Fisher-Price®

Think & Learn Code-a-pillar™

Home-School Connection

Teacher Guide

THiNK & LEARN

Code-a-pillar™

Welcome to the Code-a-pillar™ Teacher Guide!

Specially developed by researchers and educators from Fisher-Price® and the Center for Childhood Creativity, it's designed to help teachers give 3–6 year-old children their first introduction to coding, including problem solving, sequencing, and planning skills, through hands-on, active play.

Code-a-pillar™ Teacher Guide

Lesson Plans

This guide includes 12 lesson plans divided into 4 modules that focus on the following computational thinking concepts:

Module 1: Sequencing and Looping

Module 2: Events and Causality

Module 3: Conditionals

Module 4: Data

Code-a-pillar

The Fisher-Price® Code-a-pillar™ is an interactive, fun and friendly programmable toy that encourages experimentation and inspires natural curiosity—all while developing coding, sequencing and critical thinking skills. Easy-to-connect segments allow for endless combinations to move Code-a-pillar forward, left, right or even wait for a couple of seconds before moving again. Children can configure the segments so that Code-a-pillar can reach set targets throughout a room.

What is coding?

Coding is the skill of giving a set of commands to a device, and for it to respond in sequence. Code-a-pillar does exactly this. Children can select a sequence of commands, and Code-a-pillar will follow the sequence to carry out the desired route. When kids connect the segments to make Code-a-pillar move - that's sequencing! When they figure out a sequence that will create a path for Code-a-pillar to reach a target, that's programming (and problem solving, too)! It's all coding—and it's all fun!

Developmental Benefits

With the Code-a-pillar, children not only follow instructions and guide the programmable toy around obstacles, but also can:

- learn new language and mathematical vocabulary through hands-on activities.
- develop their imagination by designing their own obstacle course.
- enhance their coding skills by sequencing and guiding the Code-a-pillar forward, backward, left and right.
- become creative story tellers, developing their own stories and sequences.

21st Century Skills & the "Four Cs"

In today's rapidly changing world, children need to move beyond the basics and develop skills and habits of mind that will allow them to thrive in a future economy driven by complex and interdisciplinary challenges. These skills include the "Four Cs"—creativity, communication, collaboration, and critical thinking.

Creativity involves producing original ideas that are unusual or novel. Children express their imagination and original ideas through pretend play and the creation of imaginary companions and make-believe worlds.

Collaboration allows for the exchange of ideas among children as they work to find a solution for a problem or project. Working together fosters perspective-taking and provides a chance for children to explain and expand their thinking in new ways.

Communication of one's unique perspective plays a vital role in creativity by allowing individuals to express their feelings, ideas, and desires through language, art, and physical movement.

Critical Thinking involves examining a problem from different perspectives (i.e., flexibility) and remaining open to new and challenging experiences.

Code-a-pillar™ Lesson Plans

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OVERVIEW

The Fisher-Price® Code-a-pillar™ is excited to meet your students and introduce them to the concept of **coding**! Code-a-pillar is a programmable toy that encourages experimentation and inspires curiosity and play while developing coding, sequencing and critical thinking skills in young children. Coding is the skill of giving a set of commands to a device so that it will respond in sequence.

Children will be given the opportunity to interact with Code-a-pillar in small groups and explore how the toy works through open-ended, child-directed play. Additional expansion packs of segments will be provided and included in lesson plans to build upon coding combinations to make Code-a-pillar move! Children can configure the segments so that Code-a-pillar can reach set targets throughout the classroom.

Key Concepts

(Links to the Four Cs)

- Creativity: children often express their imagination through play, especially when interacting with peers.
- Communication: children listen to each other and follow simple directions given by a peer.
- Collaboration: turn-taking is an important part of working in a group and encourages positive social interaction.

Lesson Objectives

Students will:

- be introduced to the meaning of the word “code.”
- experiment and play with the Code-a-pillar in small groups.
- be encouraged to work together (e.g., take turns) to make the Code-a-pillar go.

Materials

Code-a-pillar toys (1 for each group of 3–4 children)

poster board

marker

getting started (10 minutes)

- Introduce children to Code-a-pillar™.
  - ➤ Place Code-a-pillar (with a few segments attached) on the floor and ask children how they think you make it go.
  - ➤ Allow children to observe Code-a-pillar move and let them know they will soon have a chance to explore how Code-a-pillar works.
- Ask your students what they think the toy looks like (i.e., a caterpillar). Highlight the word "code" in the name of the toy. Ask your students if they have heard the word "code" before, and if so, what they think it means.
- Explain that a **code** is a list or sequence of steps.
- Provide a brief demonstration of how the Code-a-pillar works and then encourage children to engage in free play.
  - ➤ Limit your instruction to:
    - › where the on and off switch is.
    - › how to push the blue button to make it go.

RESEARCH HIGHLIGHT:
Avoiding direct instruction can make children more curious and more likely to discover new information

activity (15 minutes)

- Divide children into groups of 3–4 and give each group a Code-a-pillar.
- Encourage children to take turns pressing the "go" button.
- Allow children to engage in free-play exploring how to make Code-a-pillar move in different directions.

wrap up (10 minutes)

- Ask children to share what they liked most and least about Code-a-pillar.
- Ask children what they think the symbols represent on each segment.
- Ask children what they noticed as each segment lit up.
- Record what children share on a large piece of poster board for reference as the lessons progress.
- End the lesson with a reminder of what the word "code" means.

OVERVIEW

A key concept in coding is **sequencing** — a specific order of objects or actions. In this lesson, children will first observe how a specific sequence of Code-a-pillar™ segments affects its movements, and then they will be asked to act out a sequence of moves themselves.

Key Concepts

(Links to the Four Cs)

- Critical Thinking: having children make the connection between the way Code-a-pillar moves and moving themselves provides a great opportunity for perspective-taking and problem solving.
- Collaboration: turn-taking requires planning, self-control, and social cooperation — all important skills for successful collaboration.

Lesson Objectives

Students will:

- be introduced to the term "sequence."
- become familiar with the individual Code-a-pillar segments and how the order of the segments affects how Code-a-pillar moves.

Materials

Code-a-pillar toys (1 toy for each group of 3–4 children)

left, right, and straight arrows cut out of construction paper (one for each child)

poster board

marker

getting started (5 minutes)

- Talk to children about the term "sequence." Ask your students if they know what the word 'sequence' means.
- Explain that "sequence" means a specific order of objects or actions.
- Ask children to provide examples of sequences (e.g., getting ready for school, making PB&J sandwich, taking a bath).
- Bring out Code-a-pillar and remind your students that Code-a-pillar can be broken down into segments and put back together. Highlight that the segments have different arrow icons on them, representing different moves.
- Explain that today's goal is to see how Code-a-pillar moves when its segments are put in a particular sequence.

activity (20 minutes)

- Divide children into groups of 3–4 and give each group a Code-a-pillar toy.
- Ask your students to help design a sequence for Code-a-pillar using 3 or more segments.
- Draw the segments in order on poster board, or provide each group with a drawing that depicts Code-a-pillar put together with its segments in the order designed by your students.
- Ask each group to put their Code-a-pillar together so that it matches the picture and watch how that sequence of segments makes it move.
- Next, give each child a different paper arrow.
- Ask them to line up and act out how they would move if they were Code-a-pillar.
- Ask two of the children to switch in the lineup and ask them to predict what will be different now that they changed order. Repeat a few times with different children switching places.

wrap up (5 minutes)

- Ask your students to suggest other sequences that Code-a-pillar segments could be used to form.
- Record what children share on a large piece of poster board for reference as the lesson progresses.
- End the lesson with a reminder of what the word "sequence" means.

OVERVIEW

In this lesson, children will be introduced to the concept of **looping**. A loop is a repeated set of actions and is used in coding to tell the computer to circle back to point A and repeat the same block of code X number of times. Through this activity, children will gain practice identifying and creating loops using Code-a-pillar™.

Key Concepts

(Links to the Four Cs)

- Creativity: visualizing different ways that patterns can be formed requires creative thinking.
- Collaboration: having children break up into small groups for activities encourages them to share ideas and work together.

Lesson Objectives

Students will:

- be introduced to the term "loop(ing)".
- become familiar with how to organize Code-a-pillar™ segments so that it repeats an action or group of actions.

Materials

Code-a-pillar toys (1 toy for each group of 3–4 children)

Master Moves Expansion Packs (1 pack for each group of 3–4 children)

poster board

marker

getting started (5 minutes)

- Introduce children to the idea that a **loop** is a pattern that repeats.
- Draw out a sequence on the board (move forward, right arrow, left arrow).
- Then, explain that looping involves repeating the sequence over and over (forward, right, left, forward, right, left, etc).
- Bring out Code-a-pillar™ and explain that today's goal is to see if Code-a-pillar can move in a looping pattern.
- Remind children about the sequences or patterns they put Code-a-pillar segments into from the last lesson.
- Let them know that today, we are going to have Code-a-pillar do loops — or repeat the same actions.
- Introduce children to the Master Moves Expansion Pack pieces (45° right turn, 180° left turn, and repeat) and explain how each piece, particularly the repeat piece, works.
  - ➤ Repeat: Add this piece, and Code-a-pillar will repeat the motion of the segment you attach it to. Dial the number of times you want the action to repeat.

activity (20 minutes)

- Divide children into groups of 3–4 and give each group a Code-a-pillar and Master Moves Expansion Pack.
- Ask children to arrange Code-a-pillar segments so there are several of the same segments in a row (move forward, right turn, right turn).
- Then, ask children if they can use the repeat segment to make Code-a-pillar follow the same path (move forward, right turn, repeat (set to 1)).

wrap up (5 minutes)

- Ask your students to suggest other sequences that Code-a-pillar segments could be used to form.
- Record what children share on a large piece of poster board for reference as the lesson progresses.
- End the lesson with a reminder of what the word "sequence" means.

OVERVIEW

In this lesson, children will be introduced to the concept of **cause and effect**. Additionally, the connection between the arrows on Code-a-pillar™ segments and the actions Code-a-pillar completes will be made explicit through discussion regarding what each arrow means in terms of cause and effect (e.g., if Code-a-pillar has a right arrow, it goes right!). Children will experiment with what each segment causes Code-a-pillar to do, and then, what happens as additional pieces are added.

Key Concepts

(Links to the Four Cs)

- Collaboration: having children work in small groups, sharing resources and taking turns, provides the opportunity to practice important social skills.
- Critical thinking: recognizing the connection between symbols and actions promotes problem solving and planning.

Lesson Objectives

Students will:

- be introduced to the terms “cause” and “effect.”
- be asked to consider what Code-a-pillar does, starting with a single piece.
- make connections between arrow symbols and movement (e.g., forward, right, left).

Materials

Code-a-pillar toys (1 toy for each group of 3–4 children)

Basic Expansion Packs (1 pack for each group of 3–4 children)

poster board

marker

getting started (10 minutes)

- Introduce students to the concept of **cause and effect**.
  - ➤ When one event (cause) makes another event (effect) happen.
  - ➤ Provide some examples:
    - › Kate turned on the light switch (cause). The light came on (effect).
    - › Grace skipped breakfast (cause). She was hungry at lunch (effect).
    - › It rained (cause). Jack got wet (effect).
- Explain how the arrows on Code-a-pillar™ segments tell Code-a-pillar what to do (cause it to move a certain way).
- Break up Code-a-pillar into individual segments and highlight the words, "forward," "right," and "left" in association with the different arrow symbols.
- Ask your students to try to make connections between the arrow symbols and their general knowledge.
  - ➤ "Where have you seen arrows like this before?"
  - ➤ "What do arrows help your parents do when they are driving?"
- Explain to children that like arrows on stop lights that tell your parents where and when to go, the arrows on Code-a-pillar tell it where to go!

RESEARCH HIGHLIGHT:
Research suggests an important link between spatial talk and reasoning in young children and math achievement in later childhood.

activity (15 minutes)

- Divide your students into groups of 3–4 children and give each group a Code-a-pillar and a Basic Expansion Pack.
- Ask children to begin with just one segment attached to Code-a-pillar. Have them test out what happens if Code-a-pillar has only one segment.
- Next, ask students to take turns adding more segments, one at a time, to discover what happens when new arrows are added to the Code-a-pillar body.
- For an additional challenge, ask children to predict what Code-a-pillar will do based on the arrows it has before pressing the "go" button.

wrap up (5 minutes)

- Ask children how the process of adding segments to Code-a-pillar changed what happened to Code-a-pillar and how it moved.
- Record what children share on a large piece of poster board for reference as the lesson progresses.
- End the lesson by reminding students what "cause and effect" means and ask them to think about cause-and-effect events in their daily lives (e.g., "What happens when you don't tie your shoes?").

OVERVIEW

In this lesson, students will first be introduced to the concept of **categorization** before practicing different ways that Code-a-pillar™ segments can be grouped. Next, children will explore what happens when multiple segments of the same direction are added to Code-a-pillar. The lesson will conclude with students sharing their discoveries with the class.

Key Concepts

(Links to the Four Cs)

- Creativity: asking children to think of multiple ways that the same Code-a-pillar segments can be categorized promotes flexible thinking.
- Collaboration: by playing with other students to test out different sequences of Code-a-pillar segments, children work together toward a shared goal.

Lesson Objectives

Students will:

- learn about the term "categorization".
- identify different ways that Code-a-pillar segments can be grouped.
- test what happens if Code-a-pillar has 1 vs. 2 vs. 3 of the *same segment* in a row.

Materials

Code-a-pillar toys (1 toy for each group of 3–4 children)

Basic Expansion Packs (1 pack for each group of 3–4 children)

poster board

marker

getting started (10 minutes)

- Introduce children to Code-a-pillar™.
- Talk with your students about the word "categorization" (different ways that things can be grouped).
- Ask your students for examples of categories for items in the classroom (e.g., art supplies can be categorized into markers, crayons, and colored pencils; blocks can be categorized by color; posters can be categorized by height).
- Work as a class to identify different ways that Code-a-pillar segments can be grouped (e.g., color, arrow type).

activity (15 minutes)

- Divide children into groups of 3–4 and give each group a Code-a-pillar.
- Provide each group with one type of Code-a-pillar segment (e.g., move forward, right turn, left turn).
- Ask children to start out with just one of those arrows added to Code-a-pillar and to predict what that arrow will make Code-a-pillar do.
- Then, ask children to continue adding one of those same arrows to Code-a-pillar (taking turns) and predicting what Code-a-pillar will do before pushing the "go" button and seeing what happens.

Optional Activity

- Provide each group with a few different types of segments.
- Ask children to role play by having one child act as a "computer programmer" and design a sequence of actions.
- The other children in the group can try to follow the program by putting Code-a-pillar segments in the specified order. Then, do a test run and try again if the order is not quite right.
- Ask children to switch roles.

RESEARCH HIGHLIGHT:
Practicing activities that require a shift in categorization can help to develop children's memory, self-control, and planning skills.

wrap up (5 minutes)

- Ask each group of children to explain to the class, one at a time, what happened when they used their segment (e.g., move forward, right turn). Ask them to share why they think this happened.
- Consider writing down the groups' answers on the poster board so that groups can see what the other segment types cause Code-a-pillar to do.
- End the activity by reminding children what the term "categorization" means.

OVERVIEW

Today, your students will practice **problem solving** through coding. Code-a-pillar™ is having trouble following a path to find some delicious leaves. Children will help Code-a-pillar reach that goal by rearranging the segments to follow a path and reach the leaves. Children will be encouraged to try different solutions and work together towards a shared goal.

Key Concepts

(Links to the Four Cs)

- Creativity: children will think creatively in order to figure out how Code-a-pillar might be able to get to the correct end point.
- Collaboration and Communication: children will work together and talk about their ideas with one another to successfully solve this puzzle.
- Critical thinking: children will use critical thinking skills to reason through potential solutions.

Lesson Objectives

Students will:

- talk about learning through "trial and error".
- practice problem-solving skills in small groups (more specifically, start with Code-a-pillar put together in a way that does not get it to the desired end point and be asked to figure out what needs to be done to correct this).

Materials

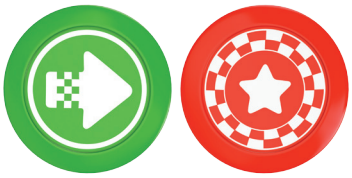
Code-a-pillar toys (1 toy for each group of 3–4 children)

Basic Expansion Packs (1 pack for each group of 3–4 children)

2 destination targets for each group (1 red and 1 green)

poster board

marker



activity prep

- Set up a course for each group by placing the 2 targets (starting at the green one and ending at the red one) around the classroom.
  - ➤ *Example:* set up the end point so that it is one forward arrow, one right arrow, and one forward arrow away from the starting point.
- Arrange the segments on each Code-a-pillar so that one (or more) segments is in the wrong position.
  - ➤ *Example:* Prep Code-a-pillar so its segments are in the following order: forward arrow → right arrow → right arrow → forward arrow. Students would need to realize they need to remove one right arrow to get Code-a-pillar to the correct end point.

getting started (5 minutes)

- Explain the concept of **trial and error** — sometimes, things do not go exactly as we expect right away, but even when things do not go how we wanted, we still learn something from that experience.
- Have a discussion with your students about "trial and error" and problem solving.
- What examples can the students think of? (e.g., when your parent cooks something and it doesn't taste quite right so he/she adds salt)

activity (20 minutes)

- Divide children into groups of 3–4 and give each group a Code-a-pillar™ (with segments in the wrong order).
- Have each group pick a course with 1 green target and 1 red target.
- Explain to your students that Code-a-pillar should start at the green target and end at the red target.
- Ask children to place their Code-a-pillar at/near the green target and press "go" to see if it gets to the red target (it should not get there).
- Then, have children work together (taking turns) to try out solutions that may get Code-a-pillar to the desired end point by removing one or more segments or rearranging them.

wrap up (5 minutes)

- Ask children to share how they were able to figure out how to get Code-a-pillar to the destination.
  - ➤ What segments did they have to change in order to get Code-a-pillar to move the right way?
- Review the concept of "cause and effect."
  - ➤ "Did the extra segment 'cause' Code-a-pillar to go the wrong direction?"
- Ask children if they could create any segment for Code-a-pillar, what would it look like and what would it cause Code-a-pillar to do?
- Record what children share on a large piece of poster board for reference as the lesson progresses.

RESEARCH HIGHLIGHT:
Encouraging children to generate many possible solutions to a problem promotes divergent thinking—a key component of creativity.

OVERVIEW

Today your students will learn about the potential effects of **conditions** — in this case, different surfaces — on the movements Code-a-pillar™ makes. In this lesson, children will experiment with Code-a-pillar by having it run on different surfaces (e.g., cardboard, carpet, wood, tile, paper) and draw conclusions about what conditions (or surfaces) result in changes in movement.

Key Concepts

(Links to the Four Cs)

- Creativity: asking children to think of new surfaces that Code-a-pillar could run on encourages creativity.
- Critical Thinking: having children make predictions about what effect different surfaces may have on the movements Code-a-pillar makes requires critical thinking.

Lesson Objectives

Students will:

- be introduced to the term "condition" — a state or situation that likely has an effect on what happens next.
- learn that the movements Code-a-pillar makes may be affected by conditions, or the type of surface it moves on.
- predict and explore what happens if Code-a-pillar moves on different types of surfaces.

Materials

Code-a-pillar toys (1 toy for each group of 3–4 children)

A variety of surfaces for Code-a-pillar to run on (e.g., cardboard, carpet, wood, tile, paper)

poster board

marker

getting started (5 minutes)

- Introduce children to the term "condition": a state or situation that likely has an effect on what happens next.
  - ➤ Have the students try to generate examples of conditions (e.g., the weather, how clean something is).
- Tell your students that today they will be letting Code-a-pillar™ explore different surfaces in the classroom.
  - ➤ Show them the cardboard and/or the paper, and point to the carpet/wood/tile.
  - ➤ Ask them to infer what might happen when Code-a-pillar moves on some of these different surfaces. Tell them that they will be able to test these guesses out and find out what happens.

activity (15 minutes)

- Divide your students into groups of 3–4 children and give one Code-a-pillar toy to each group.
- Either: (1) provide each group with a variety of surface samples (e.g., piece of paper, piece of cardboard) or (2) create stations in your classroom that student groups can rotate through (e.g., a wood station, a tile station).
- Have students first make predictions about what is likely to happen when Code-a-pillar tries to run on each type of surface and then test it out and see what happens.

wrap up (10 minutes)

- Remind children of what the term "condition" means.
- Ask the students to describe what happened when Code-a-pillar moved on each surface. How did this observation compare to their guesses?
- "On which surface did Code-a-pillar move the fastest?"
- "On which surface did Code-a-pillar move the slowest?"
- Record what children share on a large piece of poster board for reference as the lesson progresses.

OVERVIEW

Children will be introduced to the idea that one type of condition is an **obstacle**, or something that stands in your way. In today's lesson, students will learn that Code-a-pillar™ wants to make it home, but it is raining outside. It is their job to help Code-a-pillar avoid the puddles and make it home!

Key Concepts

(Links to the Four Cs)

- Creativity: the rainy day storyline can help children think imaginatively about how to solve the problem Code-a-pillar faces.
- Collaboration: children work together toward the shared goal of getting Code-a-pillar through an obstacle course.
- Critical Thinking: children use problem solving and planning skills to successfully get Code-a-pillar home without ending up in any puddles.

Lesson Objectives

Students will:

- be introduced to the term "obstacle": something that stands in your way.
- help Code-a-pillar avoid the obstacles around the classroom, putting their sequencing skills to the test.

Materials

Code-a-pillar toys (1 toy for each group of 3–4 children)

Small pieces of paper cut out to look like puddles (1–2 for each group)

2 destination targets for each group (1 red and 1 green)

Optional: Construction paper houses (1 for each group)

poster board

marker

getting started (10 minutes)

- Remind children about the term "condition" that was discussed in the last lesson (a state or situation that likely has an effect on what happens next).
  - ➤ Explain that one type of condition is an obstacle, or something that stands in your way.
  - ➤ Have students provide examples of obstacles (e.g., doors, fences).
- Explain to children that today is a rainy day and Code-a-pillar™ needs to get home without falling in any puddles.
- Explain to your students that they will need to work together to reach the house without Code-a-pillar stepping in any puddles.
- Also emphasize that they may need to try several times before finding the right path for Code-a-pillar to get home (a big part of being a scientist is learning from things that do not work!).

activity (15 minutes)

- Divide children into groups of 3–4 and give each group a Code-a-pillar.
- Set up obstacle courses for children by using the green target as a starting point, the red target as an ending point ("home"), and placing 1 or 2 paper puddles in between the targets. (Note: this could be done before class; it is important to try out the obstacle course yourself and make sure that each Code-a-pillar is able to get through the course successfully with the segments provided.)
  - ➤ Optional: Tape or place the paper house on the red target.
- Have children work in small groups to get Code-a-pillar from the green target to the red target while avoiding the puddles.
  - ➤ If the children ask for your help, encourage them to rearrange Code-a-pillar segments in different ways.
  - ➤ If one group is struggling, try suggesting a subset of sequences to them and ask them which one they think will work.

wrap up (5 minutes)

- Remind children what the word "obstacle" means.
- Ask children how they were able to get the Code-a-pillar to the red target ("home").
- Ask students what the most challenging part of this task was and why they think it was challenging.
- Record what children share on a large piece of poster board for reference as the lesson progresses.

OVERVIEW

Now that your students have experience moving Code-a-pillar™ through the rainy day obstacle course, it is time for them to create their own! Code-a-pillar is making its way home from school today and it's your students' chance to create their own obstacle course and story.

Key Concepts

(Links to the Four Cs)

- Creativity: children will express their imagination by creating a storyline for Code-a-pillar.
- Communication: students will be asked to share their experiences with the class.
- Collaboration: students will work in small groups to design an obstacle course and tell a story about the actions Code-a-pillar takes.
- Critical Thinking: children will use problem solving, planning and perspective-taking to design an obstacle course.

Lesson Objectives

Students will:

- design their own obstacle course for Code-a-pillar to move through.
- create a story about the actions Code-a-pillar takes—where it is going and why it needs to avoid some obstacles.

Materials

Code-a-pillar toys (1 toy for each group of 3–4 children)

Silly Sounds and Lights Expansion Packs (1 pack for each group of 3–4 children)

obstacles (e.g., toys, blocks, puddles from lesson #8, paper for children to make their own)

2 destination targets for each group (1 red and 1 green)

Optional: decorations for end points (e.g., paper houses from lesson #8, paper for children to make their own end point)

getting started (10 minutes)

- Explain to your students that today, they are going to be creating their own obstacle courses for Code-a-pillar™.
- Present children with either: (1) pre-made obstacles and destination targets (1 red and 1 green); or (2) paper to make their own obstacles and destination targets.
- If children will be creating their own pieces, talk with them about ideas for potential obstacles and end points (e.g., leaves to eat, branches to walk around).

activity (15 minutes)

- Divide your students into groups of 3–4 children and give each group a Code-a-pillar and segments from the Silly Sounds and Lights Expansion Pack (Sleepy ZZZs, Happy, and Wacky).
- If children will be creating their own obstacles and end points, have them do so at this time.
- Ask your students to place their pieces on the floor to create an obstacle course for Code-a-pillar to navigate: a starting point, an ending point, and one or more obstacles in between.
- Ask your students to create a story about why Code-a-pillar is going where it is going and why it needs to avoid the obstacles in its way.
  - ➤ Encourage children to incorporate different emotions/feelings in their story by using the segments in the Expansion Pack (e.g., "Code-a-pillar was feeling sleepy/happy/excited...").
- Finally, have your students work together to put the different Code-a-pillar segments in an order that gets it through the obstacle course successfully.

wrap up (5 minutes)

- Ask children to share their Code-a-pillar story with the class.
  - ➤ Encourage your students to talk about how Code-a-pillar was feeling in their story.
- Ask them how they were able to get Code-a-pillar to move around the obstacles.
  - ➤"What problems did you have to solve?"
- Record what children share on a large piece of poster board for reference as the lesson progresses.

RESEARCH HIGHLIGHT:
Encouraging children to talk about emotions can develop young children's natural tendencies to help and share with others.

OVERVIEW

In this lesson, your students will be introduced to the process of **collecting data** by recording how many of each segment type are connected to Code-a-pillar™. Observing and recording information helps children develop important data and organization skills.

Key Concepts

(Links to the Four Cs)

- Critical Thinking: children will be required to think critically to organize their data.
- Collaboration: students will work together to count segments on Code-a-pillar and record their data on a chart.

Lesson Objectives

Students will:

- count how many of each type of segment there are on Code-a-pillar.
- record data on a simple chart.

Materials

Code-a-pillar toys (1 toy for each group of 3–4 children); pre-assembled using the following pieces: forward arrow, right arrow, left arrow, sound

paper charts for recording frequency of Code-a-pillar segments with right arrow, left arrow, forward arrow, and sound symbol icons at the top (1 for each group)

arrow sheets included in the curriculum packet (1 for each group)

glue stick (1 for each group)

poster

marker

Optional: Code-a-pillar Expansion Packs (extra segments for children to record on their chart)

getting started (10 minutes)

- Begin this lesson by showing children Code-a-pillar™ with a certain sequence of segments.
- Explain that today, they will have to count and keep track of the different types of body pieces found on Code-a-pillar using a chart.
  - Discuss how one important way that scientists record data, or information, is by creating charts or graphs — pictures that show what they have learned. Today, they will be doing just that!
- Clarify that the categories of segments that they are looking for are:
  - Forward arrow
  - Left arrow
  - Right arrow
  - Sound
- Explain that for every segment, they will place an arrow cutout in the correct row to mark that there is one of that piece on Code-a-pillar.
- Use one chart and arrow sheet to demonstrate how this process will work by asking your students what each segment is and appropriately adding an arrow cutout to the chart for each segment.
- Tell your students that next, it will be their job to do the same in small groups.

activity (15 minutes)

- Divide children into groups of 3–4 students.
- Pass out one pre-assembled Code-a-pillar, one chart, and one arrow sheet to each group.
- Have children take turns adding arrow cutouts to the chart to record which segments their Code-a-pillar is made of.
- Optional: Provide each group with additional segments from one or more of the Expansion Packs and ask them to record how many of each segment they have on their chart.

wrap up (5 minutes)

- Once everyone is done recording their Code-a-pillar segments, gather the children and have each group take turns sharing their findings with the class.
  - "Which type of segment was there the most of?"
  - "Which type of segment was there the least of?"
  - "How many total segments were there?"
- Record what children share on a large piece of poster board for reference as the lesson progresses.

OVERVIEW

Today your students will be introduced to the idea that another way to record data is through **measuring distances.** In this lesson, students will work with Code-a-pillar™ by measuring and recording its movement!

Key Concepts

(Links to the Four Cs)

- Creativity: children will think creatively to identify classroom items that can be used as measuring tools.
- Critical Thinking: children will compare distances measured in standard and non-standard units.
- Collaboration: students will be asked to take turns, changing roles and duties throughout the activity.

Lesson Objectives

Students will:

- practice using measurement tools to record data on the movements Code-a-pillar makes.
- investigate length using both standard and non-standard units of measurement.
- be encouraged to take turns making Code-a-pillar go.

Materials

Code-a-pillar toys (1 toy for each group of 3–4 children)

extra forward segments from the Basic Expansion Pack (each group should have 4 forward segments)

ruler (1 for each group)

additional tools that could be used for measuring distances (e.g., books, crayons, blocks)

paper (for recording measurements)

poster board

marker (1 for each group)

getting started (10 minutes)

- Explain to your students that another way scientists record information is by measuring distances.
- Explain to children that they will work with Code-a-pillar™ by adding 1, 2, 3 and finally, 4 segments.
- Tell them that they will be working with forward arrow segments only, trying to accurately measure how far Code-a-pillar moves with each segment.
- Explain to children that their groups will be given rulers, but they are encouraged to try measuring with other items around the classroom such as books, crayons or blocks.
- Show them a ruler and explain that each number indicates one inch, a unit of measurement.
- Demonstrate how one would use a ruler, piece of paper and marker to record the distance something moves.

activity (15 minutes)

- Divide children into groups of 3–4 students and give each group a Code-a-pillar without any segments connected, a ruler for measuring and a marker and paper for recording their findings.
  - ➤ Ask students to take turns being the "recorder" (person with the marker and paper).
- Once all the groups have their materials, pass around one forward arrow segment to each group. Have them measure with a ruler how far Code-a-pillar goes.
  - ➤ Next, have them record how far Code-a-pillar goes using another everyday item found in the classroom.
  - ➤ Children can also measure the distance using heel-to-toe footsteps.
- Repeat the same process by passing around a second arrow segment, followed by a third and a fourth.
- Each time you pass around a new piece, encourage children to take turns pressing "go" and measuring.

RESEARCH HIGHLIGHT:
Early skills in mathematics predict academic achievement across multiple subject areas.

wrap up (5 minutes)

- Ask children to share what their measurements came out to.
- Ask children what the easiest method of measuring was.
- Ask children what they think might happen if they tried measuring the movements of Code-a-pillar with other segment types.
- Record what children share on a large piece of poster board for reference as the lesson progresses.

OVERVIEW

Code-a-pillar™ has enjoyed playing with your students, exploring your classroom and introducing the children to **coding**. Now it is time for Code-a-pillar to return home. Children will work in small groups to test out a variety of ways for Code-a-pillar to make it home, and additionally, practice recording what they find. The lesson will conclude with a discussion of "trial and error" as well as understanding emotions.

Key Concepts

(Links to the Four Cs)

- Creativity: children will be asked to think creatively to design new pathways for Code-a-pillar to follow.
- Collaboration: children engage in turn taking and shift roles when testing different routes for Code-a-pillar to travel home and recording successful and failed attempts.
- Communication: children practice sharing ideas and listening to others to complete this activity.
- Critical Thinking: children will use planning skills to predict what segments are necessary to get Code-a-pillar to the desired end point.

Lesson Objectives

Students will:

- be encouraged to see "trial and error" as a learning process.
- work in small groups to explore ways Code-a-pillar can get home.
- practice recording what they learn.

Materials

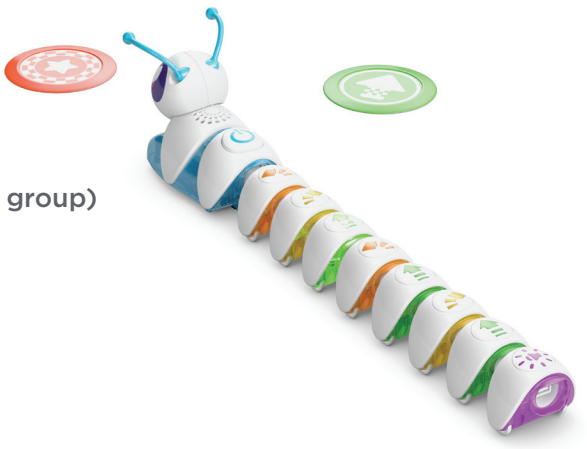
Code-a-pillar toys (1 toy for each group of 3–4 children)

paper houses or red (or green) destination targets (1 per group)

paper (1 per group)

poster board

markers (1 per group)



getting started (10 minutes)

- Explain to children that they will work together to create new paths for Code-a-pillar™ to "go" home.
- Remind your students about the concept of "trial and error" — that sometimes it takes more than one attempt to succeed and that is a useful part of the learning process.
- Explain that every time Code-a-pillar makes it home they will draw a smiley face on their group's paper, and every time Code-a-pillar does not make it home, they will draw a sad face on their group's paper.

activity (15 minutes)

- Divide children into groups of 3–4 and give each group a Code-a-pillar.
- Tell one group member to place the house or destination target somewhere on the floor of the classroom.
- Encourage children to take turns adding pieces to Code-a-pillar to try to get it to the end point (the house or target).
- Have students take turns being the "data recorder," the person in charge of keeping track of whether or not Code-a-pillar made it home.
- Repeat these steps by moving the house or target, trying out new ways to get Code-a-pillar to the end point and recording on the poster board, when Code-a-pillar made it home.

wrap up (5 minutes)

- Ask children to look at their chart and count up how many tries it took to get Code-a-pillar home.
- Ask children to share what they learned from the times Code-a-pillar did not make it home right away. Were they able to figure out how to rearrange Code-a-pillar in a way that would get it to the house/target?
- Talk to your students about why Code-a-pillar might feel happy, sad, or other emotions when trying to reach home.
  - "Why would making it home make Code-a-pillar happy?"
  - "Why would not making it home make Code-a-pillar sad?"
- Record what children share on a large piece of poster board for reference.

RESEARCH HIGHLIGHT:
Encouraging children to talk about emotions can develop young children's natural tendencies to help and share with others.

Code-a-pillar™

What is Code-a-pillar™?

Code-a-pillar™ is a friendly and fun programmable toy that encourages experimentation and inspires natural discovery and independent play while developing coding, sequencing and critical thinking skills.

Easy-to-connect segments allow for endless combinations to move Code-a-pillar forward, left, right, or even to wait for a couple of seconds before moving again.

When kids connect the segments to make Code-a-pillar move — that's sequencing! When they figure out a sequence that will create a path for Code-a-pillar to reach a target, that's programming (and problem solving, too)! It's all coding — and it's all fun!

What is coding?

Coding is a skill of giving a set of commands to a device, and for it to respond in sequence.

 | fisher-price.com | Think & Learn Code-a-pillar Home-School Connection

THiNK & LEARN

What is the Code-a-pillar™ Curriculum Toolkit?

The curriculum toolkit is a set of materials designed to support teachers of 21st Century Learning and parents in the home.

The curriculum toolkit consists of a teacher guide, lesson plans, Home-School Connection Activity tips, developmental benefits information, and FAQs.

Additional information on Think & Learn Code-a-pillar toys can be found at **www.fisher-price.com**

Fisher-Price Play Lab

THE GODDARD SCHOOL® FOR EARLY CHILDHOOD DEVELOPMENT

Center for Childhood Creativity at the Bay Area Discovery Museum