CODESPARK

CODING READINESS CURRICULUM

An Introduction to Coding Readiness for Preschoolers

RAND CORPORATION

NHSA

BY BEGiN

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Coding Readiness Curriculum

Created and tested in partnership with

Funded by

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Introduction

Welcome to codeSpark Coding Readiness Curriculum! The codeSpark app was specially designed to help bring basic computer science concepts to school-aged children and has been adopted in over 35,000 public schools worldwide. After several years of bringing award-winning educational content to homes and schools alike, we knew there was more we could do to give children the best start to their education. **So, after receiving funding from the National Science Foundation, codeSpark has partnered with The National Head Start Association and RAND to create one of the first Coding Readiness solutions for Pre-K students.** This curriculum integrates digital and physical components, teaches learning through play, emphasizes equity across socioeconomic status and gender, and is FREE to Head Starts across the U.S.

About codeSpark

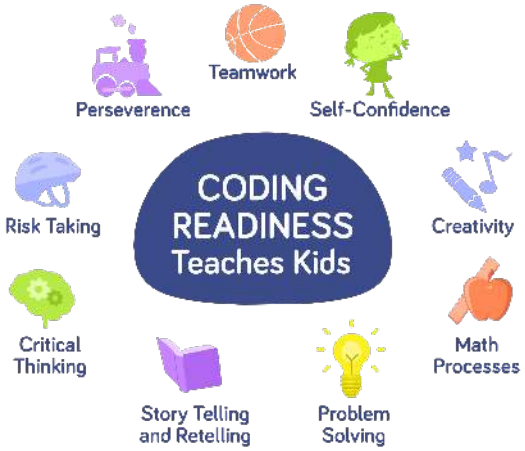
codeSpark's mission is to help kids of all ages learn to code by igniting their technical curiosity and turning programming into play. Our award-winning app is designed to teach kids the foundations of computer science through games, puzzles, coding challenges, and creative tools, while boosting their logical thinking and problem-solving skills.

Meet Begin, the company behind codeSpark

Begin is the early learning leader for kids 2-10. Our mission is to give every child the best start to achieving their fullest potential, because early learning is the key to unlocking growth at every stage of life. Our research-backed Begin Approach redefines learning through the essential skill areas for school and life success. We call these the 5 C's–Core Skills, Creativity, Critical Thinking, Curiosity, and Character–and they are at the heart of everything we create. Designed to engage growing minds and build the skills that matter most, our hands-on and digital products include activity kits from Little Passports, learning apps from HOMER, codeSpark, and Learn with Sesame Street. . Read more at beginlearning.com.

What is Coding Readiness?

You may be wondering: **What is Coding Readiness?** Coding readiness is a set of foundational thinking skills that can help prepare young children for future success in their careers. They are often related to math and reading skills such as patterns, cause and effect, sequencing, or breaking big problems into smaller steps.



Why should we teach coding readiness to preschoolers?

Coding readiness helps kids become better thinkers and problem solvers, can increase their cognitive and creative skills, and teaches them many lifelong skills including perseverance, self confidence and risk taking.

Coding readiness also better prepares kids for future careers, including those in the STEM field and helps reduce gender and racial based stereotypes by introducing it at this early age.

How does Coding Readiness connect to the curriculum I already use in my classroom?

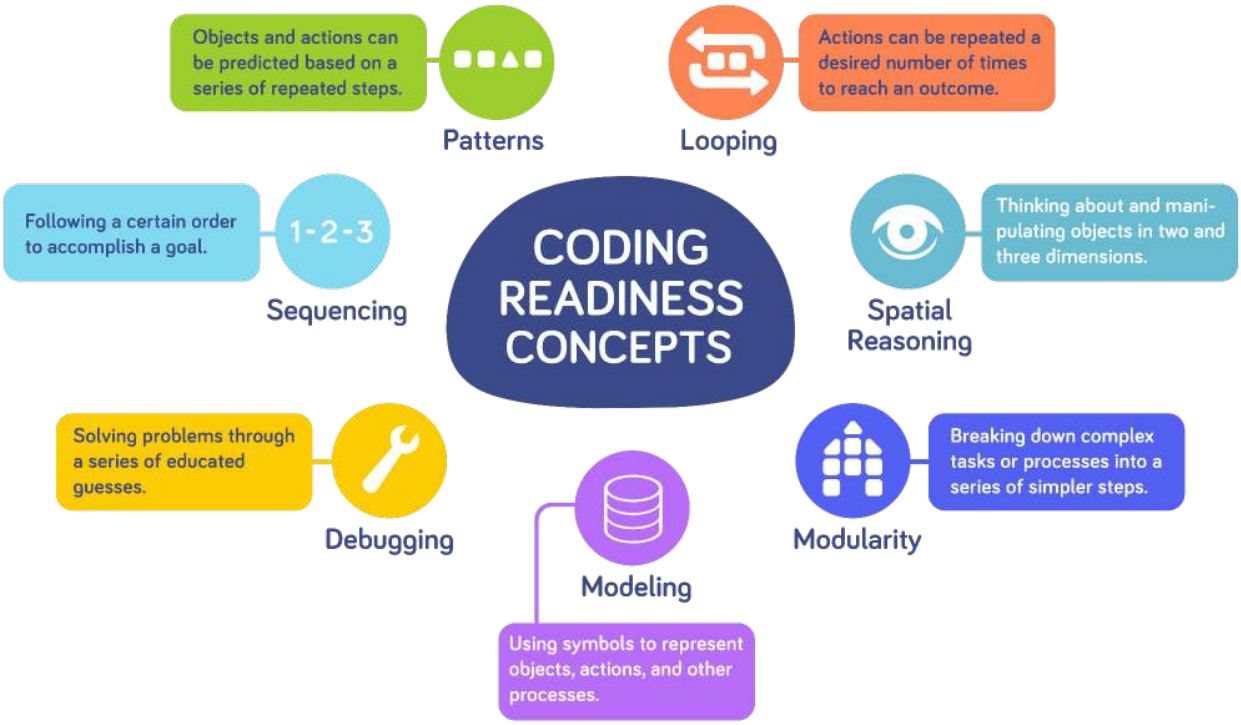
All of our curriculum can be connected with ELOF, GOLD, and CORadvantage curricula often used in Head Start centers across the country. We have outlined these connections in each lesson plan.

Do I need to have experience with coding to get started?

No! While some of the terms may feel new, many of the activities in the curriculum will feel familiar and intentionally overlap with other critical PreK skills like pattern recognition, counting, shapes, and the alphabet sequence. In addition, we've provided a professional development course that will guide you through each lesson.

How to Teach Coding Readiness

This curriculum was created to teach the core concepts of Coding Readiness, including: Sequencing, Patterns, Looping, Debugging, Modeling, Modularity, and Spatial Reasoning.



Some concepts may sound familiar and some may be new, but don't worry. codeSpark has created an online professional development to help you learn how to teach the concepts.

Access the Online Professional Development for teachers at
https://codespark.thinkific.com/courses/codespark-pre-k-coding-readiness
Or
Use the QR code below:

Our approach to teaching includes a mixture of hands-on classroom activities and digital app play. Each coding readiness topic has up to two unplugged activities and one plugged (games in the codeSpark app) activity to be taught over several weeks. Unplugged lessons are recommended to be taught in either small or whole group instruction and range from 10-20 minutes long, while plugged activities are to be done with each individual student and are subject to your center's screen time. We recommend teaching two unplugged lessons a week, along with having the plugged activity available in your computer centers to reinforce what students are learning.

Unit 1

Sequencing

Following a certain order to accomplish a goal

Keywords & Concepts:
Sequence
Order
First/Second/Third/etc.
Before/Next/After/Last
Beginning/End
Left/Right/Up/Down

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Lesson 1: The Alphabet Sequence

10-15 minutes, Whole Group

Learning Objectives

- Students will have the opportunity to accurately sequence 3-6 events.
- Students will begin to understand and use language related to directionality, order, and the position of objects.

Preparation

Materials Needed

- ☐ Alphabet on a wall strip or poster
- ☐ Alphabet magnets, foam letters, letter blocks, or create your own index cards, each with one letter of the alphabet written in marker.
- ☐ A letter display area, such as a magnetic board, or a poster board
- ☐ A bag, a hat, or a basket - to mix letters up in a jumble.
- ☐ Print and share the family connection worksheet: Sequencing Missing Letters (pg. 60)

	**Need a refresher on Sequencing?** Refer to the Sequencing Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for The Alphabet Sequence.	

Curriculum Connections:
ELOF - Goal P-ATL 8. Child holds information in mind and manipulates it to perform tasks.
GOLD - Language-Objective 8: Listens to and understands increasingly complex language 8b. Follows Directions
COR Advantage- 25. Alphabetic knowledge: Children identify letter names and their sounds.

Lesson 1: The Alphabet Sequence

10-15 minutes, Whole Group

Activity Steps

1. Introduce this activity by talking about the word "**Sequence**"
    a. What is a **Sequence**? A **sequence** is an **order** that remains the same, from **first** to **last**. It's everything in its correct place, like the days of the week or class schedule.
    b. Explain that we are going to play with a specific **sequence** today: The Alphabet!
    c. Use your alphabet wall strip or poster to sing the alphabet song together as a group.
2. Invite students to use your alphabet manipulatives to place the **first** 4 letters of the alphabet in order (A-D). Explain that the letter A is the first in the **sequence** and the letter D is the **last**.

    a. Mix all 4 letters into a bag, hat, or basket.
    b. Then, individually call on students to grab a letter from the basket and put them back in the proper **sequence**. Lead discussion by asking students: *Does this letter come toward the **beginning** of the **sequence**, in the middle, or at the **end** of the **sequence**?*
3. Lastly, play "What's missing?" with your students.
    a. Using your alphabet manipulatives, show your students the **sequence** of Q, R, S, T.

    b. Have students cover their eyes as you remove one of the letters.
    c. When they open their eyes, have them guess which letter is gone, by discussing what is **before** and **after** the empty space.

Make it Simpler:
Consider starting with just the **first** 2 letters (A & B) for this activity. Increase the number of letters used as necessary.

Up the Challenge:
Consider challenging students by using more than 4 letters at a time (potentially having all 26 letters shown at once) or use lower case letters or numbers.

Lesson 2: Obstacle Course

10-15 minutes, Small Group

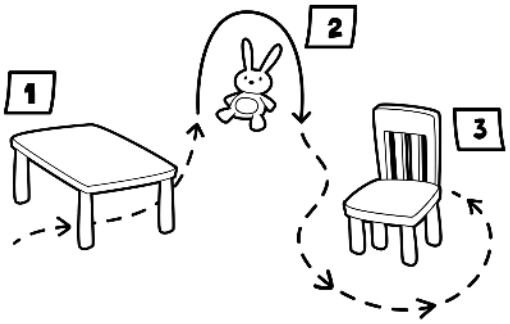
Learning Objectives

- Students will have the opportunity to accurately sequence 3-6 events.
- Students will begin to understand and use language related to directionality, order, and the position of objects.

Preparation

Materials Needed

- ☐ Post-it notes- each one marked with a numeral form 1-3
- ☐ An object to climb under, like a table or a monkey bar
- ☐ An object to jump over, like a stuffed toy or a small ball.
- ☐ An object to walk around, like a chair or a ride-on toy
- ☐ Print and share the Sequencing: Obstacle Course worksheet with families (pg.61)



Create your own obstacle course with the objects and post-its mentioned above. Be sure that the post-it note with the number 1 on it is on the item they will climb under (e.g. a table), the post-it note with the number 2 is on the item they will jump over (e.g. a stuffed animal) and the post-it note with the number 3 is on the item they will walk around (e.g. a chair)

	Need a refresher on Sequencing? Refer to the Sequencing Chapter in the Coding Readiness Training	
	Need a visual of the lesson? Watch the Teacher Video for Obstacle Course.	

Curriculum Connections:
ELOF - Goal P-PMP 2. Child uses perceptual information to guide motions and interactions with objects and other people.
GOLD - Language-Objective 8: Listens to and understands increasingly complex language 8b. Follows Directions
COR Advantage- Gross Motor Skills Level 7: Child combines a series of movements in a smooth, sequenced action.

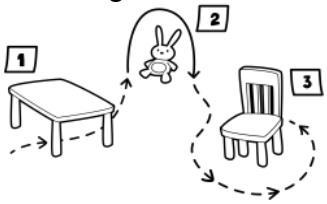
Lesson 2: Obstacle Course

10-15 minutes, Small Group

Activity Steps

1. Show students your obstacle course and tell them you're going to play a game where they need to remember the **order**. Explain that these actions are in **sequence**. (Share the definition!)
    a. Tell your students that the number on the post-it notes represents the **order** to go in. The numbers represent an ordering word.
        i. The number 1 means **first**.
        ii. The number 2 means **second**.
        iii. The number 3 means **third**.
    b. Demonstrate how to move through the course using these words:

        First, go under the table.
        Second, jump over the stuffed animal.
        Third, go around the chair.

    c. Ask students: *"What comes **before** I jump over the stuffed animal?"* or "*What comes **after** I go under the table?"*
2. Have each of the students complete the **sequenced** obstacle.
    a. The **first** time each child goes through, have the rest of their friends chant the ordering word to cheer on their friends as they reach each obstacle! (For example: *"**First**, **first**, **first**!"* and then *"**Second**, **second**, **second**!"* etc.)
3. Once the students are confident in knowing this **sequence**, it's time to mix the **order** up!
    a. Emphasize to students how you are moving the post-it numbers around to make a new **sequence**.
    b. Have them go through this new obstacle course, one at a time, chanting the **sequence** with their classmates as they go.
    c. Ask students to discuss the **sequence** now: *"What comes first?" "What comes **after**___?"* Or "*What comes **next/last**?" "Which **sequence** did you like better?"*

Make it Simpler:
Consider starting out with a 2-step **sequence**. When the student has gained an understanding of that **sequence**, add another step.

Up the Challenge:
You can challenge students to learn the words fourth, fifth, sixth, seventh, etc. by adding more steps to the obstacle course (e.g. do 3 jumping jacks, walk the line, act like you're sleeping).

Lesson 3: Foo Rescue App game

Time: 10-15 minutes or Center's Screen Time limit

Learning Objectives

- Students will have the opportunity to accurately sequence 3-6 events.
- Students will begin to understand and use language related to directionality, order, and the position of objects.
- Students will practice building an original sequence to accomplish a goal.

Preparation

Materials Needed

- ☐ Device with codeSpark app (Wi-Fi is required)
- ☐ Student profiles already set-up and ready for students

Teacher Tip: Watch the Foo Rescue App Game Teacher video to learn how the game works, so you can help your students when it's their turn to play. Use the QR code below to watch the video.

	**Need a refresher on Sequencing?** Refer to the Sequencing Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Foo Rescue.	

Curriculum Connections:
ELOF - Goal P-ATL 8. Child holds information in mind and manipulates it to perform tasks.
GOLD - Language-Objective 8: Listens to and understands increasingly complex language 8b. Follows Directions
COR Advantage- I. Approaches to Learning C. Reflection Level 5: Child recalls without prompting, the sequence of three or more things he or she did or that happened.

Lesson 3: Foo Rescue App Game

Time: 10-15 minutes or Center's Screen Time limit

Activity Steps

1. Watch the Foo Rescue App Game Teacher video to learn how the game works, so you can help your students when it's their turn to play.
2. Use the QR code in the above picture to open the game OR click on the "Foo Rescue" Menu button in the codeSpark app.
3. Encourage students to always select their profile when playing in the codeSpark app.
4. Be sure students can hear the audio (headphones are recommended)

Leveling:

- Levels increase in difficulty as students progress. (Linear Progression)
- In order to pass a level, students must collect all targets
  - The targets in this game are the floating characters that need rescuing. We call these characters "Foos".
- Levels restart if a student fails the level

Make it Simpler:
If students are having trouble with creating their own multi-step **sequence** using the arrow tiles, have them run the boat by adding one direction at a time and building on their **sequence**.

Up the Challenge:
If students are ready for a challenge, ask them to solve the same puzzle in multiple ways!

Family Connection:
Have students practice navigating through their home using their sequencing words. They can practice navigating a family member from one part of the house to another.

Example: If they practice sequencing to move out of a room, they can tell a parent *"You need to move left, up, up, right!"*

Unit 2

Patterns

Objects and actions can be predicted based on a series of repeated steps

Keywords & Concepts:
Copy/Same
Longer
Pattern
Repeat

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Lesson 4: Hello Patterns!

10-15 minutes, Small Group

Learning Objectives

- Students will practice recognizing and copying a pattern.
- Students will explore extending a pattern.

Preparation

Materials Needed

- ☐ Manipulatives that can be arranged in a pattern (can contain different colors, shapes, and/or sizes like magnatiles, counting bears, connector beads, etc.)

	**Need a refresher on Patterns?** Refer to the Patterns Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Hello Patterns!.	

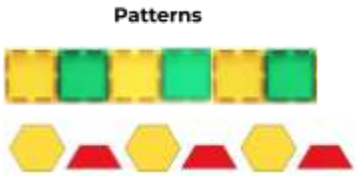
Curriculum Connections:
ELOF - Goal P-MATH 7. Child understands simple patterns.
GOLD - Mathematics- Objectives 23: Demonstrates knowledge of patterns
COR Advantage- 38. Patterns: Children identify, describe, copy, complete, and create patterns

Lesson 4: Hello Patterns!

10-15 minutes, Small Group

Activity Steps

1. Have students join you in learning about patterns. Introduce what a **pattern** is.



   a. Model how to create a simple pattern (AB pattern) using manipulatives- you can focus on color, shape, or size.

   b. Ask students to look around the room and point out patterns they see (e.g.- color/shape tiles on the floor, stripes on a shirt, shapes on a poster).

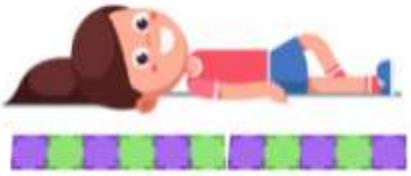
2. Invite students to copy your AB pattern example using the manipulatives. Model how to describe a pattern: "I made a color pattern. My pattern is yellow, green, yellow, green."

3. Ask students "*What comes next?* In their pattern if they were to continue (extend) it or make it longer. Have students practice continuing their simple pattern.

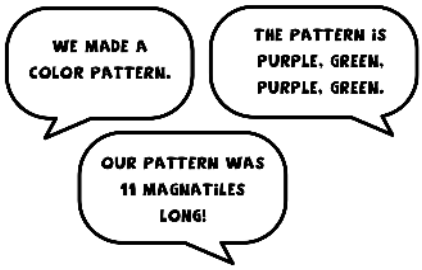
   a. If students are ready, model another pattern (AABB) and have them practice **copying** and continuing to make it longer.

4. Next, challenge students by asking them to create a pattern (AB or AABB) as long as a classmate!

   a. Ask for a student to lie down, facilitate the activity so that tall students take turns creating the pattern until it is as long as the student lying down.



5. End the activity by encouraging students to turn and talk to a friend to describe the pattern they created.



Make it Simpler: Stick to AB patterns and try to have them copy patterns step by step as you create them together.

Up the Challenge: Have students fill in the missing object from the middle of a pattern that may have a pattern rule with 3 elements "ABC". As another option, try a growing pattern.

Family Connection: Encourage families to practice identifying patterns around the house or in nature by going on a pattern scavenger hunt. They can also create their own patterns using everyday objects like utensils, cereal, coins, candy, colored paper, and more!

Lesson 5: Clap Tap!

10-15 minutes, Whole Group

Learning Objectives

- Students will practice recognizing and copying a pattern.
- Students will explore extending a pattern.
- Students will exercise the ability to create a unique pattern.

Preparation

Materials Needed

- ☐ A large area to have your class sit in a circle.
- ☐ Three pieces of blue construction paper with the letter A printed large
- ☐ Three pieces of yellow construction paper with the letter B printed large
- ☐ Three pieces of green construction paper with the letter C printed large

	**Need a refresher on Patterns?** Refer to the Patterns Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Clap Tap!	

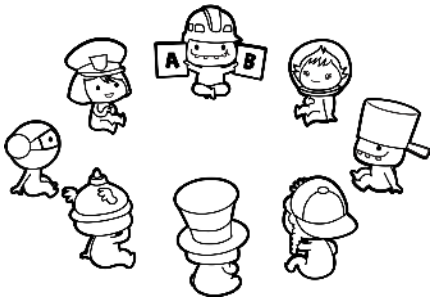
Curriculum Connections:
ELOF - Goal P-MATH 7. Child understands simple patterns.
GOLD - Mathematics- Objectives 23: Demonstrates knowledge of patterns
COR Advantage- 38. Patterns: Children identify, describe, copy, complete, and create patterns

Lesson 5: Clap Tap!

10-15 minutes, Whole Group

Activity Steps

1. Invite your students to sit in a circle with their legs crossed in front of them. Put the "A" paper and the "B" paper in front of you, for the whole class to see.



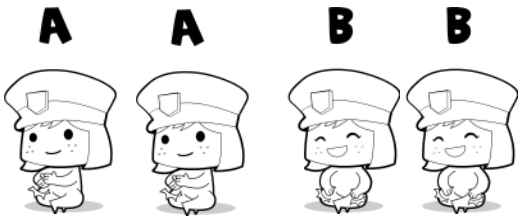
   a. Explain that this activity is about **patterns**, patterns with our hands!

   b. Model the **first** pattern for the students and explain that it is an AB pattern with where "A" mean Clap and "B" means Tap Knees:

Clap hands– Tap Knees-- Clap hands – Tap Knees

To emphasize the AB pattern, say "A" when you clap your hands, and "B" when you tap your knees. Have the students copy your pattern and try it with you!

2. Next, introduce them to the AABB pattern. First, create the AABB pattern using the construction paper letters, then have the students **repeat** those letters as they follow the motions.



Clap – Clap – Tap – Tap – Clap – Clap – Tap – Tap

3. Using the AA BB pattern, have your students tell you "*What comes next?*" (extend) after you stop the pattern. Ask:

Clap – Clap – "*What comes next?*"

Clap – Clap – Tap – Tap – Clap – Clap – *"What comes next?"*

4. Now it's time to finish the activity by having students create their own patterns! Help students by defining the A and B and/or C parts of their new pattern, using the visual aids of the labeled papers as needed.

Make it Simpler:
If students struggle with labeling the patterns with the AB terminology, just focus on having them understand the pattern of the actions.

Up the Challenge:
Encourage students to create their own pattern for the rest of the group to extend.

Family Connection:
Get parents to practice more pattern moves at home by having them look up "Banana, Banana, Meatball" by GoNoodle on Youtube.

Lesson 6: Pick That Pattern App Game

Time: 10-15 minutes or Center's Screen Time limit

Learning Objectives

- Students will practice recognizing and copying a pattern.
- Students will explore extending a pattern.
- Students will exercise the ability to create a unique pattern
- Students will have the opportunity to translate a pattern from one context to another.

Preparation

Materials Needed

- ☐ Access to Wi-FI
- ☐ Device with codeSpark app
- ☐ Student profiles already set-up and ready for students

	**Need a refresher on Patterns?** Refer to the Patterns Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Pick That Pattern.	

Curriculum Connections:
ELOF - Goal P-MATH 7. Child understands simple patterns.
GOLD - Mathematics- Objectives 23: Demonstrates knowledge of patterns
COR Advantage- 38. Patterns: Children identify, describe, copy, complete, and create patterns

Lesson 6: Pick That Pattern App Game

Time: 10-15 minutes or Center's Screen Time limit

Activity Steps

1. Try the Pick That Pattern game out on the app for yourself, so you are familiar with how it works.
2. Use this QR code in the above picture to open the game OR click on the "Pick That Pattern" Menu button in the codeSpark app.
3. Be sure students can hear the audio (headphones are recommended)
4. Encourage students to always select their profile when playing in the codeSpark app.

Leveling:

- Levels increase in difficulty as students progress. (Linear Progression)
- Once a student finishes all the activities on the wheel, the app will direct them to the main menu. Clicking on Pick that Pattern again will start a new wheel with more challenging levels, so there are dozens of activities to try.

Make it Simpler:
If students are having trouble with specific games, have them practice using manipulatives with you to work on the specific skill first.

Up the Challenge:
Ask students to solve the games for translating a pattern in different ways!

Family Connection:
Translating a pattern can be tricky. Have families practice at home by having your student create a pattern out of everyday objects that their family members will need to recreate using a different set of objects. Encourage them to take turns on who will create the pattern next.

Example:
Suzie makes a pattern that is pencil, eraser, pencil, eraser. Then, her parent recreates the pattern with fork, spoon, fork, spoon.

Unit 3

Looping

Actions can be repeated a desired number of times to reach an outcome

Keywords & Concepts:
Loops/Looping
Loop Count
Repeat

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Lesson 7: Ice Cream Truck Loops

15-20 minutes, Small Group

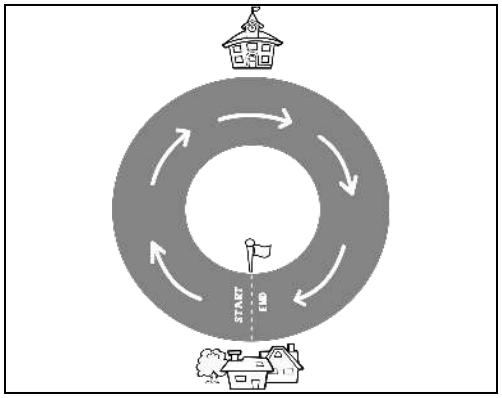
Learning Objectives

- Students will explore identifying a loop, looped behavior, or repeated pattern
- Students will practice creating a loop that ends early based on different conditions

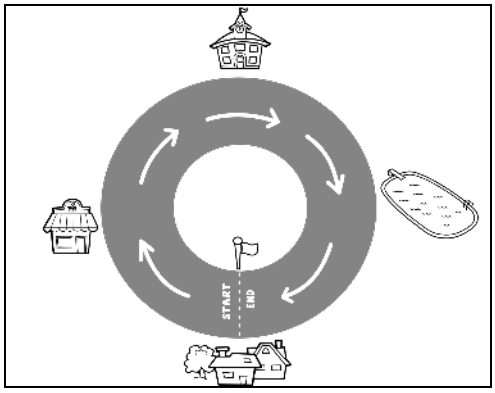
Preparation

Materials Needed

- ☐ A toy truck (pretend it's an ice cream truck)
- ☐ A die to roll
- ☐ Print and Share the Ice Cream Truck Loops worksheet (pg. 62) with parents.
- ☐ Poster board with a map drawn on both sides (See "Poster Board Prep" below)



Side 1: Road loop with 2 stops (e.g.- neighborhood & school)



Side 2: Same road loop on side 1 plus 2 more stops (e.g.- store & pool)

	Need a refresher on Looping? Refer to the Looping Chapter in the Coding Readiness Training	
	Need a visual of the lesson? Watch the Teacher Video for Ice Cream Truck Loops.	

Curriculum Connections:

ELOF - Goal P-MATH 7. Child understands simple patterns.

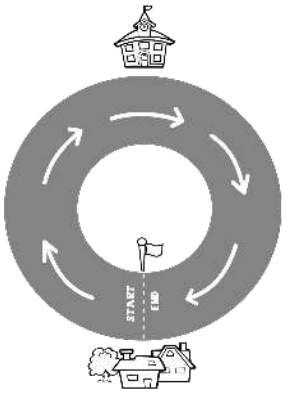
GOLD - Mathematics- Objectives 23: Demonstrates knowledge of patterns

COR Advantage- 38. Patterns: Children identify, describe, copy, complete, and create patterns

Lesson 7: Ice Cream Truck Loops

15-20 minutes, Small Group

Activity Steps

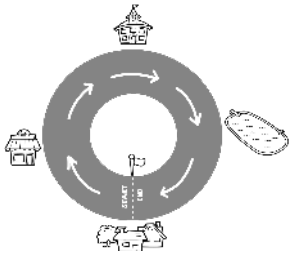


1. Display Side 1 of the poster
    a. Tell students that the road is a **loop**, because it **starts** and **ends** in the same place.
    b. Model how to make a circle in the air as you say the word **loop**. Encourage students to do the same.
2. Take the ice cream truck and drive it around the road **loop**. Emphasizing how the truck **starts** and **ends** in the same place
3. Point out the school and discuss how the truck will need to stop at the school to give out ice cream, and we should shout “Hooray,” with our fists in the air, when the truck gets there.
4. Drive the truck around the **loop** and be sure to make a quick stop at the school to shout “Hooray” together, with your fists in the air.
5. Next, turn it into a game! Roll a die to figure out how many times the truck will repeat driving around the road **loop**. This number is called the **loop count**.

    a. As the truck drives around the **loop**, don’t forget to stop at the school and shout “*Hooray!*” with fists in the air.
    b. Students should count each **loop** as they go until they’ve reached the **loop** count determined from the die.
        i. Note: Stopping at the school does not count in your **loop** count, you have to complete the drive around the road **loop** for it to count as a one whole **loop**.
6. Once the game is over, end the activity in a discussion::
    a. *Where is the **loop** in our road?*
    b. *Where did our **loop start** and where did it **end**?*
    c. *How many stops are in the **loop**?*
    d. *If we just went to the school, did we make a **loop** yet? Why not?*
    e. *How did we know when to stop **looping**?*
    f. *What else can you think of that **loops**?*

Make it Simpler:
If students are struggling with doing the actions/sayings at each stop for the **loop**, have them focus on counting the number **loops** they rolled only.

Up the Challenge:
Add 2 more stops around the **loop** (see Poster Board Prep Side 2).



Lesson 8: Dance Dance

15-20 minutes, Whole Group

Learning Objectives

- Students will have the opportunity to identify the smallest unit of a looping pattern.
- Students will explore identifying a loop, looped behavior, or repeated pattern.
- Students will practice creating a loop that ends early based on different conditions.

Preparation

Materials Needed

- ☐ A large area for the whole class to move and dance
- ☐ A phone/tablet/computer to play music (See links and QR code below)

	**Need a refresher on Looping?** Refer to the Looping Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Dance Dance.	
	**Download:** The Let's Get Loopy Song (Lyrical Version) to play for your students	
	**Download** The Let's Get Loopy Song (Instrumental Version) for student created dances	

Curriculum Connections:
ELOF - Goal P-MATH 7. Child understands simple patterns.
GOLD - Mathematics- Objectives 23: Demonstrates knowledge of patterns
COR Advantage- 38. Patterns: Children identify, describe, copy, complete, and create patterns

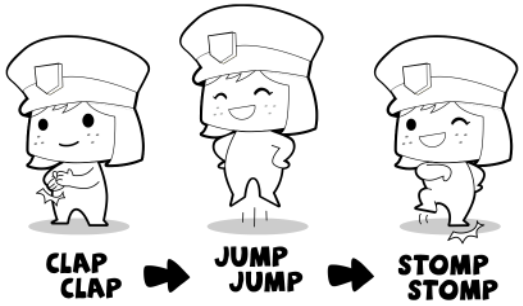
Lesson 8: Dance Dance

15-20 minutes, Whole Group

Activity Steps

1. Explain to students that they are going to learn a dance using **loops**. Remind students that **loops** are a way of **repeating** actions.

    a. Without any music, model this dance **loop** with them and practice it a few times: Clap (2x), Jump (2x), Stomp (2x)



    b. Say *"We are now going to **loop** this dance two times."* Shout *"**Loop** one!"* to **start** the **first loop**. Then, say *"**Loop** two!"* for the **second**.

2. Turn on the **Let's Get Loopy** song (lyrical version) and have the class dance freestyle until the song says "**Loop** one"

    a. When the song says "**Loop** One", shout "***Loop** One*!" and do the dance **loop** together (Clap Clap, Jump Jump, Stomp Stomp). Repeat for **Loop** Two and **Loop** Three.

3. **After** doing the **loop** dance several times, end the activity with discussion:
    a. *Where does our **loop begin**? Where does it **end**?*
    b. *How do we know when to start the **loop**?*
    c. *For this **loop** we've been doing - clap, clap, jump, jump, stomp, stomp - What if we clap and jump - but don't stomp? Is that a **loop**?*

Make it Simpler: Have students do each action once instead of twice. The 3 actions together will still create a **loop**!

Up the Challenge: Have students create their own dances with the instrumental version of Let's Get Loopy. The chorus to say *"**Loop** one"* **starts** at the 48-second mark. Encourage students to add more dance moves to their **loops** (i.e. Clap Clap, Jump Jump, Stomp Stomp, Wiggle Wiggle)

Family Connection: Share the cool moves your students created with their families. Invite parents in for a performance or videotape it to share digitally. If you are able, send an email to parents with the Let's Get Loopy song for them to dance along with at home.

Lesson 9: Doodle Looper App Game

Time: 10-15 minutes or Center's Screen Time limit

Learning Objectives

- Students will have the opportunity to identify the smallest unit of a looping pattern.
- Students will explore identifying a loop, looped behavior, or repeated pattern.

Preparation

Materials Needed

- ☐ Device with codeSpark app (Wi-Fi is required)
- ☐ Student profiles already set-up and ready for students

Watch the Doodle Looper App Game Teacher video to learn how the game works so you can help your students when it's their turn to play. Use the QR code below to watch the video.

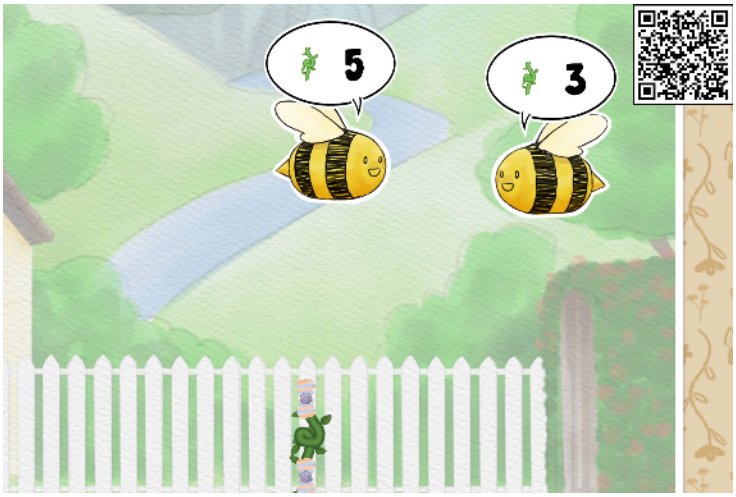
	**Need a refresher on Looping?** Refer to the Looping Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Doodle Looper.	

Curriculum Connections:
ELOF - Goal P-MATH 7. Child understands simple patterns.
GOLD - Mathematics- Objectives 23: Demonstrates knowledge of patterns
COR Advantage- 38. Patterns: Children identify, describe, copy, complete, and create patterns

Lesson 9: Doodle Looper App Game

Time: 10-15 minutes or Center's Screen Time limit

Activity Steps



1. Try the Doodle Looper game out on the app for yourself so you are familiar with how it works.
2. Use the QR code in the above picture to open the game OR click on the "Doodle Looper" Menu button in the codeSpark app.
3. Encourage students to always select their profile when playing in the codeSpark app.
4. Be sure students can hear the audio (headphones are recommended)

Make it Simpler:
Try practicing this concept with blocks. Have students build a tower by stacking 4 blocks on top of one another, then have students build a tower by stacking 5 blocks on top of one another. Ask which tower is taller, the tower that was built 4 times or 5 times. Then return to the app.

Up the Challenge:
Ask students if **looping** a vine with 3 elements will grow higher compared to a vine **looping** one element (e.g. 2 vines **looped** 5 times is greater than **looping** one vine 8 times)

Family Connection:
Have families practice identifying **loop counts** at home by creating a pattern out of forks and spoons, then having their child count how many times the pattern is **looped**. (i.e. if the pattern is fork, spoon, fork, spoon, fork, spoon, then the **loop count** is 3)

Unit 4

Debugging

Solving problems through a series of educated guesses

Keywords & Concepts:
Process
Bug
Debug/Debugging

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Lesson 10: Handwashing Detectives

10-15 minutes, Small Group

Learning Objectives

- Students will pinpoint specifics about a problem in a process.
- Students will demonstrate flexible thinking and perseverance when feeling frustrated with a problem.

Preparation

Materials Needed

- ☐ Sink with running water
- ☐ Soap
- ☐ Paper towels
- ☐ Washing Hands Activity Cards (pg. 63)

	**Need a refresher on Debugging?** Refer to the Debugging Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Handwashing Detectives.	

Curriculum Connections:
ELOF - Goal P-ATL 7. Child persists in tasks. 9. Child demonstrates flexibility in thinking and behavior
GOLD - Cognitive-Objective 11: Demonstrates positive approaches to learning 11b. Persists 11e Shows flexibility and inventiveness in thinking
COR Advantage- B. Problem solving with materials: 4. Problem solving: Children solve problems encountered in play. K. Personal Care and healthy Behavior: 20. Healthy Behavior: Children engage in healthy practices. BB. Observing and Classifying: 45. Children observe the materials and processes in their environment.

Debugging

Lesson 10: Handwashing Detectives

10-15 minutes, Small Group

Activity Steps

1. Discuss: *"Do you know how to wash your hands? There are a lot of steps in washing your hands. Together, these steps are called a **process**. We're going to see if we know the true **process** of washing hands. It seems easy, but it's easy to make mistakes or forget some of the steps. Those mistakes are called **errors**. We'll need to work like detectives to find the errors and fix them."*
    a. Have students share their ideas about handwashing steps without correcting them. Write down their responses without providing feedback.
    b. Review the **order** with the students and ask if they want to make any changes to their instructions.
2. Explain that you are going to **test** their steps by pretending not to know the process of washing hands (kind of like a robot).
3. Copy the steps exactly as written. For example, if their step says to put your hands under the water, but doesn't mention scrubbing your hands, don't scrub. If one of their steps says "Get soap" you might just grab a bottle of soap (but not dispense it into your hand)
4. Once you've completed their steps, say *"All done! Did I do that correctly?"* (The answer is most likely "No!")
5. Tell the students, *"We tested it, but there are some problems, or errors, here. Can you help me fix the steps? I have some pictures that might help"*
    a. Show the students the picture cards. Have them take turns suggesting a new picture for each part of the **process**.
    b. Test the **process** they created with the cards and repeat step 5 as often as needed.

Make it Simpler:
Break it down into smaller groups of steps. For example, you can start by **debugging** the **process** of drying hands.

Up the Challenge:
Have students create their own activity cards to represent another **process**, such as making a bowl of cereal with milk, getting dressed for school, or shampooing their hair.

Modification Guidelines:
The keywords here are **process, error(s),** and **test**. If you choose to modify this activity using a different **process**, then be sure to use these words.

Family Connection:
Encourage families to watch "Exact instructions" by Josh Darnit on Youtube. This video is the same activity, but with PB&J sandwiches– and quite funny!

Lesson 11: Count and Correct

10-15 minutes, Whole Group

Learning Objectives

- Students will pinpoint specifics about a problem in a process.
- Students will try solutions based on educated guesses.

Preparation

Materials Needed

- ☐ Number cards, printed and cut-out (pg. 64)
- ☐ Bug and Object cards, printed and cut out (pg. 65)

	**Need a refresher on Debugging?** Refer to the Debugging Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Count and Correct.	

Curriculum Connections:
ELOF - Goal P-ATL 7. Child persists in tasks. 9. Child demonstrates flexibility in thinking and behavior
GOLD - Cognitive-Objective 11: Demonstrates positive approaches to learning 11b. Persists 11e Shows flexibility and inventiveness in thinking
COR Advantage- B. Problem solving with materials: 4. Problem solving: Children solve problems encountered in play. S. Numbers and Counting: 31. Number words and symbols: Children recognize and use number words and symbols.

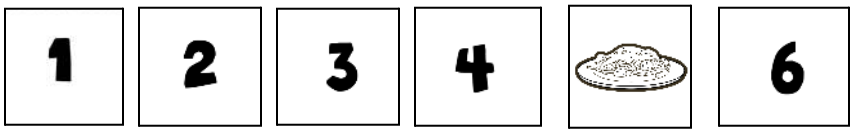
Debugging

Lesson 11: Count and Correct

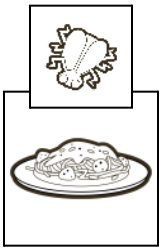
10-15 minutes, Whole Group

Activity Steps

1. Introduce the word "**Debugging**" as a new vocabulary word. **Debugging** is problem-solving by looking closely, finding problems, and fixing them.
2. Explain that you will use counting to help them practice **debugging**.
3. Display your number cards for numbers 1-3 in front of your students, counting out loud as you go. Ask students if the numbers are in the right **order** (**sequence**). If so, tell them that you're going to keep counting.
    a. When you get to 5, instead of putting up the number 5 card, add the spaghetti card and say "spaghetti". Continue counting and displaying number cards as normal, until you get to 10 or until students notice the error/problem.



1. Ask students to point out the problem in your number **sequence** . Tell students that this problem (the spaghetti) is called a **bug**. Place the **bug** card above the spaghetti card and say *"Oh, there's the **bug**!"*



2. Once the students have identified the **bug**, tell them "*Great work! We looked closely, found the **bug**, and now it's time to fix it with **debugging**."*
    a. Have them correct the mistake by replacing the spaghetti card with the number 5 card.
    b. Then, remove the **bug** card and say.*"Good job, **debugging**! You looked closely, found the **bug**, and **debugged** it!"*
3. You can repeat this activity by starting over and placing an object card in a different spot or continue counting to higher numbers and add object cards as you go.

Make it Simpler:
Keep the number **sequence** shorter (1-5, for example.)

Up the Challenge:
Use higher numbers, such as 1-20, start with a number other than 1, and/or include several errors for the students to **debug**.

Modification Guidelines:

You can replace "spaghetti" with other object cards, we've provided a variety for your choosing

You can do this activity with any **sequence** or omit the cards and count verbally. Just keep in mind that **BUG** and **DEBUG** are the two keywords to use here.

Family Connection:

Talk with families about the activity completed in class. If possible, print off the number and object cards for them to continue practicing at home.

Lesson 12: Road Repair

Time: 10-15 minutes, Whole Group

Learning Objectives

- Students will demonstrate flexible thinking and perseverance when feeling frustrated with a problem
- Students can pinpoint specifics about a problem in a process
- Students can make guesses about why something happens in a process.

Preparation

Materials Needed

- ☐ Access to Wi-FI
- ☐ Device with codeSpark app
- ☐ Student profiles already set-up and ready for students

	**Need a refresher on Debugging?** Refer to the Debugging Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Road Repair.	

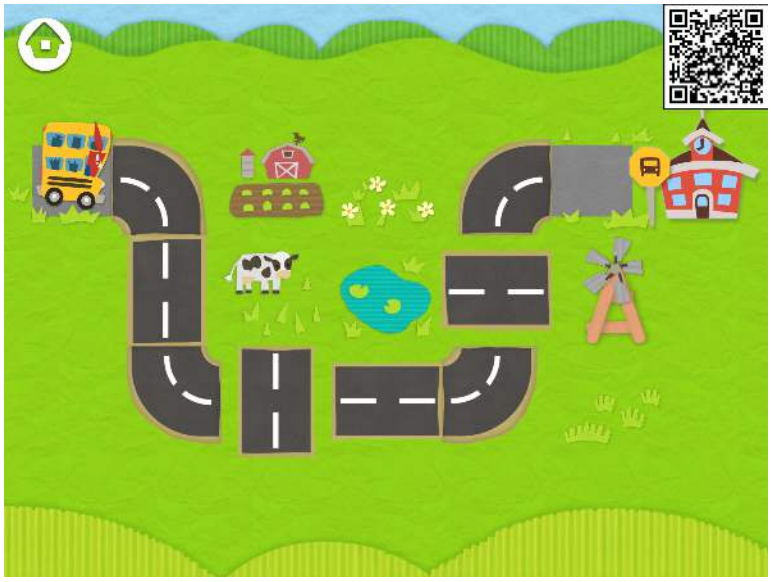
Curriculum Connections:
ELOF - Goal P-ATL 7. Child persists in tasks. 9. Child demonstrates flexibility in thinking and behavior
GOLD - Cognitive-Objective 11: Demonstrates positive approaches to learning 11b. Persists 11e Shows flexibility and inventiveness in thinking
COR Advantage- B. Problem solving with materials: 4. Problem solving: Children solve problems encountered in play.

Debugging

Lesson 12: Road Repair

Time: 10-15 minutes or Center's Screen Time Limit

Activity Steps



1. Try the Road Repair game out on the app for yourself so you are familiar with how it works.
2. Use the QR code in the above picture to open the game OR click on the "Road Repair" Menu button in the codeSpark app.
3. Be sure students can hear the audio (headphones are recommended)
4. Encourage students to always select their profile when playing in the codeSpark app.

Make it Simpler:
Practice driving a toy car on wooden blocks (these blocks will act like a road) that are positioned in a straight line. Point out how the car can easily drive on it, because all of the blocks are connected. Then, rotate one block and ask the child if the car can still drive easily on the "road" and work together to fix the road. Repeat as needed.

Up the Challenge:
Continue to have students return to the game. Each time they return, there will be more challenging puzzles to try.

Family Connection:
Encourage parents to take a light bulb out of a light and/or batteries out of a remote (without the child seeing) and have their child try to debug why the light fixture or remote is not functioning properly.

Unit 5

Modeling

Using symbols to represent objects, actions, and other processes

Keywords & Concepts:
Symbol
Represent
Chart/Flowchart

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Lesson 13: Play and Pause

15-20 minutes, Whole Group

Learning Objectives

- Students can use symbols.

Preparation

Materials Needed

- ☐ A space to have students in a large circle. (This activity can be done inside or outside.)
- ☐ Each of the following symbols drawn on a separate piece of paper (5 papers total):

	Need a refresher on Modeling? Refer to the Modeling Chapter in the Coding Readiness Training	
	Need a visual of the lesson? Watch the Teacher Video for Play and Pause	

Curriculum Connections:

ELOF - Goal IT-LC 11. Child recognizes pictures and some symbols, signs, or words.
Goal P-LC 7. Child shows understanding of word categories and relationships among words.
GOLD - Cognitive-Objective 14: Uses symbols and images to represent something not present. 14a. Thinks symbolically.
COR Advantage- BB. Observing and Classifying. 46. Children classify materials, actions, people, and events.

Modeling

Lesson 13: Play and Pause

10-15 minutes, Whole Group

Activity Steps

1. Have all your students stand in a large circle and hold hands.
2. Take a minute to practice walking in a circle together, then tell the students to sit down, keeping the circle formation.
3. Display both the PLAY and PAUSE **symbols** for students to see. Tell them that these images are **symbols**.
    a. Pointing to PLAY, say "*This **symbol** means PLAY*" 
    b. Pointing to PAUSE, say "*This **symbol** means PAUSE*" 
    c. Ask your students if they have seen these **symbols before** and where.
4. Tell students that you will use these **symbols** to walk in a circle, again.
    a. Tell students that when you hold up the PLAY **symbol**, they will walk at a normal pace. When you hold up the PAUSE **symbol**, they will freeze.
5. Have students stand up again and hold hands. Hold up the PLAY symbol, reminding students that this means they should walk in a circle at a normal pace. Then, hold up the PAUSE **symbol**, reminding students to freeze. Don't let them move again until you hold up the play button again. Practice this step a few times.
6. Once your students have mastered the PLAY and PAUSE buttons, it's time to move on to the other buttons. Display each of the other buttons, one at a time, and explain what they mean:
    a. FAST FORWARD - or move very fast around the circle. 
    b. STOP - sit down where you are standing. 
    c. REWIND - you move in the opposite direction fast. 
7. Once you have reviewed the remaining buttons, it's time to start incorporating them into the circle walk. Continue to use the PAUSE and PLAY buttons, but slowly incorporate FAST FORWARD, REWIND, and STOP, one at a time.

Make it Simpler:
Omit steps 6 & 7, focusing only on the play and pause buttons.

Up the Challenge:
Have students move in different ways: Hop like bunnies, take baby steps, or move like robots!

Modification Guidelines:
The main idea of this activity is to understand **symbols**. You can also try this with a traffic light (real or constructed), where the green light means walk, the yellow light means freeze in place, and the red light means sit down.

Family Connection:
Encourage families to identify symbols inside of their home with their children. Examples could be the play, pause, stop, etc. symbols that they may find on Youtube videos or TV remotes or even symbols like the recycling symbol.

Lesson 14: Everyday Symbols

10-15 minutes, Small Group

Learning Objectives

- Students will use symbols to represent everyday objects in the classroom.
- Students will categorize objects using symbols.

Preparation

Materials Needed

- ☐ Groups of classroom materials in bins or containers:
  - ☐ Counting bears
  - ☐ Crayons
  - ☐ Pencils
  - ☐ Jigsaw puzzle pieces
  - ☐ Paint brushes
- ☐ Symbol cards (pg. 68)
- ☐ Scotch tape (or other adhesive) for attaching labels

	**Need a refresher on Modeling?** Refer to the Modeling Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Everyday Symbols	

Curriculum Connections:
ELOF - Goal P-LC7. Child shows understanding of word categories and relationships among words
GOLD - Cognitive-Objective 14: Uses symbols and images to represent something not present. 14a. Thinks symbolically.
COR Advantage- BB. Observing and Classifying. 46. Children classify materials, actions, people, and events.

Modeling

Lesson 14: Everyday Symbols

10-15 minutes, Small Group

Activity Steps

1. Display all classroom materials in designated bins
    a. Pointing to each bin, ask students to identify what's inside.
2. Next, display all the symbol cards. Ask, *"Have you seen these kind of pictures **before**? These are called symbols. A SYMBOL is something that REPRESENTS another thing, even if it doesn't look exactly the same."*
    a. Hold up the symbol cards one at a time, and ask what each is a picture of. (e.g., *"This is a picture of… a bear,"* etc.)
    b. Then, holding up the bear symbol, ask *"Which bin would this bear symbol represent?"* (The Counting Bears) Tape the Bear symbol on the counting bears container.
    c. Continue so that all the bins are labeled

3. Now it's time to mix it up! Dump the materials out of their bins and mix them all together. Say "Oh, no! I made a mess. It's time to clean-up!"
4. Have each student grab one item and wait for further instruction.
5. Once everyone has an item in their hands, hold up the pencil symbol card saying, *"Who has one of these? Let's put them back."* Go through each symbol card, so that students correctly categorize each item. Repeat until all of the items have been put away.

Make it Simpler:
Limit your materials to 2 items (i.e. counting bears and crayons)

Up the Challenge:
Use the blank symbol cards to make your own symbols for other bins in your classroom.

Modification Guidelines:
There are many different symbols you can use to have students match to objects in your classroom. If you decide to use other symbols, be sure not to use colors, as the point of this lesson is not about color matching, but recognizing symbols.

Family Connection:
Encourage families to work together to create labels for toy containers at home, using symbols they find online or create themselves.

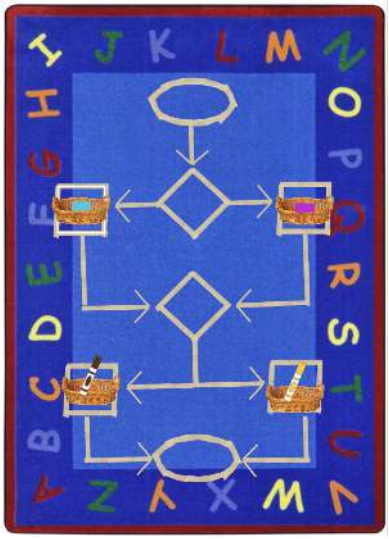
Lesson 15: Masking Tape Flow Chart

15-20 minutes, Whole Group

Learning Objectives

- Students will have the ability to represent a process in a flowchart
- Students will modify a flowchart and then demonstrate that process.

Preparation



Materials Needed

- ☐ Masking Tape (or chalk*)
- ☐ Post-it Notes of two different colors
- ☐ Crayons or markers in brown and yellow
- ☐ A blank wall or whiteboard/chalkboard
- ☐ 4 baskets/containers
- ☐ Carpeted area*

Prepare your carpeted area by creating this flowchart out of masking tape. The first two baskets will hold the post-it notes (one color per basket). One color of post-its will **represent** a cone and the other color will **represent** a bowl. The **last** two baskets will hold the markers (brown for one basket and yellow for the other). The brown markers will **represent** chocolate ice cream and the yellow markers will **represent** vanilla ice cream

*If your classroom does not have a carpeted area, we recommend modifying this lesson to be done with chalk (instead of masking tape) as an outdoor activity.

	Need a refresher on Modeling? Refer to the Modeling Chapter in the Coding Readiness Training	
	Need a visual of the lesson? Watch the Teacher Video for Masking Tape Flow Chart	

Curriculum Connections:
ELOF - Goal P-LC7. Child shows understanding of word categories and relationships among words
GOLD - Cognitive-Objective 14: Uses symbols and images to represent something not present. 14a. Thinks symbolically.
COR Advantage- B. Problem SOlving with Materials. 5. Use of resources: Children gather information and formulate ideas about their world.

Lesson 15: Masking Tape Flow Chart

15-20 minutes, Whole Group

Activity Steps

1. Explain to students that they are going to make decisions for an imaginary ice cream party. We will use post-its and markers to make our decisions and see what kind of ice cream combinations the class likes.
2. Model the steps of going through the flow chart:
    a. Step on the **first** oval in the flow chart. This is the "**Start**".
    b. Then, move to the diamond shape that comes next in the flow chart. This will be where you will ask the **first** question**: "***Do you want a cone or a cup?***"** Then, follow the masking tape to the corresponding basket and grab a post-it note.
    c. Now follow the masking tape to the next shape: a diamond. Ask the **second** question: **"***Do you want chocolate or vanilla ice cream?***"**
    d. Then, follow the masking tape to the corresponding basket and draw a circle on your post-it note.
    e. Finally, move to the last shape (an oval) and examine your result. You will have one of four possible combinations. Add the sticky note to your whiteboard.
3. Have each child go through the flow chart individually or in pairs
4. Once all post-it notes are on the whiteboard, group the post-its to help children answer the following questions as a group:
    a. Which flavor was chosen most: chocolate or vanilla?
    b. Which was chosen most: cone or bowl?
    c. Which was chosen most: vanilla cone, vanilla bowl, chocolate cone or chocolate bowl?

Make it Simpler:
Limit the decisions to just the flavor of ice cream.

Up the Challenge:
Include an extra step for toppings

Modification Guidelines:
If your class is extra large, consider having students work in pairs to make their ice cream decisions.

This activity is a great activity to do outside with chalk (especially if you do not have a large indoor carpet or space to use masking tape.

Family Connection:
Have students recreate the flow chart on a piece of paper with a pencil, crayon, or maker. Then encourage them to use the flowchart at home to see the results of their family's ice cream decisions vs the class's.

Unit 6

Modularity

Breaking down complex tasks or processes into a series of simpler steps

Keywords & Concepts:
Part
Whole
Shape/Shape Names
Number words

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Lesson 16: Many Ways to Build

10-15 minutes, Small Group

Learning Objectives

- Students will demonstrate an understanding of part / whole relationships
- Students will demonstrate an understanding that there are different ways to make up a unit of 4.

Preparation

Materials Needed

- ☐ Lego Duplo blocks, Fisher Price Mega Blocks, or anything similar: several that are 4 units wide, several that are 2 units wide, and several that are 1 unit wide.

	**Need a refresher on Modularity?** Refer to the Modularity Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Many Ways to Build.	

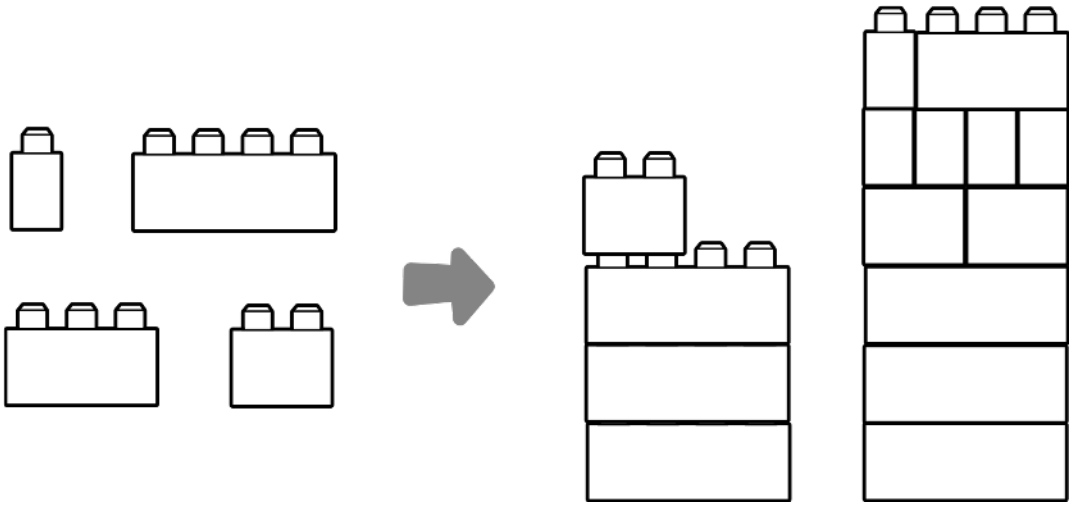
Curriculum Connections:
ELOF - Goal P-ATL 8. Child holds information in mind and manipulates it to perform tasks. Goal P-MATH 6. Child understands addition as adding to and understands subtraction as taking away from.
GOLD - Language-Objective 8: Listens to and understands increasingly complex language. 8b. Follows directions.
COR Advantage- S. Number and Counting. 33. Part-whole relationship: Children combine and separate quantities of objects.

Lesson 16: Many Ways to Build

10-15 minutes, Small Group

Activity Steps

1. Put all the blocks you will use for this activity in a pile.
    a. Say *"Today, we are going to work together to build a tall tower that is this wide" (show the width of a 4-unit block). This is called a 4-unit block, because it has 4 bumps, or units, on top. Let's count the bumps together." (point to each block bump as you count) "Let's see how tall we can make a tower using only 4-unit blocks."*
    b. With the class watching, stack the 4-unit blocks together until you run out of them.
2. Say, *"Oh no! We ran out of 4-unit blocks, but I want to make this tower taller, but the same size across. What should we do?"* Collaborate with students on how to continue building with other blocks, pointing out not to lose the tower's width.
    a. Discuss with the class how different block combinations can create a 4-unit block. (1+1+1+1), (2+2), (1+3), (2+1+1)



Make it Simpler:
Start with one 4-unit wide block and collaborate with students on how to recreate the block with other smaller blocks (Step 2a)

Up the Challenge:
Present a different length tower (such as 2-units or 3-units) and challenge them to build it higher using different units of length.

Modification Guidelines:
Use dry-erase markers to label each block according to how many units it represents. For example, blocks that are four-units wide labeled as "4", etc. This will reinforce learning the numerals as you play!

Family Connection:
Have families practice part-whole relationships by slicing an apple and discussing how many pieces it takes to make it whole again.

Lesson 17: Paper Shaper (App)

10-15 minutes, Whole Group

Learning Objectives

- Student can recreate a shape picture using 2-7 shape pieces
- Students will understand and/or use positional words
- Students will predict whether an object will fit into a certain space.
- Students will break down a complex task or process into a series of 2-3 steps

Preparation

Materials Needed

- ☐ Access to Wi-FI
- ☐ Device with codeSpark app
- ☐ Student profiles already set-up and ready for students
- ☐ Print and Share the Paper Shaper at Home Worksheet (pg. 67) with parents.

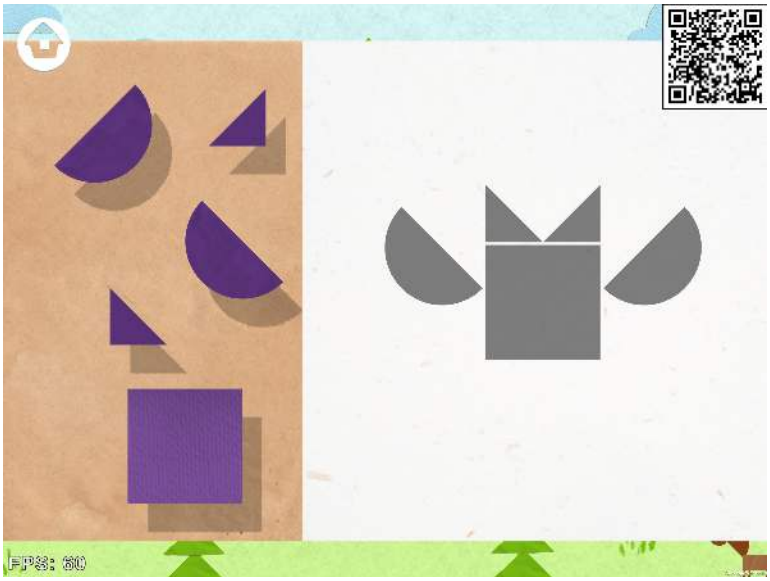
	**Need a refresher on Modularity?** Refer to the Modularity Chapter in the Coding Readiness Training	
	**Need a visual of the lesson?** Watch the Teacher Video for Paper Shaper.	

Curriculum Connections:
ELOF - Goal P-ATL 8. Child holds information in mind and manipulates it to perform tasks. Goal P-MATH 6. Child understands addition as adding to and understands subtraction as taking away from.
GOLD - Language-Objective 8: Listens to and understands increasingly complex language. 8b. Follows directions.
COR Advantage- S. Number and Counting. 33. Part-whole relationship: Children combine and separate quantities of objects.

Lesson 17: Paper Shaper (App)

10-15 minutes or Center's Screen Time Limit

Activity Steps



1. Use the QR code in the above picture to open the game OR click on the "Paper Shaper" Menu button in the codeSpark app.
2. Be sure students can hear the audio (headphones are recommended)
3. Encourage students to always select their profile when playing in the codeSpark app.
4. Try the Paper Shaper game out on the app for yourself so you are familiar with how it works.

Make it Simpler:
Cut a piece of construction paper into a large circle and then cut the circle in half. Work with students to put the circle back together. Then, cut the circle into fourths, mix up the pieces and encourage students to put the circle back together. Repeat with a square or rectangle.

Up the Challenge:
Encourage students to use tangrams to create their own creatures or objects, pointing out the shapes (or number of shapes) that they used to create their object.

Unit 7

Spatial Reasoning

Thinking about and manipulating objects in two and three dimensions

Keywords & Concepts:
Directional words (up, down, left, right)
2-D and 3-D Shapes
Shapes/Shape Names
Rotate

CODESPARK
BY BEGiN

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Lesson 18: 3D Shapes in Our World

15-20 minutes, Whole Group

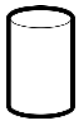
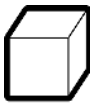
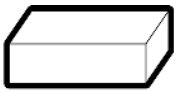
Learning Objectives

- Students will be able to recognize an object or location from a different perspective.
- Students will be able to recognize and name 3D shapes
- Students will be able to identify 2D shapes within 3D shapes

Preparation

Materials Needed

- ☐ Large construction paper cutouts to display: a square, a circle, a rectangle.
- ☐ Paper bags
- ☐ 3D shapes represented by everyday materials, such as:

 CYLINDER	 CONE	 CUBE	 RECTANGULAR PRISM
• Cans of food • Small round jars • Soda can • Paper towel rolls	• Party hats • Ice cream cones	• Alphabet blocks • Dice • Rubix Cube	• Small shipping box • Cracker Box • Jewelry Box

	Need a refresher on sequencing? Refer to the Spatial Reasoning Chapter in the Coding Readiness Training	
	Need a visual of the lesson? Watch the Teacher Video for 3D shapes in Our World	

Curriculum Connections:

ELOF- Goal P-Match 9. Child identifies, describes, compares, and composes shapes. P-MATH 10. Child explores the positions of objects in space.

GOLD- Mathematics: 21. Explores and describes spatial relationships and shapes. A. Understands spatial relationships. B. Understands shapes.

COR Advantage- Geometry: Shapes and Spatial Awareness 34. Shapes: Children identify, name, and describe shapes. 35. Spatial Awareness: Children recognize spatial relationships among people and objects.

Lesson 18: 3D Shapes in Our World

15-20 minutes, Whole Group

Activity Steps

1. Discuss 2D shapes: Display the square, the circle, the rectangle, and the triangle. Ask students to describe each shape by how many edges and corners they have.
    a. The circle has one long edge but no corners.
    b. The square has 4 edges and 4 corners.
    c. The rectangle also has 4 edges and 4 corners. Note the difference between the rectangle and the square (a square has four equal sides, but a rectangle has two sets of equal sides.)

2. Introduce the 3D shapes. Explain that 3D shapes are not flat, they pop out and you can hold on to them. Show examples made of everyday materials and discuss the 2D shapes they see in each 3D shape.

    a. CONE - show your cone example. Have students observe what 2D shape they see from different angles (circle)

    b. CYLINDER - show your cylinder example. Have students observe what 2D shape they see from different angles (circle)

    c. CUBE - show your cylinder example. Have students observe what 2D shapes they see from different angles (squares)

    d. RECTANGULAR PRISM - show your cylinder example. Have students observe what 2D shapes they see from different angles (rectangles, maybe some squares)

3. Play “Guess the shape!” Put a 3D shape in a paper bag. Have one student take a look at what is in the bag. Have that student say which 2D shapes they see. Have the other students try to guess which 3D shape it is. (Example: The object in the bag is a can of soup. The child says that she sees a circle. The rest of the class will try to guess the cylinder.)

Make it Simpler:
For students who are struggling, work with only two 3D shapes, such as a cylinder and a cube.

Up the Challenge:
For students who need a challenge, have them go on a “3D shape hunt around the classroom. Plant various shapes in different centers and see what they can find!

Modification Guidelines:
Using magnet tiles, have students construct the cube or the rectangular prism using them. Challenge your students to build a pyramid with four triangle pieces and square bottom!

Family Connection:
Let families know that you’re learning about 2D and 3D shapes. Encourage them to find these shapes around the house and report back on what they found.

Glossary

2D Shapes
A flat shape, having only two dimensions: height and width

3D Shapes
A solid shape, having three dimensions: length, width, and height.

Bug
A mistake or error in a process

Chart
a sheet of information in the form of a table, graph, or diagram.

Coding Readiness
A set of foundational thinking skills that can help children thrive now and better prepare them for future success in their careers.

Debug
Find and fix errors (bugs) in programs

Debugging (Concept)
Solving problems through a series of educated guesses.

Loop
Repeat a sequence of instructions

Loop Count
The number of times a sequence of instructions is repeated.

Looping (Concept)
Actions can be repeated a desired number of times to reach an outcome.

Modeling (Concept)
Using symbols to represent objects, actions, and other processes.

Modularity (Concept)
Breaking down complex tasks or processes into a series of simpler steps.

Order
An arrangement of people or things in relation to one another

Patterns (Concept)
Objects and actions can be predicted based on a series of repeated steps.

Process
A series of repeatable steps to accomplish a goal; a way of doing something

Repeat
To do or say something again

Represent
To serve as a sign or symbol of something

Sequence
A series of steps or items in a specific order

Sequencing (Concept)
Following a certain order to accomplish a goal

Spatial Reasoning (Concept)
Thinking about and manipulating objects in two and three dimensions.

Symbol
Something that represents another thing.

SEQUENCING: MISSING LETTERS

Directions

Your child is learning about sequencing: A sequence is an order that remains the same, from first to last. Work together with your child to figure out the letter sequences below.

Questions to ask your child:

- What letter comes first?
- What letter comes next?
- What letter comes last?

Write these letters in the correct sequence: D A B C

Write these letters in the correct sequence: N O M L P

What letter is missing? E ___ G H

What letter is missing? U V ___ X Y ___

SEQUENCING: OBSTACLE COURSE

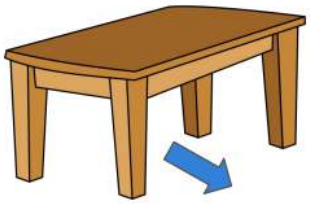
Directions

Your child is learning about sequencing: A sequence is an order that remains the same, from first to last. Work with your child to create a sequenced obstacle course at home!

Cut out and sequence the cards below for inspiration or make up your own obstacle course. Have your child complete the sequence of the obstacle course in order.

Reflection questions to ask your child:

- What did you do first?
- What did you do second?
- What comes after _____?
- What did you do last?

Go under the table 	**Jump over a stuffed animal** 	**Walk around a chair 2 times** 
Do 5 jumping jacks 	**Act like you're sleeping** 	**Make up your own action:** _____ _____

LOOPING: ICE CREAM TRUCK LOOPS

Directions

Your child is learning about **looping**: A **loop** is a way to repeat one or more actions a desired number of times (called a **loop count**) to reach a goal. To demonstrate this, we have been playing with road loops for an ice cream truck. Now it's your turn to learn by having your child teach you how to play!

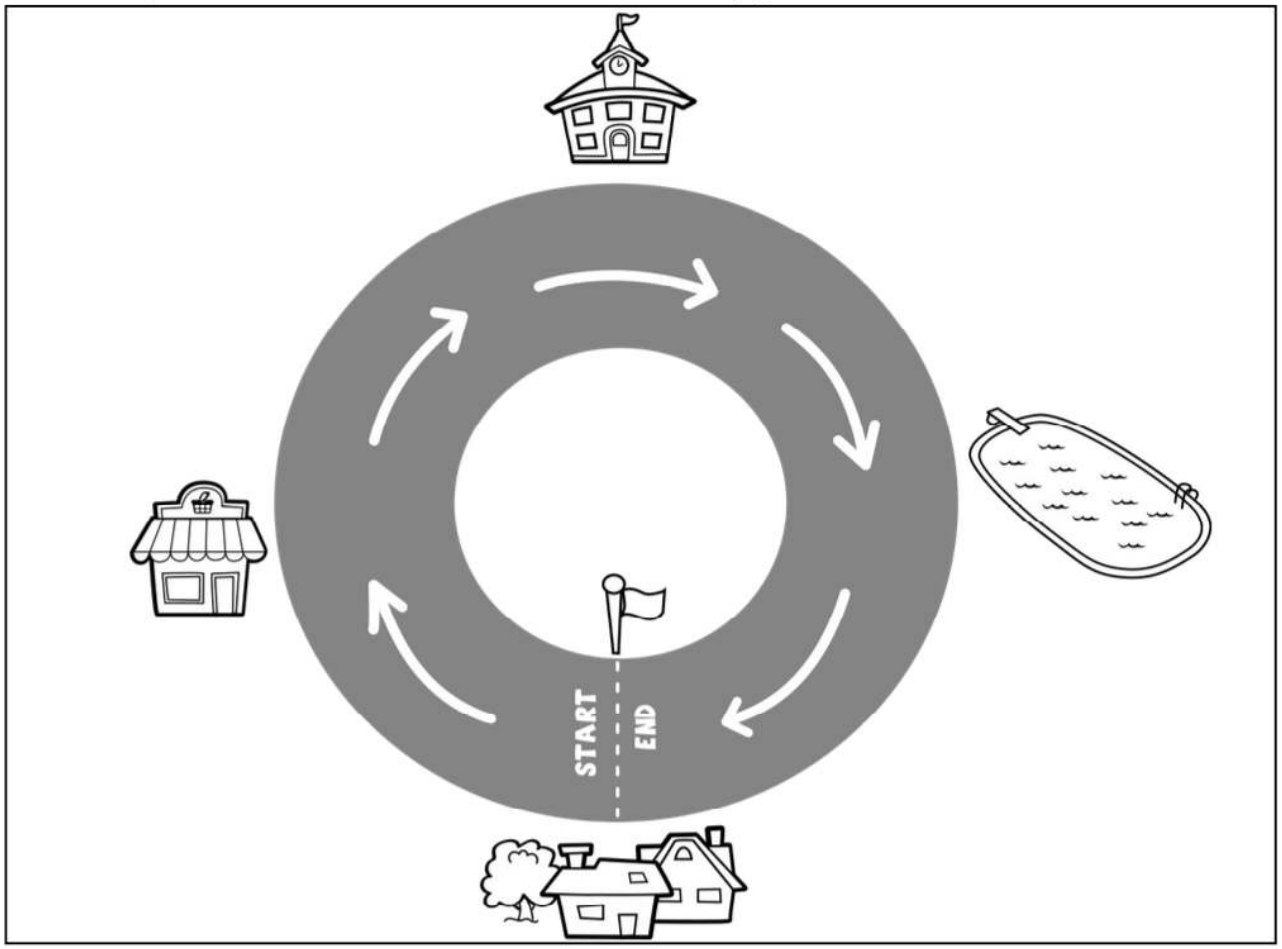
You will need:

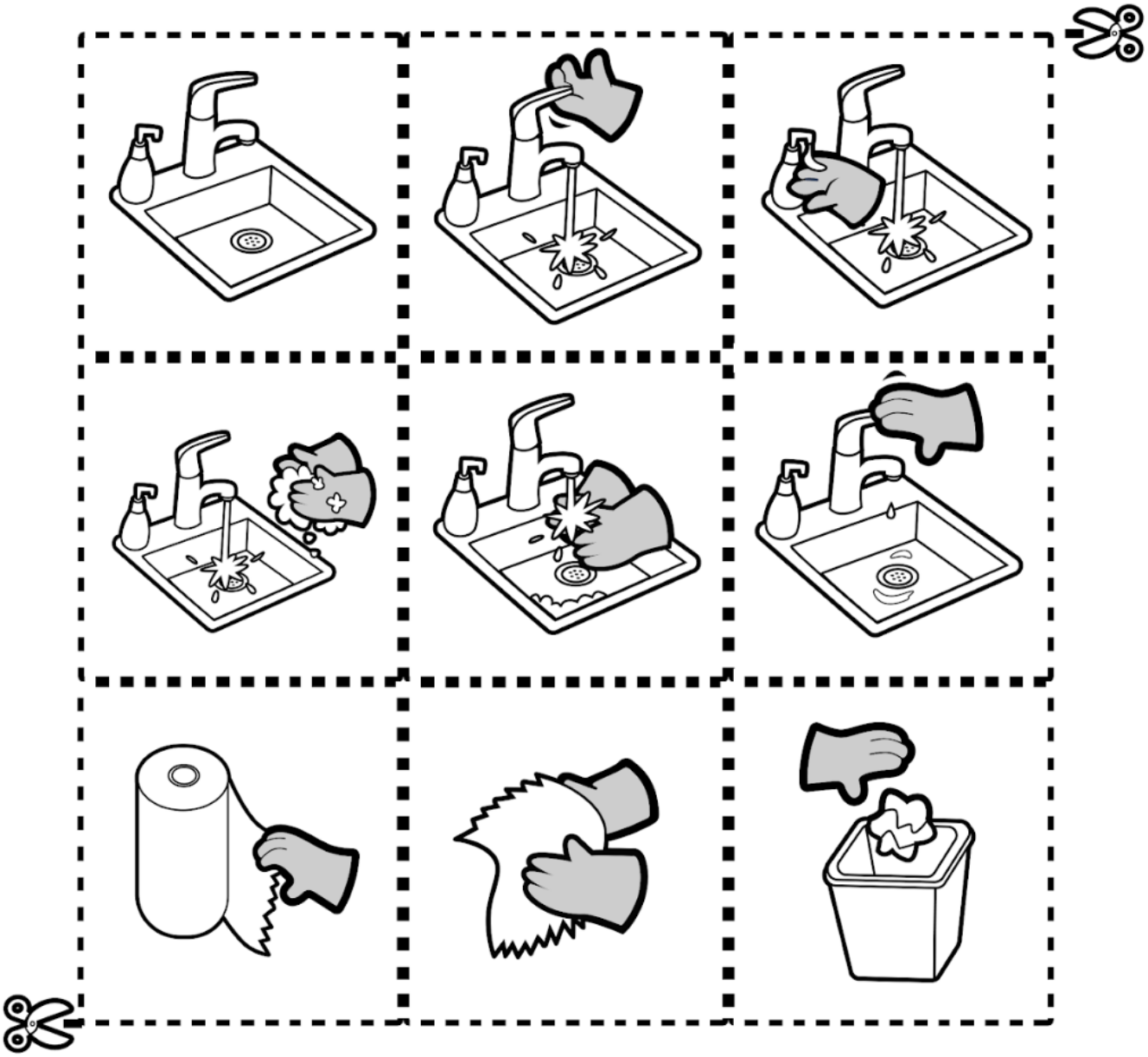
- This sheet, a toy car or small object to act as the "ice cream truck"
- Die or random numbers from 1-6 to be said out loud

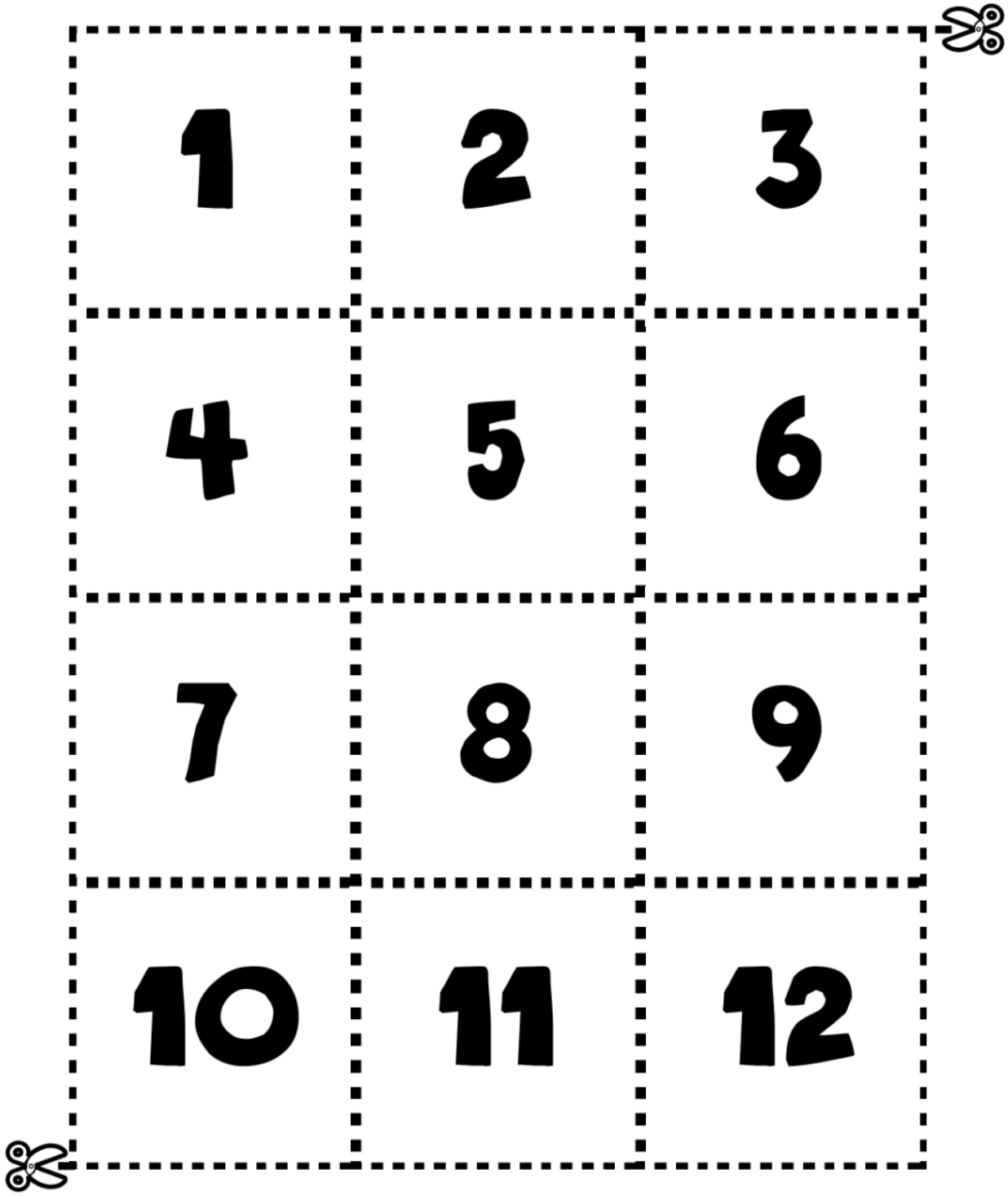
To play: Take turns rolling the die and moving the "truck" around the loop as many times as indicated. Your child will tell you what to do!

Reflection questions to ask your child:

- Where is the loop in our road?
- Where did our loop start and where did it end?
- How many stops are in the loop?
- If we just went to the school did we make a loop yet?



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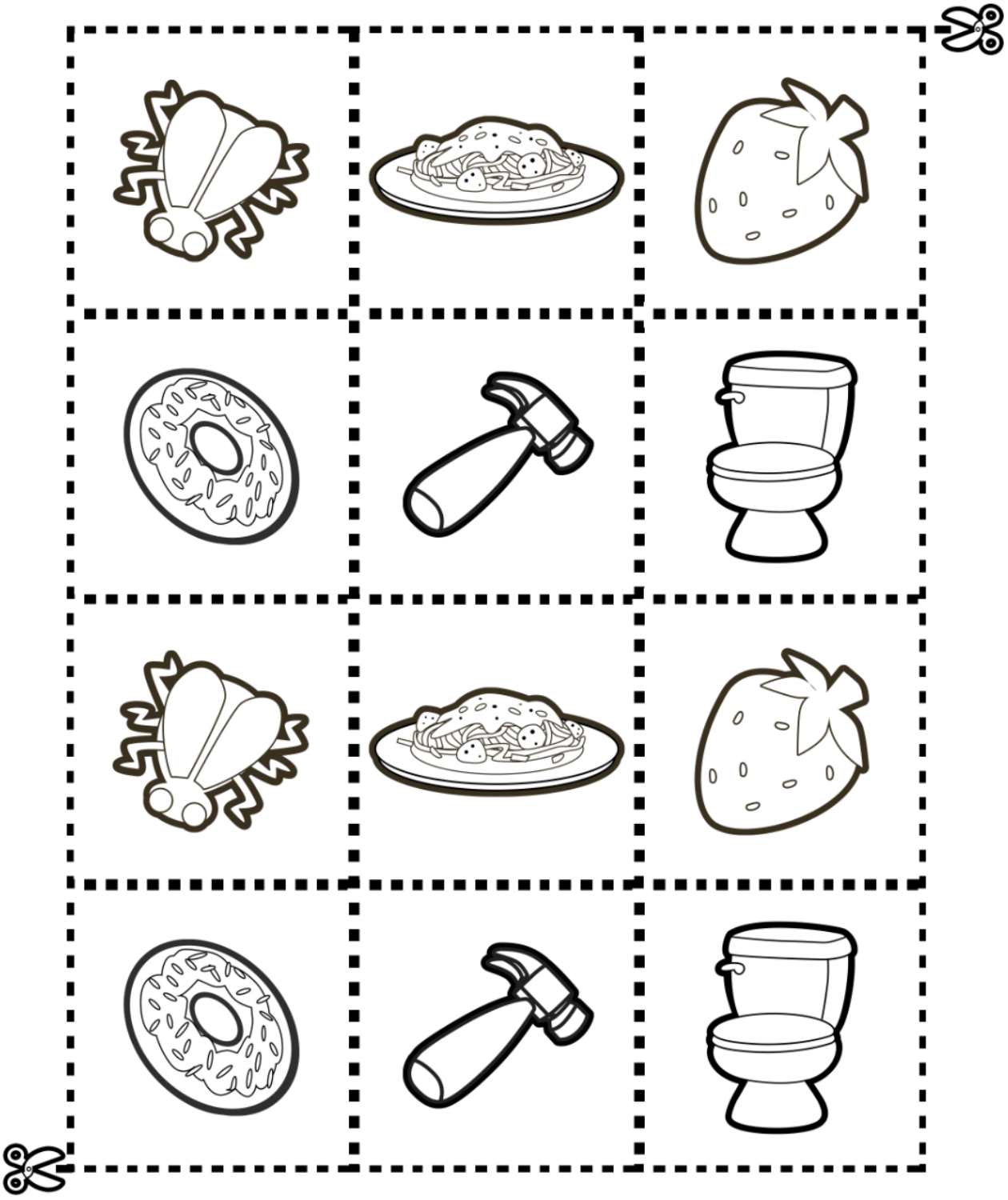
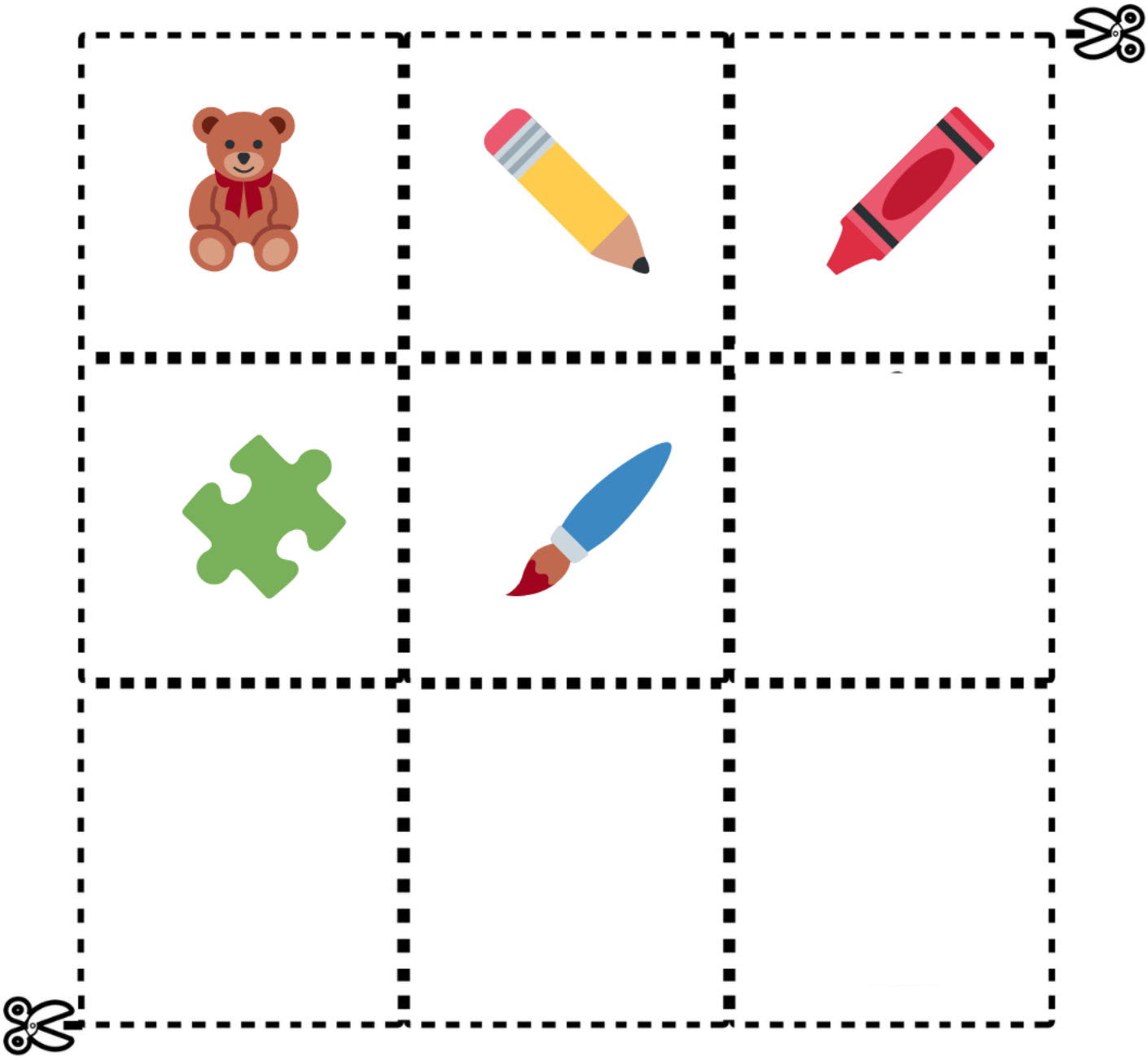




Modularity: Paper Shaper at Home

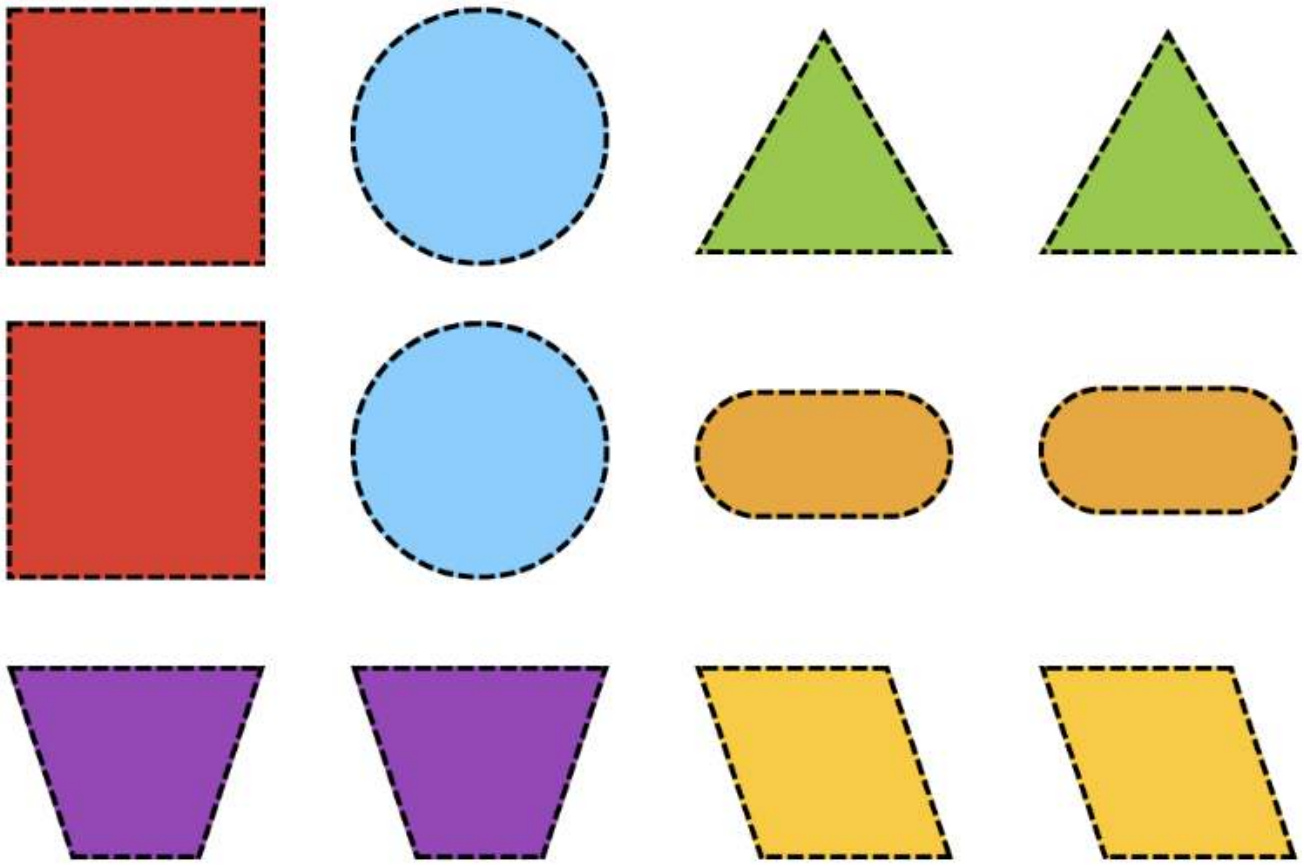
Directions

Your child is learning about "**modularity**," which means breaking down big tasks into simpler steps. In class, we've been doing this with fun puzzles using different shapes like tangrams in a codeSpark game called "Paper Shaper". Now, you can help at home! Use the shapes below to make your own things, like a house with one square and one triangle. Then, try breaking the shapes apart and see what else you can create—maybe an ice cream cone with a triangle and a circle.

You will need:

- This sheet
- Scissors

Take pictures and share what you've created with your teacher!



Family Connection