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Finger Trails
Grade 3-5

Introduction

This activity encourages students to connect multiple representations of the numbers 1-5 as well as develop 'finger discrimination' so that students understand individual fingers really well. In the Atlantic article, Why Kids Should Use Their Fingers in Math Class, Jo Boaler and Lang Chen share the importance of using fingers for the brain's development of numbers.

Agenda

Activity	Time	Description/Prompt	Materials
Mindset Message	10 min	Play the mindset video.	Mindset Video
Play	15 min	• Have students find a partner in class • Pass out one Finger Trails board to each student and one six-sided die per pair of students • Have students read the directions and play a few rounds of the game together • Encourage students to keep track of their rolls as they move the counters on the board.	• Finger Trails Gameboard Handouts • Hand Outline Handout (optioanal) • Six-sided dice • Counters (or other markers) • Maths Journal • Pencils
Discussion	5 min	Discuss the following questions as a whole class: • Which trail took the most turns to complete? Why? • Which trail took the fewest turns to complete? Why? Show students a board that's part-way through a game. Introduce the following questions: • What is a sequence of rolls could get the board to this position? • What is a sequence of rolls that would win the game?	
Deliberating	5 min	Have students return to their pairs to work in the questions introduced above as well as: • How many of these sequences can you come up with? • What are the shortest/longest ones you can come up with?	• Finger Trails Board • Six-sided dice • Counters (or other markers) • Maths Journal • Pencils
Discussion	5 min	Have students present different solutions.	

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Agenda continued

Debrief Mindset Message	5 min	Debrief the mindset message for this activity.	

Activity

Have students pair up to play the game and distribute one Finger Trails Gameboard per student and one die per pair. As an optional step you might choose to give your students Hand Outline Handouts for them to label and color-code their fingers before moving on to the game board. Have students read the rules for the game and start playing. The students in each pair will take turns rolling their die and moving the counters in their own board. The first student to reach the end of the board with all their counters wins. Encourage students to play the game a few times and to keep track of the rolls they are getting so they can start noticing patterns. Watch to see if students are collecting data but not noticing patterns because of their organization strategy. You may want to stop and discuss as a whole class ways to organize data so they can see patterns. If there are students who have found ways to organize data for pattern recognition you could ask them to share their strategy with the class.

Bring students back to a full class discussion to talk about the following questions: Which trail took the most turns to complete? Which trail took the fewest turns to complete? and Why? These questions will get at some notions of multiples and divisibility as well as the absolute values of the numbers in play. Students might explore the connection between the number of turns it takes to reach the end and the number of circles in each trail.

Show students a board that is part-way through a game. This might be a pre-made one you have ready for this part of the activity or one your students were playing or had brought up for discussion. Ask them What is a sequence of rolls that could get the board to this position? And what is a sequence of rolls that would win the game? Let students share some initial thoughts on these questions and ideas on how to solve them, but don't look for answers at this stage. After they brainstorm as a whole class, have them go back into pairs to work on these questions as well: How many of these sequences can you come up with? What are the shortest/longest ones you can come up with?

Finally, bring the class back together for a debrief of what they found in their exploration. Encourage students to share not only solutions, but the ways they came up with them or patterns they noticed and used to help them reach different answers.

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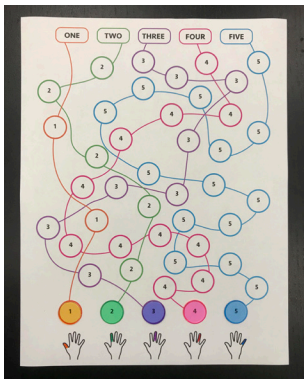
Finger Trails
Game Rules

Game Rules:



1. Assign numbers 1-5 to the fingers on one of your hands in whatever order you want. Color in the finger you will use for each number underneath its corresponding trail.
2. Place counters (or some other form of marker) in the first circle of each trail to start the game.
3. Roll a die. If you get a number that is one through five, use your finger labeled with that number to slide the counter in the trail with that number, that number of spaces ahead. For example, if you roll 3, use your 3-finger to push the counter on the 3-trail 3 spaces ahead. The goal is to reach the end of each trail (the word for the number), even if you get a number greater than you need to get there.
4. If you roll a 6 move all counters one step back.
5. The goal is to reach the end of each trail (the word for the number), but you must reach it with an exact number of moves. If you have "leftover" steps to reach the end of the trail, your counter "bounces" back. (e.g. if your 4-counter is 2 steps from the end and you roll a 4, you must move the 4-counter two steps forward and two steps back).
6. Once a counter reaches the end of its trail it doesn't move again. If you roll a number whose counter is at the end of its trail, you may choose to move another counter that number of steps. (For example, if your 1-counter is at the end of its trail and you roll another 1, you may move any other counter 1 step forward.)
7. Pass the die to your partner and now it's their turn to roll and move the counters on their own board.

Optional Variation:
Lefty-Righty

- Give one student in the pair a right-handed board and the other one a left-handed board. Have them switch boards between games. This will help them with finger training in both hands rather than in just their dominant hand.

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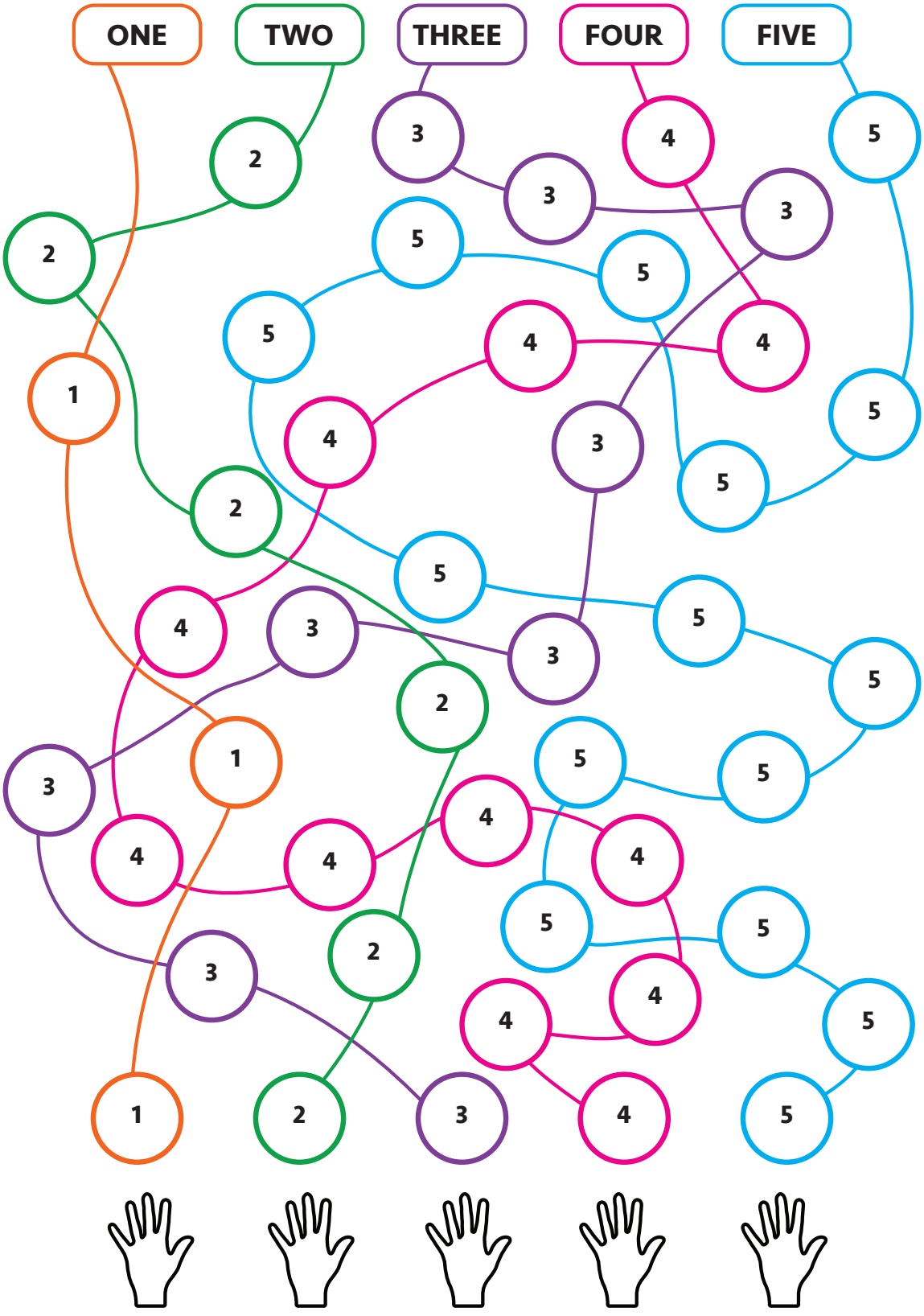
Finger Trails Gameboard



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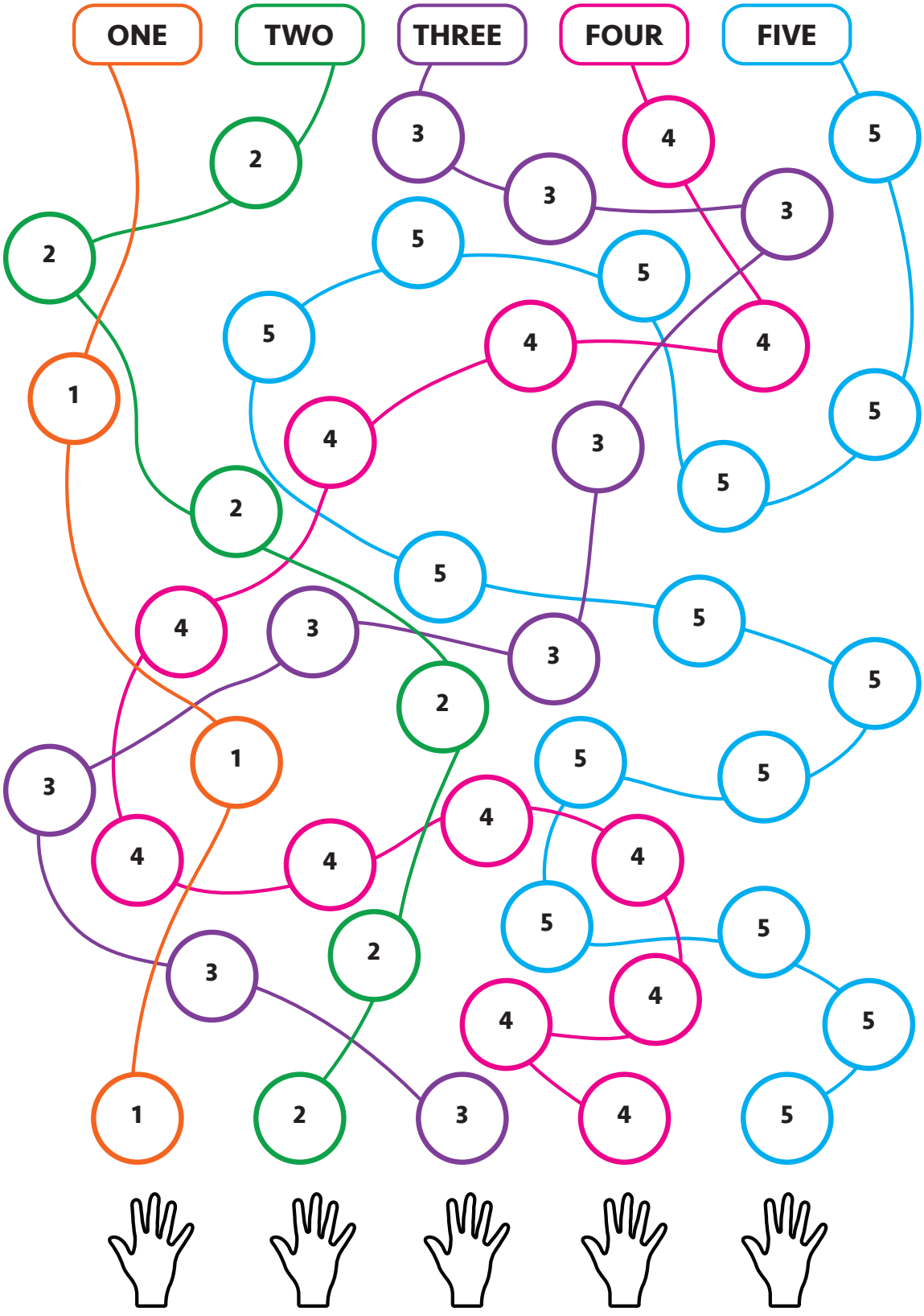

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Hand Outline Handout

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Hand Outline Handout