expected answer: Yes!). Okay, (Programmer Name), now give me the reverse order of those same steps to the second robot! Tell robot #2: 'Put on your shoe, THEN your sock!' (Programmer repeats instruction). Okay robot, go! Class, is that correct? (Expected answer: NO! GLITCH!). Excellent! You are identifying the messy outcomes of the wrong order!"

10 min | Closure

Activity Description: Reflecting on Order and outcomes.

Teacher Instructions: Have students sit down. Review the core definition of sequencing.

Teacher Script:

"Amazing job today, sequences detectives! We learned that the specific order we follow instructions really matters! Who can tell me what happens when a computer gets the sequence steps mixed up? (Expected answer: It makes a mistake/a glitch!). Yes, the outcome changes! It might even be unsafe or messy!"

Tomorrow, we are going to use everything we know. We know what instructions are, how symbols work, and how order matters. We are going to put all that together on a massive floor grid and program a real (toy) robot to move across the room!"

Kindergarten CS Lesson 3

Differentiation

Support/Scaffolding: Use simple visual icons on the board. Tape pictures of '1. Sock' and '2. Shoe' next to the 'Correct Outcome' sign, and pictures of '1. Shoe' and '2. Sock' next to the 'Glitch' sign so students can physically see the order difference. Use visual hand signals: a thumbs up for correct sequence and a thumbs down (or hands making an X) for glitch.

Extensions: Challenge students who grasp the 2-step sequence to identify a simple 3-step sequence (e.g., 1. Put paint on the brush, 2. Paint the picture, 3. Wash the brush) and identify what happens if the order is changed.

Assessment

Formative Assessment: During the 'Reverse That Routine!' activity, observe which students can successfully give a clear two-step sequence for a purpose (Assessment checkpoint: Communicate a sequence of two steps for a given purpose). Track which students can correctly identify if the robot is performing a sequence "correctly" or in a "glitch/reversed" order (Assessment checkpoint: Identify differences in outcomes when the order of two steps is changed).



Kindergarten CS Lesson 4

Lesson Title: Grid Adventures: Navigating with Code

Subject Area: Science (Computer Science)

Grade Level: Kindergarten

Duration: 50–60 minutes



Lesson Overview

In this lesson, students apply their understanding of symbols and sequencing to a spatial reasoning task. Working with 3x3 grids, arrow cards, and movable play pieces, students will follow specific, two-step visual instructions to navigate their piece from a starting point to a goal. This bridges the gap between following physical directions and reading "code."

Learning Objectives: By the end of the lesson, students will be able to:

- ☐ Interpret directional arrows as instructions for movement.
- ☐ Follow a sequence of two steps related to a learning experience.
- ☐ Demonstrate how the order of two directional arrows changes the final destination of their play piece.

Essential Questions:

- ★ How do we use picture instructions to move from one place to another?
- ★ Why does the order of our arrow cards matter?

Materials & Resources

Category	Item Description
Classroom Tools	• Large 3x3 floor grid (can be made with masking tape). • Small 3x3 paper grids for groups. • Movable play pieces (e.g., toy animals, cars, or blocks).
Technology	None required (Unplugged activity).
Files/Handouts	Printed and laminated "Arrow Coding Cards"

Kindergarten CS Lesson 4

Instructional Procedure

5–10 min | The Hook

Activity Description: The Lost Bear.

Teacher Instructions: Sit the students around the large masking tape floor grid. Place a toy bear in one corner and a "honey pot" (or picture of one) in another square.

Teacher Script:

"Hello, programmers! Look who is visiting us today—it's Coding Bear! But Coding Bear has a problem. He is hungry, and his honey pot is all the way over here. He doesn't know how to get there, and he only understands secret computer code. How can we give him instructions without using our voices? Today, we are going to use arrows to build a path!"

15–20 min | Direct Instruction

Activity Description: Introducing Arrow Cards and Grid Movement.

Teacher Instructions: Hold up the arrow cards. Explain what each symbol means. Model how to place the cards in a sequence (side-by-side, reading left to right) and move the bear accordingly.

Teacher Script:

**"Look at this arrow card (Hold up Forward $\uparrow$). This symbol is an instruction that means 'move forward one square.' What about this one? (Hold up Turn Right $\rightarrow$). This means 'turn to the side.'*

*Watch carefully as I create a sequence of two steps. I am going to place a Forward arrow *first*, and *then* another Forward arrow right next to it. Let's read the code together: Forward, Forward.*

*Now, let's be the computer and follow the instructions. (Move the bear one square forward, pause, then move it one more square forward). We did it! What if I change the order? What if I use a Turn arrow first, and *then* a Forward arrow? (Demonstrate). Look! The outcome is different, and the bear ended up in the wrong square."**

Kindergarten CS Lesson 4

20–30 min | Guided Exploration

Activity Description: Small Group Grid Navigation.

Teacher Instructions:

1. Divide students into small groups of 2–3.
2. Give each group a small 3x3 grid, a toy, and a set of arrow cards.
3. Dictate or display a two-step sequence on the board (e.g. $\rightarrow$ and then $\uparrow$).

Students must build the code with their cards and then physically move their toy piece on their grids to follow the sequence of two steps related to the learning experience.

Teacher Script:

"Now it's your turn to read the code! Put your toy on the star square. Look at the board. My instructions have two steps. Step one: Forward $\uparrow$. Step two: Forward $\uparrow$. Work with your team to build that code with your cards, and then move your toy! Let's see if everyone's toy ends up in the same spot!"

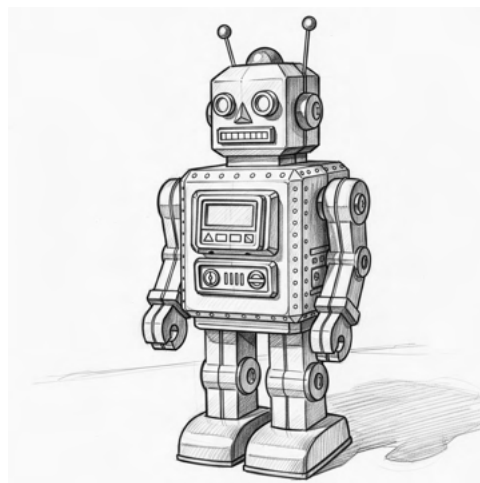
10 min | Closure

Activity Description: Debugging and Debriefing.

Teacher Instructions: Bring the class back together around the main floor grid.

Teacher Script:

"You were amazing code readers today! We followed a sequence of two steps to move our toys safely across the grid. Did anyone's toy end up in a different spot when they accidentally mixed up the order of the arrows? (Allow a few students to share). It's true—the order in which instructions are followed can completely affect the outcome! Tomorrow, in our final lesson, YOU are going to become the master programmers. Instead of reading my code, you are going to write your own two-step sequences to command a robot!"



Kindergarten CS Lesson 4

Differentiation

Support/Scaffolding: For students struggling with left/right orientation, limit the arrow cards to only "Forward" and "Backward" initially to solidify the concept of moving one square at a time before introducing turns.

Extensions: Have advanced groups try placing an obstacle (a block or "rock") on their grid. Give them a sequence that intentionally runs into the rock, and ask them to identify why the outcome failed (debugging).

Assessment

Formative Assessment: Circulate during the small group activity. Observe and note which students can successfully translate the visual arrow symbols into physical movement on the grid. Assess their ability to follow a sequence of two steps related to the activity without skipping steps or changing the order.

Summative Assessment: None for this lesson; the core assessment of these skills will culminate in Lesson 5 when students communicate their own sequences.



Grid Adventures!

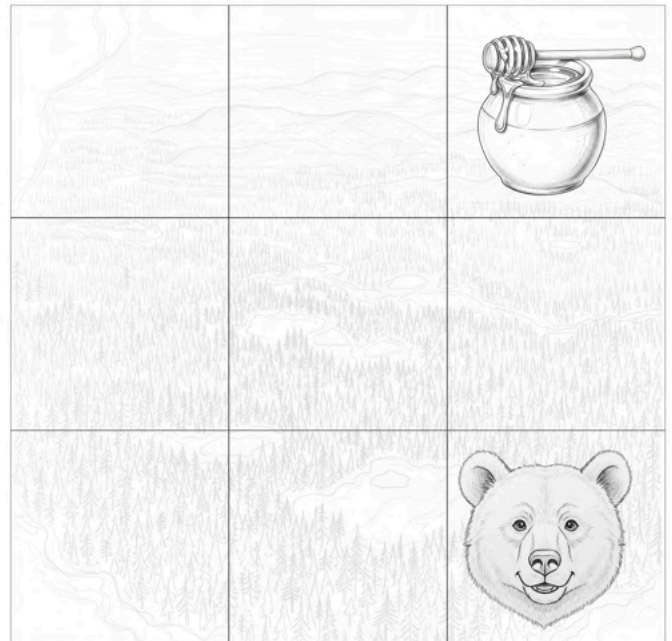
Name: _____

Help Coding Bear Find the Honey!

Coding Bear needs to follow the computer code. Draw arrows to get bear to the honey.

Adventure 1: The Straight Path

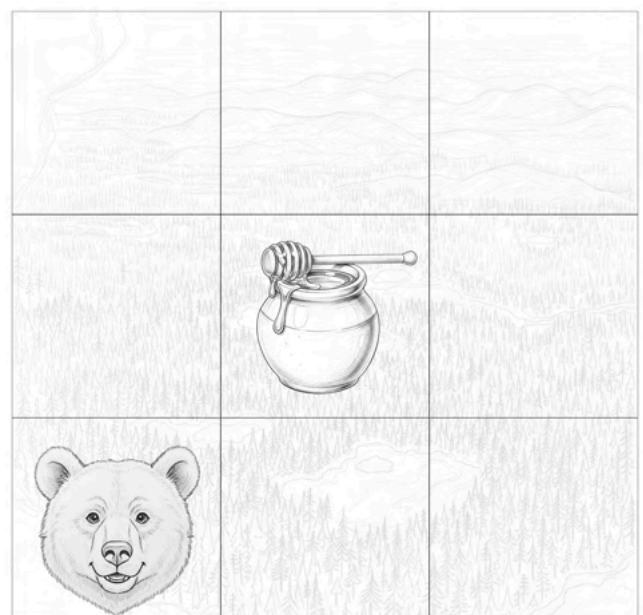
Draw arrows to get bear to the honey.



Did you find the honey?



Adventure 2: The Secret Turn



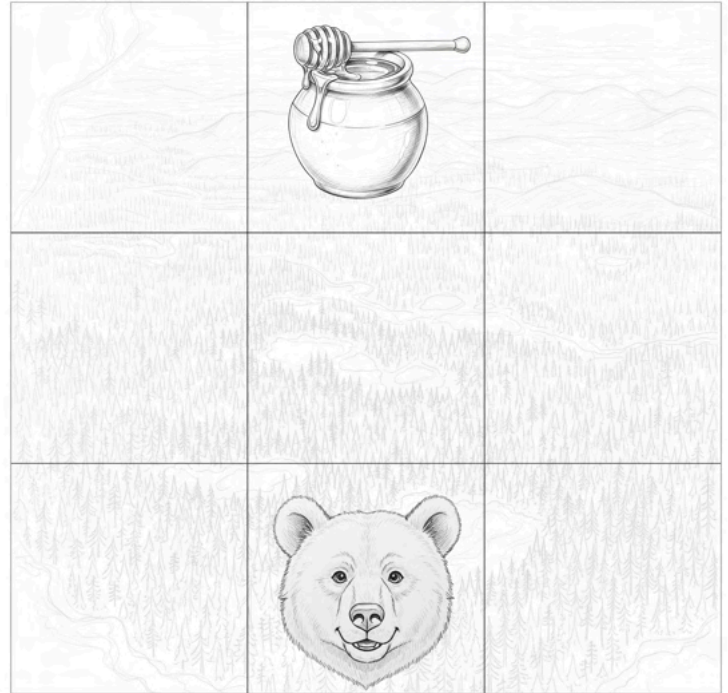
Did you find the honey?



Grid Adventures!

Name: _____

Adventure 3: Your Turn!



Did you find the honey?  

How do you feel about coding?

Circle the face that shows how you feel today!



Kindergarten CS Lesson 5

Lesson Title: I Am the Programmer: Writing Code

Subject Area: Science (Computer Science)

Grade Level: Kindergarten

Duration: 50–60 minutes



Lesson Overview

In this culminating lesson, the roles reverse. Instead of just reading and following instructions, students will step into the role of the "programmer" by creating their own code. Using the 3x3 grids and arrow cards from the previous lesson, students will choose a destination and communicate a precise two-step sequence to direct a classmate or toy to that specific goal.

Learning Objectives: By the end of the lesson, students will be able to (SWBAT):

Communicate a sequence of two steps for a given purpose.

Verify if the outcome of their instructions matches their intended goal.

Essential Questions:

How do we give clear instructions to others?

How do we check if our instructions worked?

Curriculum Standards: Alberta Science (K-6) Curriculum – Kindergarten Computer Science:

Communicate a sequence of two steps for a given purpose.

Materials & Resources

Category	Item Description
Classroom Tools	• Small 3x3 paper grids for partner work. • Movable play pieces (e.g., toy animals, cars). • Small target markers (like a token or a picture of an apple) to place on the grid as the goal.
Technology	None required (Unplugged activity).
Files/ Handouts	Printed and laminated "Arrow Coding Cards" (Forward, Turn Right, Turn Left).

Kindergarten CS Lesson 5

Instructional Procedure

5–10 min | The Hook

Activity Description: The Confused Robot.

Teacher Instructions: Stand at the front of the room with your eyes closed or wearing a silly blindfold. Place a physical object (like a stuffed animal) a few steps away from you.

Teacher Script:

"Programmers, I need your help! I am a robot, and my purpose is to pick up that stuffed animal. But my computer brain is blank! I have no instructions. If I just start walking without instructions, I might bump into a wall! I need a programmer to communicate a sequence of two steps for this purpose. Who can tell me what two steps I should take?" *(Allow a student to say "Take two steps forward" or "Turn left, then step forward." Follow the instructions exactly, even if they are wrong, to show the outcome.)*

15–20 min | Direct Instruction

Activity Description: Modeling How to Write Code.

Teacher Instructions: Gather students around a small 3x3 grid on the floor or project one on the board. Place a toy dog on the start square and a "bone" target two squares away.

Teacher Script:

"Yesterday, you were the robots following my instructions. Today, YOU are the programmers! A programmer's job is to look at a goal and communicate the sequence of steps to get there. Watch how a programmer thinks. My purpose is to get the dog to the bone. I see the bone is straight ahead. I will choose my first step: Forward. I will lay that arrow card down. Am I there yet? No. I need a sequence of two steps. So, my second step will also be Forward. I will lay the second arrow card down next to the first one. Now, I will communicate my sequence. I am going to tell my robot to read my cards: 'Forward, Forward.' Let's test it! (Move the dog). It worked! We achieved our given purpose!"

Kindergarten CS Lesson 5

20–30 min | Guided Exploration

Activity Description: Partner Programming.

Teacher Instructions:

Pair students up (Student A is the Programmer, Student B is the Robot).

Give each pair a 3x3 grid, a toy, a target token, and arrow cards.

The Programmer places the target token anywhere on the grid that is exactly two moves away from the start.

The Programmer selects two arrow cards and lays them down side-by-side to communicate a sequence of two steps for a given purpose.

The Robot reads the cards and moves the toy.

Have them swap roles so every student gets to be the Programmer.

Teacher Script:

"Programmers, it is time to write your code! Decide where you want your toy to go. Then, communicate a sequence of two steps by placing your arrow cards in order. Robots, your job is to follow the sequence exactly. If the toy doesn't make it to the target, don't worry! That is called a bug. Just fix your code and try again!"

10 min | Closure

Activity Description: Celebrating our Computer Science Skills.

Teacher Instructions: Bring the class back together to a circle.

Teacher Script:

"I am so proud of you all! You are officially computer programmers! We learned that instructions are directions we follow. We learned that symbols can give us instructions. We learned that instructions have one or more steps. And today, you were able to communicate a sequence of two steps for a given purpose! You can use these skills every day, whether you are playing a game, building with blocks, or helping out at home. Give your programming brains a big pat on the back!"

Kindergarten CS Lesson 5

Differentiation

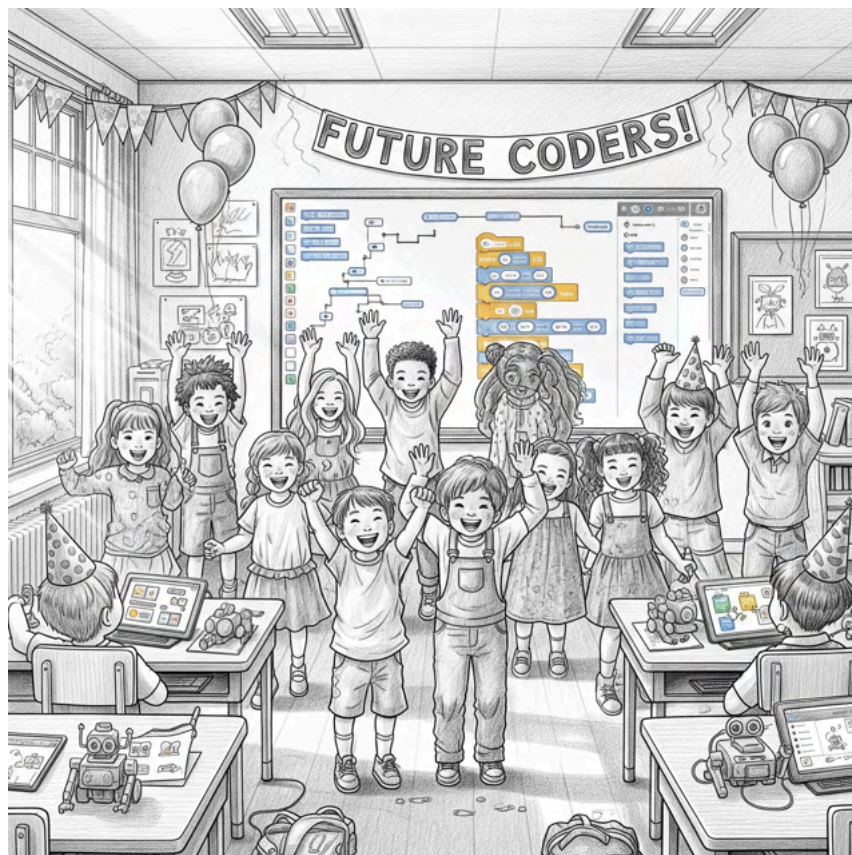
Support/Scaffolding: For students who struggle to plan two steps ahead, have them place one card, move the toy one square, and then figure out the second card. Break the communication down into one step at a time before having them say the full two-step sequence.

Extensions: Provide three cards instead of two and ask advanced students to communicate a three-step sequence to reach a target that is further away or requires a turn.

Assessment

Formative Assessment: Observe the pairs during Guided Exploration. The critical assessment point is whether the student acting as the Programmer can intentionally communicate a sequence of two steps for a given purpose. Note if they select the correct cards to match their goal.

Summative Assessment: Use the observations from this partner activity as the final summative evaluation of the unit's learning outcomes. You may use a checklist to record which students successfully communicated their sequence and which students correctly followed instructions given by their peers.

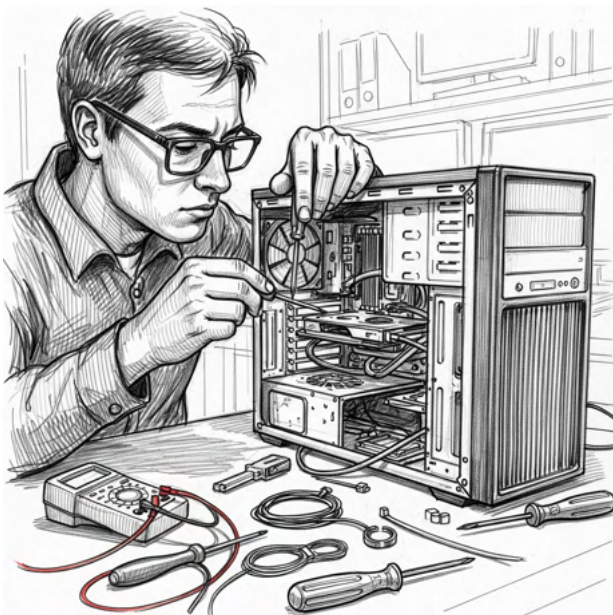


I Am the Programmer!

Name: _____

Part 1: Who is the Programmer?

Circle the pictures of Programmers.

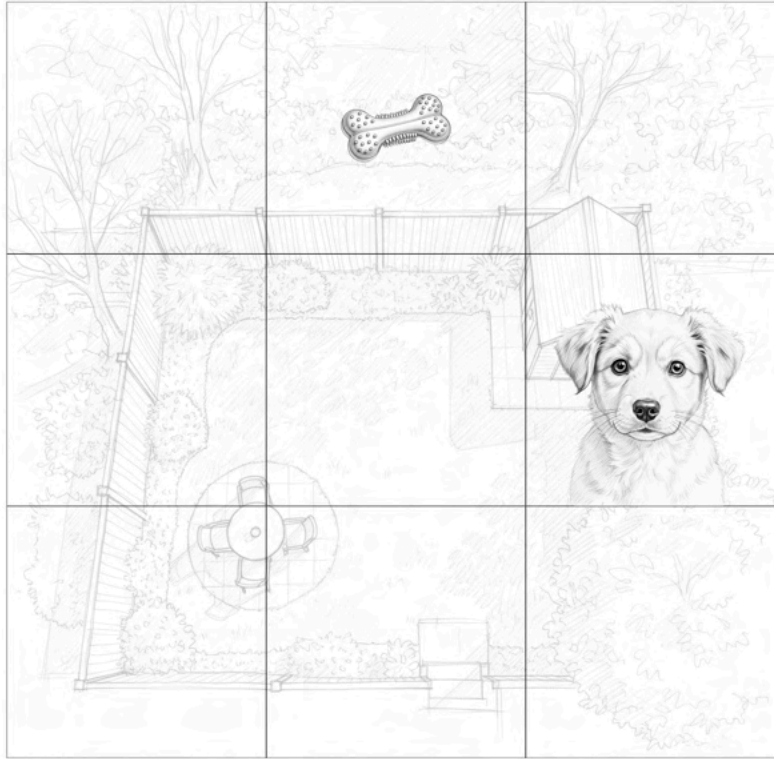


I Am the Programmer!

Name: _____

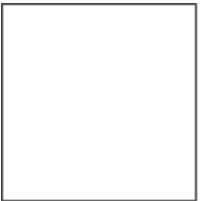
Part 2: Plan Your Path

Your purpose is to get the Dog to the Bone in exactly two steps. Look at the grid below.



Part 3: Write Your Code

Draw the two arrow symbols you need to communicate your sequence.



Part 4: Testing Your Code

Did your instructions work? Circle the face that shows what happened.

