

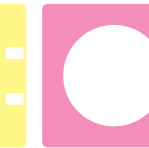
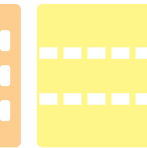
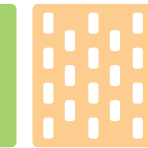
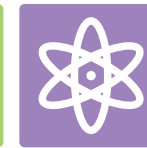
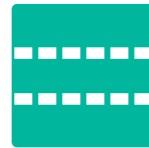


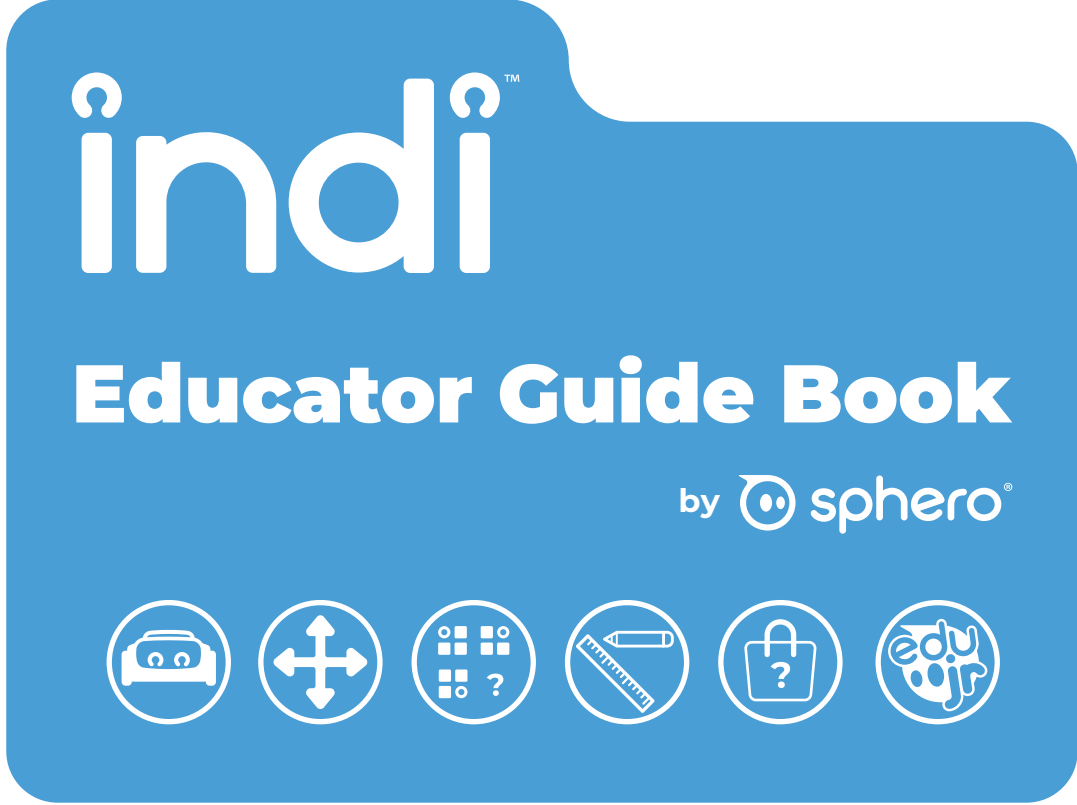
# indi™



## Educator Guide Book

by  sphero®





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## This is indi

Rev up STEAM learning with the indi robot (“indi”)—an entry level robot designed to introduce early learners to the fundamentals of computational thinking, STEAM, and computer science principles.

indi encourages open-ended, imaginative play-based learning with real-life scenarios as learners build custom mazes, solve puzzles, and drive.

indi offers an unplugged experience with an on-board color sensor. Students can also kick their programming skills into high gear with more learning options in the free Sphero Edu Jr app.



## The Importance of Computational Thinking

Before young learners can begin to learn a programming language or assemble computer hardware, they need to learn how to think creatively to solve complex logical problems. The key to preparing young learners to grow up computer science literate is to reinforce computational thinking.

Computational thinking is the thought process involved in finding solutions for complex problems. Often

computational thinking is associated with computer science and programming but can be taught in the absence of any technology.

As young learners develop their computational thinking they are able to think more logically and articulate problems better. As students learn pattern recognition, creating and using algorithms, decomposition, and understanding abstraction they will become better thinkers and problem solvers.



## Decomposition

- The process of breaking down something, like a complex problem, into smaller, more manageable parts.
- Understanding place value or being able to describe a story’s arc requires the learner to break the bigger picture into smaller pieces. Everyday tasks like making a schedule or a shopping list are also examples of decomposition.



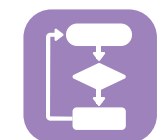
## Pattern recognition

- The analysis of similar objects or ideas to extend or create patterns to better understand a problem.
- Early signs of pattern recognition include being able to sort objects by something like color, or learning to skip count. Realizing that most plants have green leaves or that the sun is seen during the day and the moon during the night are everyday examples too.



## Abstraction

- The process of weeding out the important information and ignoring irrelevant details.
- Abstraction can be difficult for young learners because it generally only exists as an idea and requires the ability to make generalizations and draw conclusions. Examples include being able to identify the main idea of a story or formulate a hypothesis.



## Algorithms

- The development of steps used to solve a problem, often a sequential set of rules that are followed.
- Solving a math problem or writing a computer program are examples of algorithmic thinking, but even everyday tasks like making a peanut butter and jelly sandwich or tying your shoes are examples of algorithmic thinking too.

## Computer Science Teachers Association (CSTA) CS Standards

- **1A-CS-01** Select and operate appropriate software to perform a variety of tasks and recognize that users have different needs and preferences for the technology they use.
- **1A-CS-03** Describe basic hardware and software problems using accurate terminology.
- **1A-DA-05** Store, copy, search, retrieve, modify, and delete information using a computing device and define the information stored as data.
- **1A-DA-06** Collect and present the same data in various visual formats.
- **1A-DA-07** Identify and describe patterns in data visualizations, such as charts or graphs, to make predictions.
- **1A-AP-08** Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.
- **1A-AP-09** Model the way programs store and manipulate data by using numbers or other symbols to represent information.
- **1A-AP-10** Develop programs with sequences and simple loops, to express ideas or address a problem.
- **1A-AP-11** Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
- **1A-AP-12** Develop plans that describe a program's sequence of events, goals, and expected outcomes.
- **1A-AP-14** Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
- **1A-AP-15** Using correct terminology, describe steps taken and choices made during the iterative process of program development.

## Stages of Learning with indi



### Exploration

All learners, especially young learners, benefit from being able to freely explore something new. Through the process, learners develop questions, find answers, and begin to generate new ideas.



### Skills Building

Skills building highlights the skills used during this particular activity. These skills are developed or reinforced through focused practice.



### Challenge

To demonstrate their level of learning during the activity, learners apply their skills and ideas to successfully complete a challenge.



### Extended Challenge

An extended challenge is provided when there is a chance for students to demonstrate additional understanding and skills development.

## Getting Started with indi

### Understanding the Color Sensor

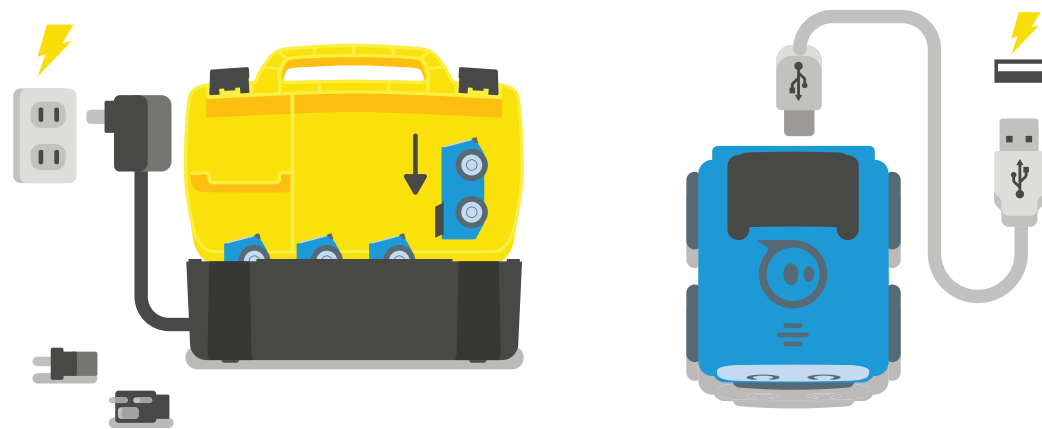
- Each color tile is pre-programmed to instruct indi how to move and operate.
- Some classroom floors may have colorful patterns that could interact with indi's color sensor. If you notice this happening, place the color tiles edge to edge to avoid any interference from other colors.
- Each Student Kit comes with 20 durable silicone tiles. The Class Pack comes with 8 sets of 20 durable silicone color tiles plus an additional 60 color cards for extended learning.

### Charging

- Individual indi
  - ◆ Plug the included USB Micro B cable into indi and the other end into a USB port or wall adapter.
  - ◆ Make sure that you are using the USB cable provided with indi or a USB cable that provides power (rather than a cable that only transports data).
  - ◆ Make sure the USB port is providing enough power to properly charge indi. If you plug the USB cable into your laptop, please ensure your laptop is plugged in to provide enough power. Use a USB wall charger when possible.

- Class Pack

- ◆ Plug the end of power cord into the class pack charging case. Then plug the other end of the power into an outlet.
- ◆ Make sure each indi is seated properly in the charging case.
- ◆ Be sure to check that the charging leads on the bottom of indi are clean and free of any debris.
- ◆ Unplug the charging case for long-term storage.



### Cleaning

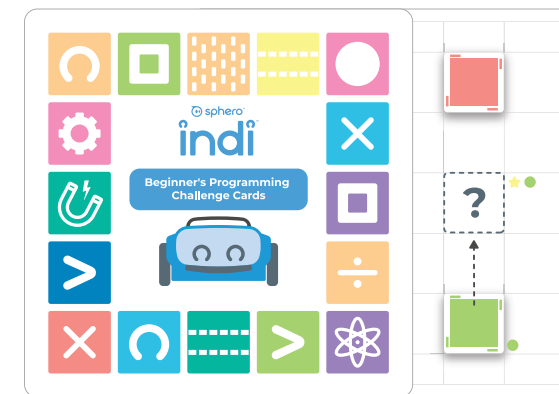
- indi
  - ◆ To clean indi, lightly spray a clean cloth or towel with your preferred disinfectant and wipe indi until clean.
- Color tiles
  - ◆ Do not leave color tiles or color cards in direct sunlight for extended periods of time. This will cause color fade and may affect indi's ability to correctly sense each color.
  - ◆ Wipe or shake color tiles to remove any dirt or debris.
  - ◆ To clear a durable silicone color tile, lightly spray it with your preferred disinfectant and wipe clean with a clean cloth or towel.
  - ◆ Gentle cycle with cold water is also an easy way to clean all color tiles at one time. DO NOT put color tiles in the dryer. Let the color tiles air dry.

### Classroom Management

- Each Student Kit includes everything a small group of students will need to learn.
- Consider including only the necessary color tiles in each student kit for each lesson. This will help reduce distractions and any unnecessary loss of materials.

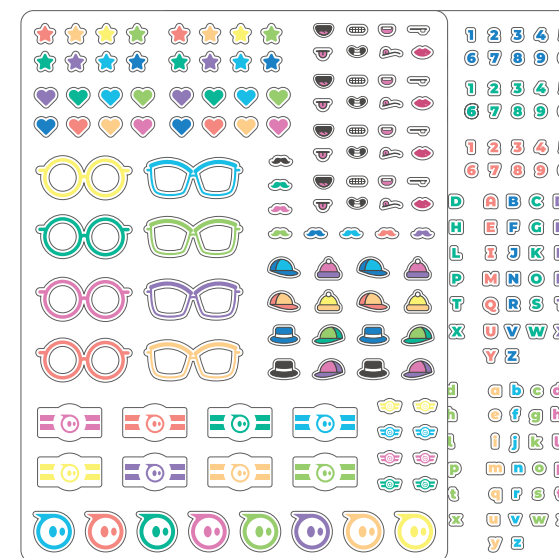
### Beginner's Programming Challenge Cards

- Each Student Kit includes a set of 15 Beginner's Programming Challenge Cards.
- Beginner's Programming Challenge Cards are designed for independent learning and may require additional direction by the teacher before first use.
- Some of the Beginner's Programming Challenge Cards are used in lessons to provide additional scaffolding for learners.
- The grid on each challenge card is there to help students visualize color tile spacing.



### indi Sticker Sheets

- Each Student Kit includes two sheets of decorative stickers that can be used to customize each robot.





# Meet Sphero indi

## Lesson 1: Meet Sphero indi

### Overview

Like most robots, indi has different parts and pieces that help it do all the amazing things it can do. Learn about the different parts that help indi see, move, and light up!

### Objectives

(1) I can identify key parts of indi and explain what they do.

(2) I can teach someone else about indi and how it works.

### Vocabulary

- **Electric motor** - a machine that uses electric energy to create mechanical energy (make something move).
- **LED light** - (L)ight (E)mitting (D)iode, a light source that emits (shines) light when electricity flows through it.
- **Color sensor** - a type of sensor that shines a bright light and detects the light (the color) reflected back.
- **Speaker** - a device that converts an electrical audio signal into a specific sound.

### CS Practices

- **1A-CS-03** Describe basic hardware and software problems using accurate terminology.
- **1A-AP-09** Model the way programs store and manipulate data by using numbers or other symbols to represent information.

### Content Connections

- Social-Emotional Learning
- Multisensory Learning

### Color Tiles Needed

- Green x 3
- Yellow x2



### Preparation

- Each Student Kit needs to have a charged indi robot and the color tiles listed above.
- Students will need 20 or more feet of space to learn how far indi can travel.

## Lesson Steps



### Exploration 1

For many students, this may be their first time seeing or handling indi. Have students open their kits and use their senses to describe what they see, feel, smell, and hear. Have them share one-word descriptions of what they observe (blue, small, plastic, etc).

**Introduce indi to them in a way that personifies their robot. For example:**

*"I want to introduce all of you to indi the robot. indi is new to our school and is going to be a part of our classroom this year. What are some ways we can welcome indi to our class?"*

or

*"Meet indi. indi is on a special trip from its home planet of Spheropa. indi is going to be a part of our class so it can learn what kids on Earth learn in school. What are some things indi should know about our school and classroom?"*

Everyone is new to school at some point in their lives. This is an opportunity to introduce empathy for others. Continue to ask students about different things they can do to make indi feel welcome and things that indi should know about school (routines, expectations, etc).



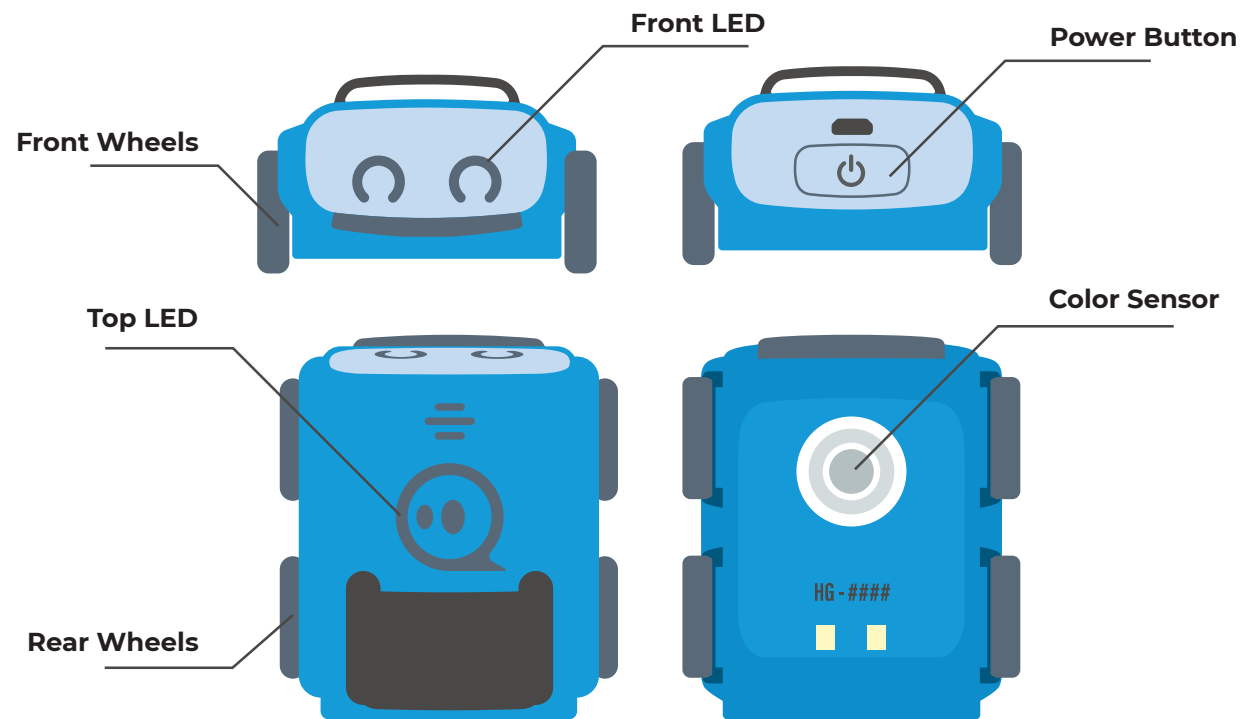
### Exploration 2

Ask students what they see when they hold and look at indi. Do they notice the eyes (front LED lights)? The Sphero logo (top LED light)? The wheels? Is there a difference between the front and rear wheels? What do they see on the backside? Underneath?

If possible, project this image/diagram of indi for all to see.

**Identify and discuss each of the following parts:**

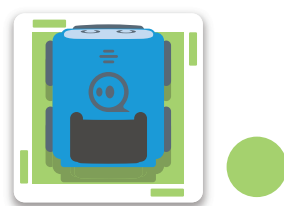
- Front wheels
- Rear wheels (connected to...)
- Electric motor
- Front LED lights
- Top LED light
- Color sensor
- Power button



Describe the color sensor in terms of “how indi sees” or “how indi is programmed”. The color sensor shines a bright light and then identifies the color that returns. Each color provides indi with different instructions (or code).

## Skills Building 1

Have students place the green color tile on the floor. Show students how to power on indi and have them place the robot on the green tile. Again, have them observe using their senses.



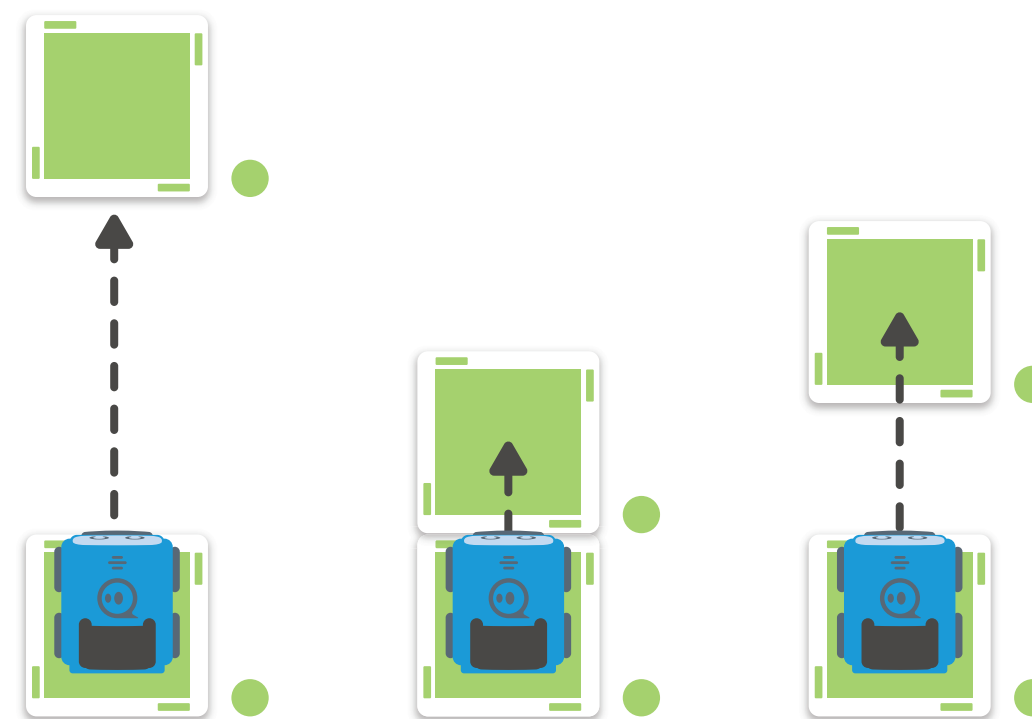
### Discuss with students:

- How did indi react when placed on the green tile?  
*It moved. It beeped!*
- What did you hear?  
*I heard beeping sounds.*
- What did you see?  
*I saw a white light on top. It rolled away.*

- How does indi know how to do that?  
*The color tells it what to do.*

## Skills Building 2

Ask students to place a second green color tile on the floor. Encourage them to place the green tiles at different distances apart to see what happens.





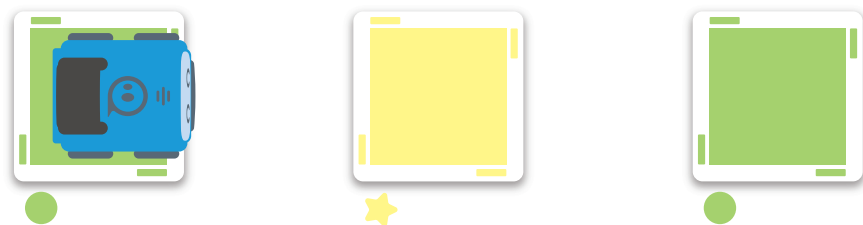
**TEACHER TIP:** Color tiles can be placed right next to each other or apart. If the classroom floor is colorful, instruct students to place the tiles right next to each other.

### Discuss with students:

- What happened when indi drove over the second green tile?  
*It went faster! It went farther!*
- What did you hear?  
*I heard beeping sounds. It beeped three times.*
- What did you see?  
*I saw a green light on top. It drove far away.*
- Did indi drive farther when the green tiles were close together or farther apart?  
*indi goes farther when the green tiles are far apart.*
- What happened when the second green tile was too far away?  
*indi stopped moving.*
- Did indi miss the second green tile? Why did that happen?  
*indi wasn't aimed right.*

## Skills Building 3

Tell students to place a yellow tile between the two green tiles. Place indi on the first tile and have them observe what happens.



### Discuss with students:

- What happened when indi drove over the yellow tile?  
*indi went slower.*
- What happened when indi drove over the second green tile AFTER driving over the yellow tile?  
*indi went faster again.*

## Challenge

Ask students how far they think they can get indi to drive using all the green color tiles. If students have trouble describing distance, have them measure with their own steps.

- ◆ Invite groups to test their guesses.
- ◆ Groups should have someone stand where they think indi will stop, and another stand where indi actually stopped.

Discuss how close each group was to correctly guess how far indi would travel.

**TEACHER TIP:** If students space the green tiles so that indi crosses each tile just before it stops, indi should travel between 15 and 17 feet from where the first green tile was placed.

## Extended Challenge:

If time permits or some students are in need of additional guidance, ask them how far they think indi can travel if they also use the two yellow tiles along with the three green tiles.

Have each participating group repeat the challenge as before, but this time include the two yellow tiles.



# Meet Sphero indi

## Lesson 2: Stops and Celebrations

### Overview

indi loves its new class and enjoys all it is learning. Help indi learn more about moving around the classroom by teaching it how and when to stop.

### Objectives

- (1) I can use my senses to describe what I see.
- (2) I can teach indi when to stop rolling using red and purple color tiles.

### Vocabulary

- Traffic sign** - a sign that shows information, instructions, or a warning to those on the roads.
- Celebration** - recognizing a special occasion or event.

### CS Practices

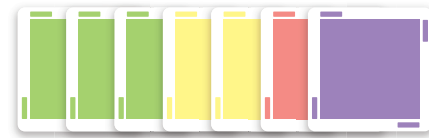
- 1A-DA-06** Collect and present the same data in various visual formats.
- 1A-AP-09** Model the way programs store and manipulate data by using numbers or other symbols to represent information.

### Content Connections

- Traffic safety
- Image recognition

### Color Tiles Needed

- Green x 3
- Yellow x2
- Red x1
- Purple x1



### Additional Supplies

- Traffic signs or pictures of traffic signs

### Preparation

- Each Student Kit needs to have a charged indi robot and the above color tiles.
- Print images or have students color pictures of traffic signs.

## Lesson Steps



### Exploration

Share with the class images of traffic signs and see if anyone recognizes and/or can explain what some of them mean.

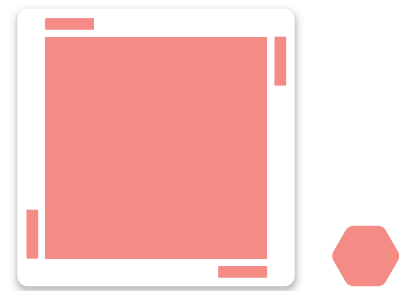


 | Discuss:

- Why do we have traffic signs?
- Are they just for cars?
- Who are they supposed to help?
- What could happen if we don't pay attention to traffic signs?

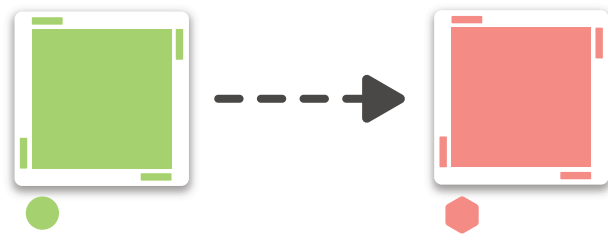
 Skills Building 1

Hold up a red color tile and ask the students what the color red makes them think of.



- ◆ If no one mentions a stop sign or stop light, ask the students if they know what to do if they are driving in a car and see one of these.
- ◆ Ask students to then predict what they think indi will do when it sees a red color tile.  
*(Stop! Turn red.)*

Direct students to place a green tile on the floor, followed by a red tile. Let them experiment with the distance between the tiles.

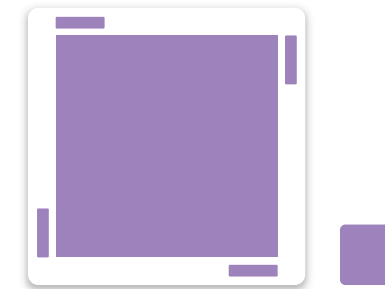


 | Discuss with students:

- How did indi react when it rolled onto the red tile?  
*indi stopped!*
- What did you hear?
- What did you see?  
*I saw a red light on top. indi stopped.*
- How does indi know how to do that?  
*The color tells indi what to do.*

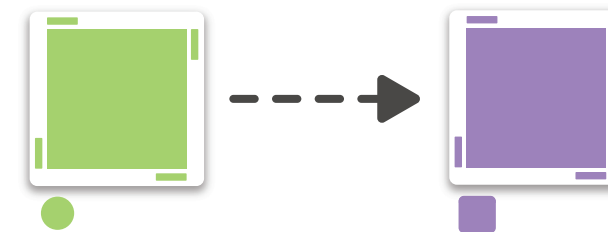
 Skills Building 2

Hold up a purple color tile and ask them what the color purple makes them think of.



- ◆ Explain to the class that the purple color tile is a stop tile too, but instead of just coming to a complete stop, indi will do a celebration "dance" first before stopping.

Direct students to place a green tile on the floor, followed by a purple tile. Let them experiment with the distance between the tiles.





### Discuss with students:

- How did indi react when it rolled onto the purple tile?  
*indi spun around and did a dance!*
- What did you hear?  
*I heard music.*
- What did you see?  
*I saw indi spinning around and then it stopped.*
- How does indi know how to do that?  
*The color tells it what to do.*

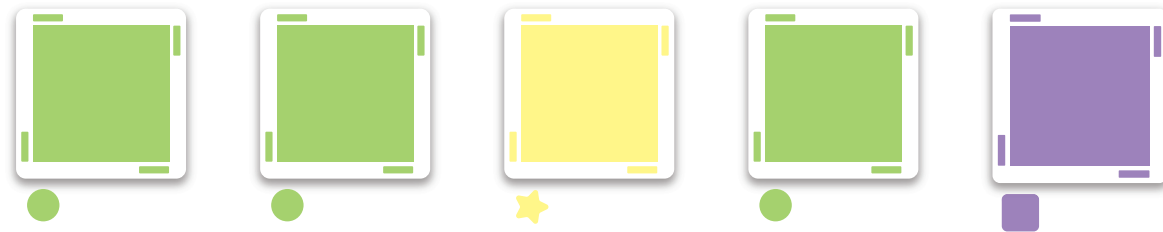


### Challenge

So far students have learned what indi does when it “sees” a green, yellow, red, and purple color tile.

Have students create various paths with the tiles.

- ◆ Some may want to recreate their longest path from Lesson 1 and place a red or purple tile at the end.



### Overview

indi is finding it a little difficult to make its way around the room by only driving in a single direction. Can you learn which color tiles will help indi turn (change directions) left or right so it can enjoy more of the classroom?

### Objectives

- (1) I can show indi how to turn left or right.
- (2) I can design a route around obstacles for indi to follow.

### Vocabulary

- **Turn** - to change the direction of your movement
- **Obstacle** - Something that blocks your way

### CS Practices

- **1A-DA-06** Collect and present the same data in various visual formats.
- **1A-AP-09** Model the way programs store and manipulate data by using numbers or other symbols to represent information.
- **1A-AP-12** Develop plans that describe a program’s sequence of events, goals, and expected outcomes.

### Content Connections

- Learning left and right

### Color Tiles Needed

- Green x3
- Yellow x2
- Red x1
- Purple x1
- Blue (turn 90° right) x3
- Pink (turn 90° left) x3



### Preparation

- Each Student Kit needs to have a charged indi robot and the above color tiles.

# Lesson Steps

## Exploration

Up to now, students have only seen indi move in one direction → straight ahead.

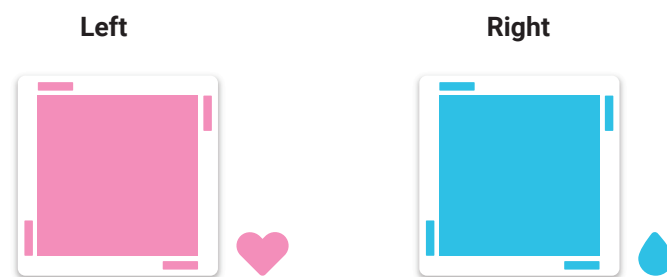
Ask students if they could walk to the cafeteria for lunch without having to change direction (to turn their body or to move in a different direction). Outside for recess? To the library?

If time permits, take students outside.

- ◆ Starting simple, have them walk from one point to another. Ideally something straight ahead of them.
- ◆ Pick two more points, possibly further apart, but that still only requires them to walk in a straight line.
- ◆ Now pick two points that have an obstruction in between or requires an obvious turn. Remind them that they must only walk in a straight line and cannot change direction.
- ◆ Back in the classroom, discuss why it was difficult to walk to the third location without turning or changing direction.

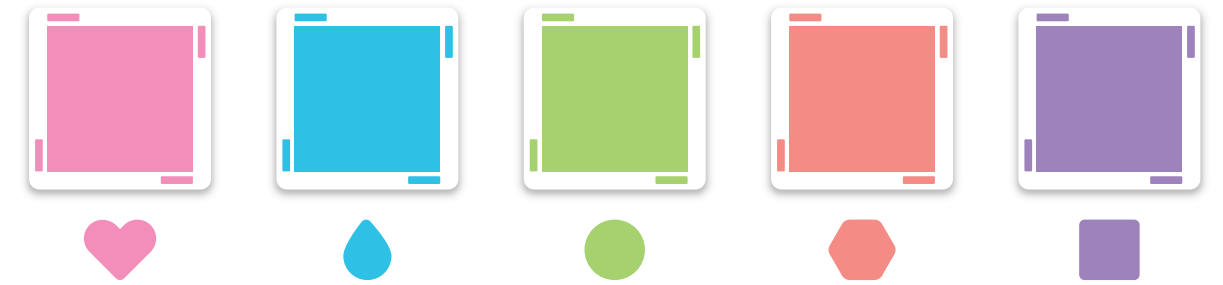
## Skills Building 1

Hold up a pink and a blue color tile. Explain that pink instructs indi to turn **left** and blue instructs indi to turn **right**.

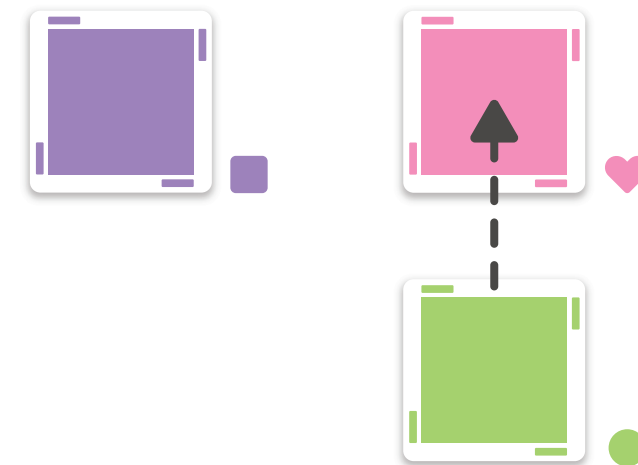


**TEACHER TIP:** If students are not familiar of left and right, consider a washable stamp or marker to mark either their left or right hand.

Have each group remove a pink, blue, green, and red/purple tile from their kit.



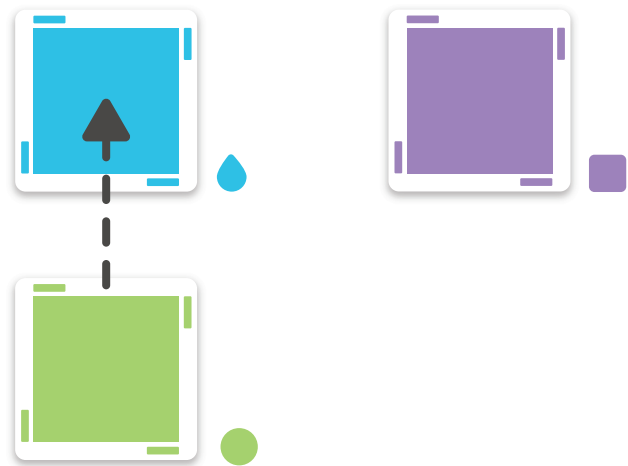
Place the green tile on the floor followed by a pink tile. Place a red or purple tile where you want indi to stop. Allow students to experiment with the distance between the three tiles.



Before placing indi on the green tile, have students walk and describe the path that they believe indi will follow.

**TEACHER TIP:** Pseudocode (sue-doe-code) is a plain language description of a process or algorithm. It is helpful for students to practice pseudocode as they develop their ideas in relation to programming and programming logic.

Direct students to swap the pink tile for a blue tile and try again.

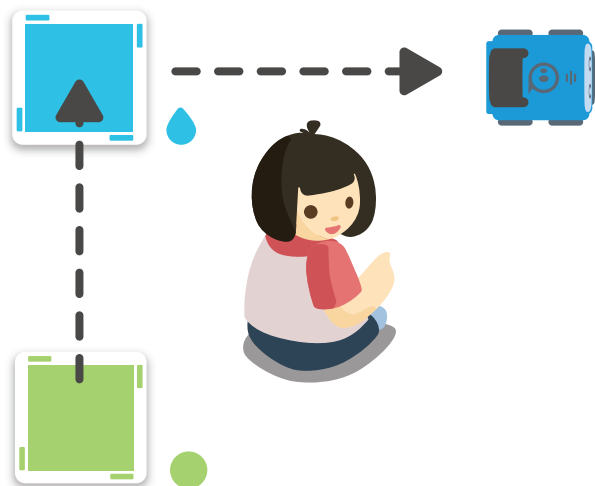


## Challenge

Allow students some free play to make different paths for indi using all the colors.

After some free play, explain the challenge to students:

- ◆ Have one group member sit on the floor.
- ◆ Explain that each group needs to create a path to lead indi around their classmate.

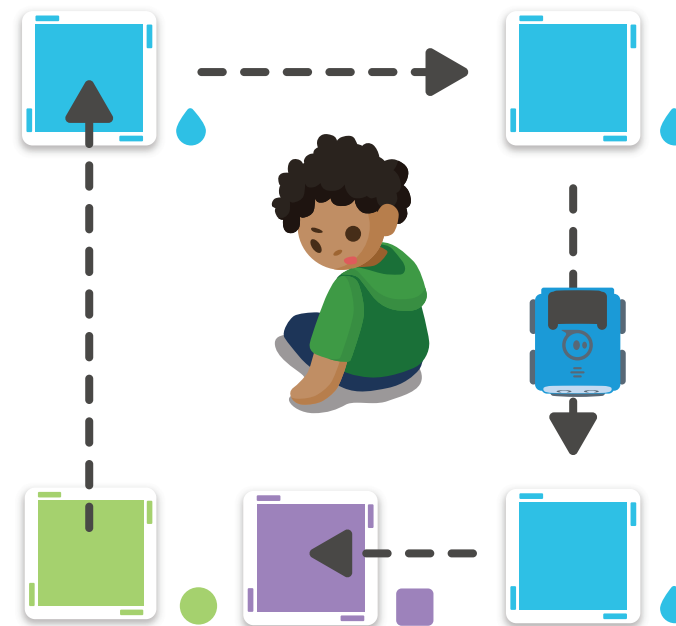


- ◆ Have another group member place the first green tile on the floor.
- ◆ Have another group member place a pink or blue tile where indi needs to turn to go around their group member.

When groups have completed the first challenge, explain the second challenge:

- ◆ Have a new group member sit on the floor.

- ◆ Explain that now groups need to create a path that leads indi all the way around their classmates.
- ◆ indi needs to stop close to where it started.





## Overview

More turns mean more possibilities. Help indi learn two more new colors, teal and orange.

## Objectives

(1) I can show indi how to turn slightly left or slightly right.

- ◆ Teal (turn 45° right)
- ◆ Orange (turn 45° left)

(2) I can design a route around obstacles for indi to follow.

## Vocabulary

- **Turn** - to change the direction of your movement
- **Obstacle** - Something that blocks your way

## CS Practices

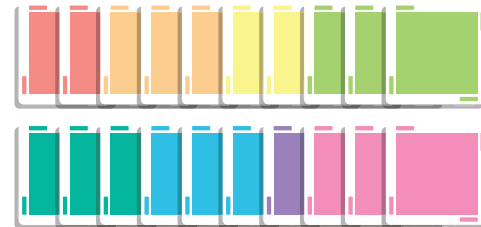
- **1A-DA-06** Collect and present the same data in various visual formats.
- **1A-AP-09** Model the way programs store and manipulate data by using numbers or other symbols to represent information.
- **1A-AP-12** Develop plans that describe a program's sequence of events, goals, and expected outcomes.

## Content Connections

- Learning left and right

## Color Tiles Needed

- All 20 color tiles (Red x2, Orange x3, Yellow x2, Green x3, Teal x3, Blue x3, Purple x1, Pink x3)



## Preparation

- Each Student Kit needs to have a charged indi robot and the above color tiles.

# Lesson Steps



## Exploration

Recall the discussion from the previous lesson about making turns. Remind students how the blue and pink color tiles tell indi to turn 90 degrees right and left.

Sometimes the turns do not need to be so sharp and only need to be a slight turn to the left or right.

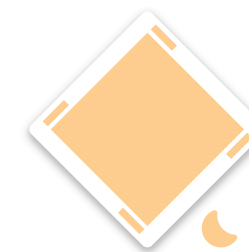
Have students stand up and form a line. Lead them through the classroom around different obstacles, pointing out sharp turns (like the blue and pink tiles) and slight turns (like the teal and orange tiles).



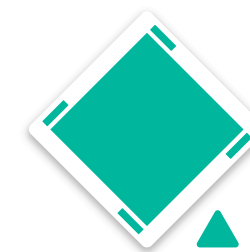
## Skills Building 1

Hold up an orange and a teal color tile. Explain that orange instructs indi to turn **slightly left** and blue instructs indi to turn **slightly right**. If students are not familiar or sure of left and right, consider a washable stamp or marker to mark either their left or right hand.

Slightly Left



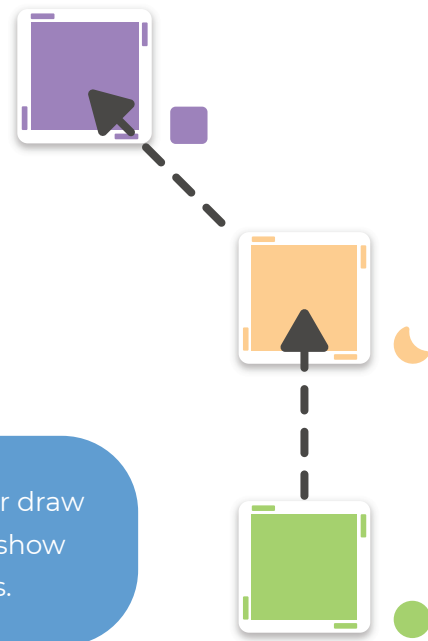
Slightly Right



Have each group remove an orange, teal, green, and red/purple tile from their kit.



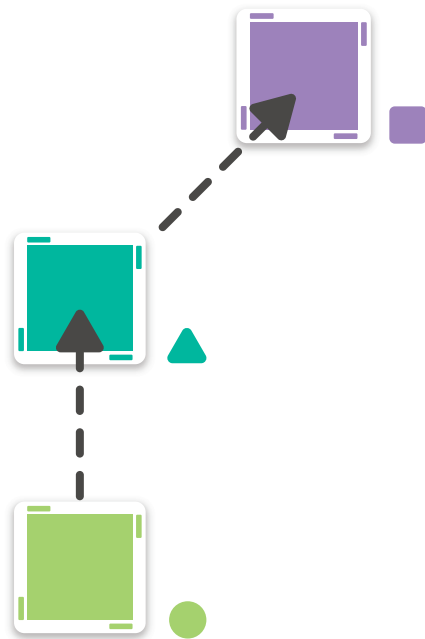
Place the green tile on the floor followed by an orange tile. Place a red or purple tile where you want indi to stop. Allow students to experiment with the distance between the three tiles.



**TEACHER TIP:** Make a poster or draw the color tiles on your board to show students which way indi travels.

Before placing indi on the green tile, have students walk and describe the path that they believe indi will follow.

Direct students to swap the orange tile for a teal tile and try again.

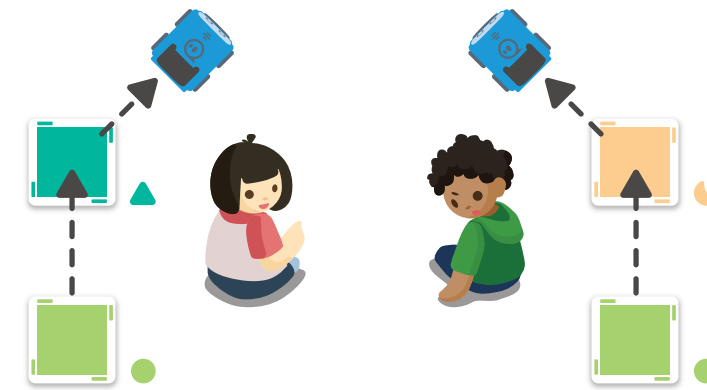


## Challenge

Allow students some free play to make different paths for indi using all the colors.

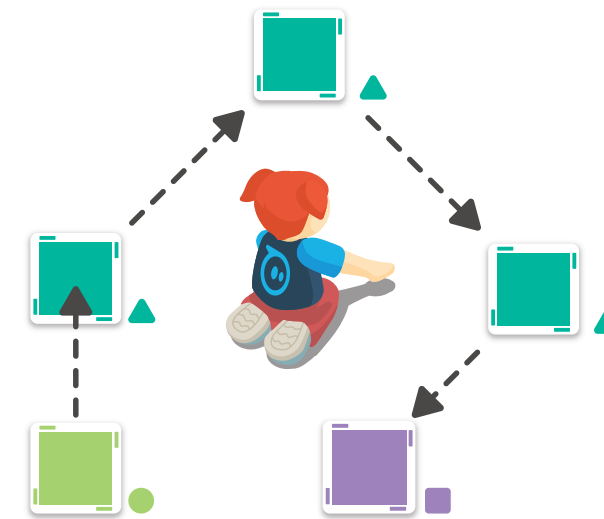
After some free play, explain the challenge to students:

- ◆ Have one group member sit on the floor.
- ◆ Explain that each group needs to create a path to lead indi around their classmate.
- ◆ Have another group member place the first green tile on the floor.
- ◆ Have another group member place an orange or teal tile where indi needs to turn to go around their group member.



When groups have completed the first challenge, explain the second challenge:

- ◆ Have a new group member sit on the floor.
- ◆ Explain that now groups need to create a path that leads indi all the way around their classmates.







## Overview

indi wants to learn more about what being a student is all about at (your school name). Help indi learn about school and classroom routines.

## Objectives

(1) I can help indi move through the classroom at different speeds.

(2) I can explain why we move in the classroom, the hallways, and the playground in different ways.

## Vocabulary

- **Speed** - the rate at which something moves. (how fast or slow something moves)
- **Routine** - something you do regularly and often do it the same way.

## CS Practices

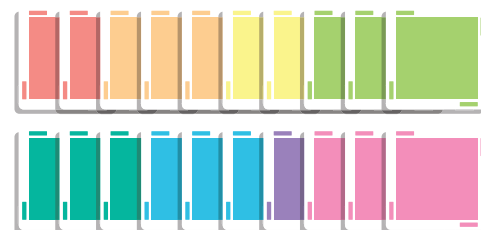
- **1A-AP-08** Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.
- **1A-AP-09** Model the way programs store and manipulate data by using numbers or other symbols to represent information.
- **1A-AP-12** Develop plans that describe a program's sequence of events, goals, and expected outcomes.

## Content Connections

- Classroom/School routines

## Color Tiles Needed

- All 20 color tiles (Red x2, Orange x3, Yellow x2, Green x3, Teal x3, Blue x3, Purple x1, Pink x3)



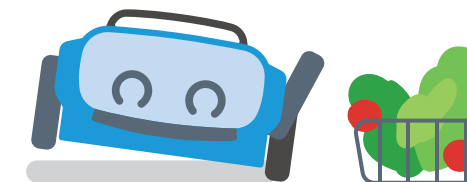
## Additional Supplies

- Drawing paper and crayons

## Preparation

- Each Student Kit needs to have a charged indi robot and the above color tiles.
- Groups will need eight to ten feet of space to work in.

# Lesson Steps



## Exploration 1

Start a whole-class discussion around routines.

- ◆ What is something you do every day, something you usually do the same way each time?
- ◆ Do you know what a routine is?
- ◆ What are some routines you have at home?
- ◆ What are some routines we have at school?
- ◆ Why do we have routines? Are they helpful?

Make a list of at least five routines. Make sure to identify a variety of routines that occur in the classroom and around the school.

- ◆ Examples: lining up, going to the bathroom, walking to the library, end of the day, etc.



## Exploration 2

Routines are important, especially at school. Each routine has different expectations. Discuss with students the different behaviors that are expected when performing different routines.

- ◆ "Walk quietly"
- ◆ "Walk in line"
- ◆ "Raise your hand"
- ◆ "Ask a teacher first"
- ◆ "We can run around"



How we talk and move can depend on the routine or space we are in. We need to teach indi about these expectations.



Review with students by asking the following:

- Can someone explain the difference between the red and purple tiles?

*Red is a simple stop with little noise.*

*Purple is rowdy and noisy.*

- What happens when indi drives over a second or third green tile?  
*indi increases its speed.*
- What about the yellow tile? What does it do?  
*Yellow slows indi down.*

These are all different ways indi talks and moves. We will need to use the right color tiles when teaching indi about classroom and school routines.

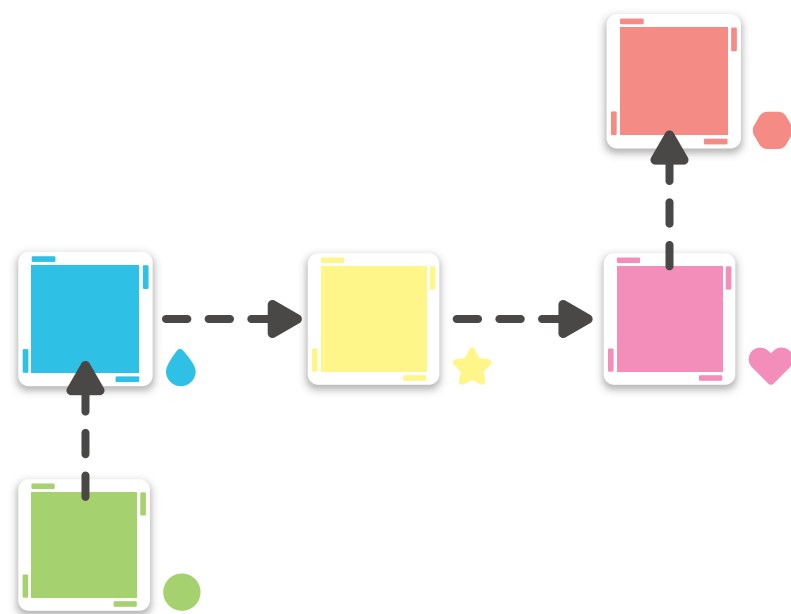
## Skills Building

Choose one of the simpler routines from the list on the board or one that was discussed as a class.

Walk groups through setting up the same or a similar path with the needed tiles. Keep it simple and easy to make.

- Example:
  - *Going to the library*
    - ◆ Start with a green tile (leaving the classroom)
    - ◆ Add a blue tile (turn right down the hallway)
    - ◆ Add a yellow tile (we should walk slowly and calmly into the library)
    - ◆ Add a pink tile (turn left into the library)
    - ◆ Add a red tile (stop in the library)

*Why did we not use a purple tile for the end?*



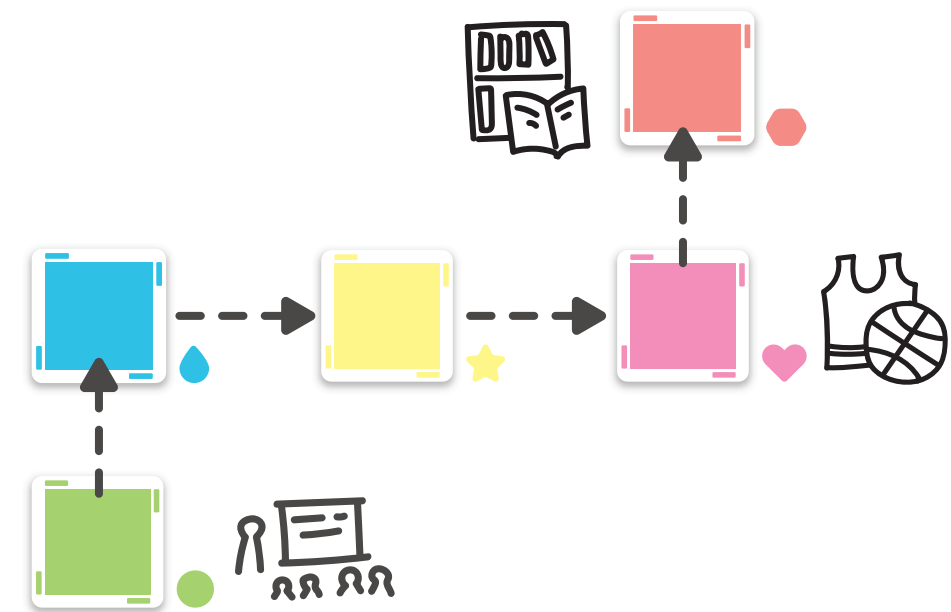
## Challenge

Provide each group with a classroom or school routine that they are responsible for teaching indi.

Quickly talk about different ways they move or talk throughout the day to get them thinking about how they should teach indi to move.

Instruct some of the group members to begin building their path and the others to draw pictures of different places associated with their routine. Place these pictures along the path.

If time permits, allow each group to explain and demonstrate how they taught indi their routine.





### Overview

Schools can have lots of hallways and doors. Sometimes we need some help getting from place to place until we know our way around. Help indi learn its way around the school.

### Objectives

(1) I can help indi turn and move through the classroom.

(2) I can explain how to get to different places in our school from our classroom.

### Vocabulary

- **Directions** - a path or route someone should follow to get to a specific place.

### CS Practices

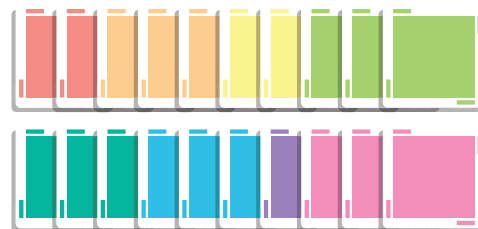
- **1A-AP-08** Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.
- **1A-AP-09** Model the way programs store and manipulate data by using numbers or other symbols to represent information.
- **1A-AP-12** Develop plans that describe a program's sequence of events, goals, and expected outcomes.

### Content Connections

- Giving directions

### Color Tiles Needed

- All 20 color tiles (Red x2, Orange x3, Yellow x2, Green x3, Teal x3, Blue x3, Purple x1, Pink x3)



### Additional Supplies

- Sports cones, masking tape or plastic cups (something to mark a path)

### Preparation

- Each Student Kit needs to have a charged indi robot and the above color tiles.
- Prepare a space on the board to discuss places students go when leaving the classroom.
- Write down words commonly used when giving directions to reference during exploration.
- Groups will need eight to ten feet of space.

## Lesson Steps



### Exploration

Make a list on the board with students of common places they go to when leaving the classroom.

- ◆ Classroom → bathroom
- ◆ Classroom → cafeteria
- ◆ Classroom → library
- ◆ Classroom → gym
- ◆ Classroom → playground
- ◆ Classroom → front office

Ask students if any of them have ever had to give directions, or explain to someone how to get from one place to another. Have students share examples with the class.



### Discuss with students

- What are some of the words we use when we give directions or explain which way to go?

First, ...  
 Then, ...  
 Next, ...  
 After \_\_\_\_, ...  
 Turn \_\_\_\_  
 Walk to \_\_\_\_  
 Finally, ...  
 Last, ...

**TEACHER TIP:** Write these words on the board as students suggest them. They will be using these words to describe indi's path later in the activity.

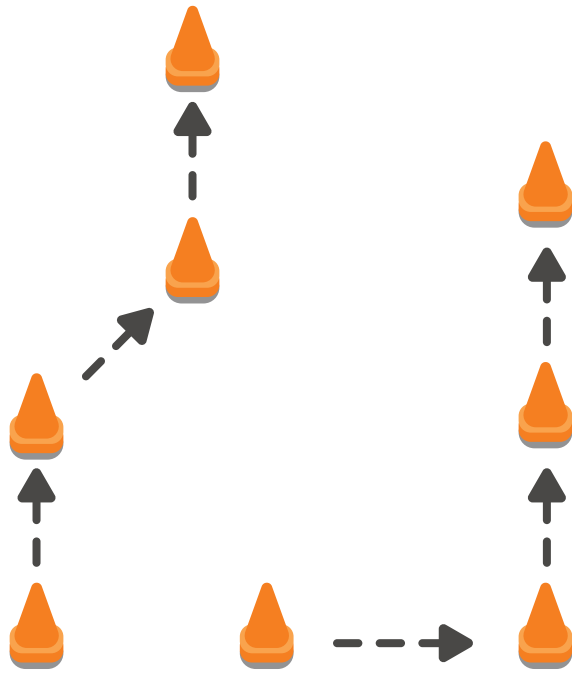


### Skills Building 1

In this step, students will be participating in an "unplugged" activity. That means they will not need indi or the color tiles.

Spread groups around the room. If possible, do the following activity outside or in a larger space like the gym or cafeteria.

Prepare different courses or paths using the sports cones, plastic cups, or masking tape. Assign one of the items or materials to each group.



Each group member will take a turn giving directions to one of their classmates.

- ◆ Student A stands at the start.
- ◆ Student B uses the words discussed previously to give directions to Student A until they arrive at the end.

Consider having groups rotate courses for each new pair of students. This will help ensure students don't just repeat the directions provided by the previous pair of students.

## Skills Building 2

Have groups invite indi to join them at their different courses.

Instead of giving directions to a classmate, have groups create a simple path for indi to follow from start to finish.

As indi goes from tile to tile, students need to explain the directions using the vocabulary learned.

For older students, consider having groups place vocabulary cards that describe a color tiles' action next to each associated tile.

## Challenge

Using the materials used for the other courses, instruct each group to create a new course.

After each new course is completed, instruct students to rotate to a new course.

Each group will need to divide up into two smaller groups.

- **Small Group A:**

- ◆ These students will walk the course and come up with specific directions.
- ◆ They will give these directions to Small Group B as they prepare a path for indi to follow.  
For example:

*"Start next to the cone, then turn right, slow down, and then turn left."*

- **Small Group B:**

- ◆ While listening to the directions given by Small Group A, students will lay down the appropriate tiles to guide indi from the start to the finish.

When both groups are done, place indi on the start (first green color tile) and watch it go!

- **Did indi go where you expected it to go? Why not?**

- ◆ Were the directions unclear? Did you use the wrong color tile?
- ◆ How will you fix this?

Allow students to go back and fix any mistakes they made and run indi again.