

# Addition Table Trail

## Variation: Multiplication Table Trail

**Recommended Grades** 3–5

**Time** Instruction: 45–60 minutes

Independent Play: 20–30 minutes



### TEACHING TIPS

#### Transparent Counters

Consider using transparent counters. This way, the number is still visible on the game board when a counter is placed on it. This is especially helpful for students who struggle with number patterns.

#### Addition and Multiplication Tables

Be sure to give students addition or multiplication tables that are large enough for the game counters to cover a space without overlapping into the next space. **Reproducibles B, C, and D** are designed with this in mind. You may choose to have the tables, which serve as the game boards, be consumable—meaning students can write on them. In this case, students mark the numbers using colored pencils or markers instead of counters.

#### Quiet Dice

Rolling dice can create lots of noise. To lessen the noise, consider using foam dice or padding students' workspaces with foam or fabric placemats.



### TIME SAVER

#### Managing the Materials

For ease in managing the distribution of materials, place the required four dice (two labeled 0–5 and two labeled 5–10) and fifty counters (25 of each color) in quart-sized baggies (one baggie for each pair of students playing the game).

### Overview

In this game, an addition table becomes the game board, encouraging students to practice their basic facts and work with addends up to ten. The game helps students increase their familiarity with reading an addition table, connect to previous conceptual understanding of addition, and improve their automaticity with facts. Students play in pairs, the winner being the first person to complete a continuous path (horizontally or vertically) across the table. As a variation, directions and the game board for *Multiplication Table Trail* are also provided.

### Materials

- Addition Table 0–10 (REPRODUCIBLE 1) or Multiplication Table (REPRODUCIBLE 3), one per pair of students
- fifty counters (twenty-five of each color) per pair of students
- two dice labeled 0–5 per pair of students
- 2 dice labeled 5–10 per pair of students
- Game Directions (REPRODUCIBLE G-2A OR G-2B), one per pair of students

### Key Questions

- Tell me about the game board. When playing, what did you notice about how the board is organized?
- What decisions did you have to make while playing this game?
- How did you determine where to place your counter?

## Teaching Directions

### Part I: The Connection

*Relate the game to students' ongoing work.*

*Addition Table Trail* assists students with the memorization of basic addition facts and builds their fluency and automaticity. Before playing the game, students need to be familiar with their basic facts and have some experience with using a completed addition table. Connect the game to students' previous work in mathematics around combining numbers. Review key vocabulary: *horizontal* and *vertical*.

### Part II: The Teaching

*Introduce and model the game to students.*

1. Tell students they will be playing the game *Addition Table Trail* with a partner. To model the game, give each pair of students one Addition Table 0–10 (REPRODUCIBLE 1) and twenty-five game counters of the same color (note that pairs just need twenty-five counters at this point; later in the lesson each student will each get twenty-five for a total of fifty per pair).
2. Explain the object of the game to students. Share, “The object of the game is to be the first to complete a continuous trail across the table.” Show students what qualifies as a continuous path across the addition table. To do this, post an addition table where everyone can see it. Using a highlighter or bright marker (so students can easily see what is happening), draw an example of a continuous path. The path needs to connect two sides of the table, either vertically (the top and bottom sides of the table) or horizontally (the left and right sides of the table). While drawing, be sure to point out that the path can go up, down, forward, backward, or diagonally, as long as the squares are touching each other (see Figure 2.2).



#### TEACHING TIP

##### Pairing Students

Prior to the game, determine how to pair students. One important factor is a student's current fluidity with addition facts. If pairing students with like abilities, consider having manipulatives available for pairs of students who may need them. If pairing students with differing abilities, think about how to make the game accessible yet challenging for both students. One idea is to have students who are just emerging in their facts use an abbreviated addition table to focus on facts one through five. For those who need more challenge, consider using an abbreviated version of a multiplication table with facts zero through five. There could be three versions of the game happening at once just by differentiating the content: addition facts one through five, addition facts zero through ten, and multiplication facts zero through five.



#### TECHNOLOGY TIP

##### The Addition Table for Modeling

You will need an enlarged addition table for modeling the game. Consider enlarging Reproducible 1 on a photocopier. Alternatively, interactive whiteboards often have addition tables in their tool kits. A documentation camera also works well for displaying the addition table and demonstrating the game.

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

**Figure 2.2:** Example of an addition table with a continuous trail.

3. Tell students the game is played with four dice, two with faces labeled 0–5 and two with faces labeled 5–10. When it is your turn, select two of the four dice to roll. You may choose any combination of dice to roll: both 0–5, both 5–10, or one of each.
4. Roll the two dice you have selected. Explain that the numbers rolled are “addends.” If you roll a 2 and an 8, place a game counter where  $2 + 8$  intersect (or  $8 + 2$ ) on the table (the number 10).
5. Check for understanding by rolling two dice and having pairs of students point to the corresponding sums on their tables. Unless you roll doubles, students should be pointing to two squares on the addition table. Repeat this a number of times while circulating the classroom, checking in with pairs of students.
6. Once you have determined that all students understand the numbers rolled are addends and how to locate the sums on the addition table, begin a game.

### Part III: Active Engagement

Engage students to ensure they understand how to play the game.

- Remind students, “For learning the game you will be playing *with* your partner, not against them. For this round, you and your partner need to decide if you are going to move from the top of the chart to the bottom (vertically—see Figure 2.3) or from left to right (horizontally—see Figure 2.4) to make the continuous trail across the table.” The paths may still connect diagonally.



#### TEACHING TIP Emphasize Collaboration

For Part III, Active Engagement, students should test the game out in teams of two *with* their partner, not playing against him or her. The goal is for students to work together in understanding *how* to play the game and the math that is involved. When students have the opportunity to independently play the game (Part IV), they then can play each other.

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

**Figure 2.3:** An example of an addition table in which the player is moving vertically, from top to bottom.

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

**Figure 2.4:** An example of an addition table in which the player is moving horizontally, from left to right.

- Select and roll two dice, or ask a pair of students to each roll one. Announce to the class the numbers rolled. Write the addends where everyone can see them. For example, if you rolled a 3 and a 5, write down the numbers.
- Instruct students to place a game counter on the corresponding sum on their addition table. In the previous example, the counter would go on either the square numbered 8 where 3 and 5 (or 5 and 3) intersect (see Figure 2.5).

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

**Figure 2.5:** An example of an addition table showing the two choices a player needs to make in covering the sum for the addends  $3 + 5, 5 + 3$ .



**TEACHING TIP**  
**Recording the Addends**

Record the addends where all students can see them, typically on the board. This is especially helpful to the visual learners in the classroom. Recording also provides an opportunity to highlight the commutative property of addition, which states that the order of two or more addends does not matter; the sum remains the same.

- Continue facilitating by walking the dice to different pairs of students around the classroom. Ask them to select two dice, roll, and announce the addends. Each time, record the addends where all students in the classroom can clearly see them.
- After several rounds, your recording of addends may look like this:

$$3 + 5 , 5 + 3$$

$$2 + 4 , 4 + 2$$

$$2 + 8 , 8 + 2$$

Find the two sums on the addition table. Show students how you would select just one sum to cover.

Try a few more so students get the idea of each roll of the dice leading to two sums (unless doubles are rolled) on the addition table. Emphasize that students should only cover one square (sum) each turn. Soon a path will begin to emerge and strategies will come into play.

12. Circulate, asking pairs of students to point out the continuous trail they are creating across the addition table. Use this time to clarify understanding of continuous trails. When a pair of students has made a trail across the addition table, enough practice has likely happened and understanding of the “how” to play is solid.

## Part IV: The Link

*Students play the game independently.*

13. Set students up for independent practice with the game. At this point, each pair of students has approximately twenty-five same-color game counters and a completed addition table. Now give each pair another twenty-five game counters of a different color (each pair should then have fifty counters, twenty-five of each color) and four dice (two labeled 0–5 and two labeled 5–10). Explain that they will be given the opportunity to play the game on their own.
14. Tell students they will continue playing in pairs, however, this time they will play each other (versus as a team). One player will move up and down the board in a vertical fashion and the other player will move across the board in a horizontal fashion (refer back to Figures 2.3 and 2.4). Both partners’ paths will likely have zigzags in them as discussed. Make sure each player uses a different color counter so their paths can be clearly distinguished from each other (see Figure 2.6). The first player to make a continuous trail to the opposite side of the addition table is the winner.



### TEACHING TIP

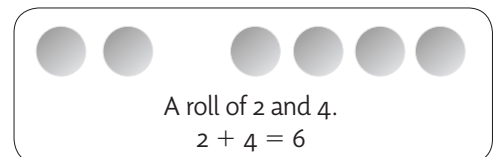
#### The Importance of Practice

Some students will want to offer their reasoning as to why they choose to cover one sum over the other. Resist discussing strategy, skill, and luck at this time. Wait until all students have had many days of practice with the game before engaging in this conversation.



### DIFFERENTIATING YOUR INSTRUCTION

Modify the addition table for younger or struggling students so that they are only practicing facts zero through five. **Reproducible 2** has been provided for this purpose. Only two dice (labeled 0–5) are needed. Encourage students to use their unused counters as manipulatives for facts with which they are struggling. For example, if a student rolls a 2 and a 4, she can group her unused counters accordingly (see **Figure 2.1**).



**Figure 2.1** Encourage struggling students to use their unused counters to support their understanding of basic facts.

## ASSESSMENTS

### Using Language Frames

*Addition Table Trail* does not produce a product so you will want to tell students how you will be assessing their learning. One suggestion is to provide students with language frames. Tell students you will be listening to them speak and use their mathematics vocabulary. Language frames for this game might be:

\_\_\_\_\_ is the sum of \_\_\_\_\_ + \_\_\_\_\_.

When you combine \_\_\_\_\_ and \_\_\_\_\_ you get a total of \_\_\_\_\_.

\_\_\_\_\_ and \_\_\_\_\_ are the addends so \_\_\_\_\_ is the sum.

### How Do You Feel About Your Basic Facts?

After students have played *Addition Table Trail* for a week or two, ask students how they are feeling about their basic facts. Do they feel more confident knowing the facts and knowing them quickly? Have students respond orally or in a math journal.

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

**Figure 2.6:** One player uses one color of counters to build his path vertically; the other player uses another color of counters to build her path horizontally. In this example, the player moving vertically won because she was the first to complete a continuous path.

- Distribute the directions (REPRODUCIBLE G-2A) to students as needed; give them time to play at least three to four rounds over the next few class periods.

## SUMMARIZING THE EXPERIENCE

Teach this game at the beginning of the week to the whole class, then make it an integral part of your math workshop (for more on math workshops, see Chapter 5 in *From Reading to Math* by Maggie Sienna). Build in time to observe students playing the game. Note their individual skill level and the strategies being utilized; come together later in the week to discuss both strategy and how the game aided in automaticity and fact facility. Refer to your notes during the discussion. Ask questions such as:

- How did the game become easier for you as you played more rounds?
- What made the game challenging?
- How might the game be more challenging?
- What properties of mathematics were you practicing as you rolled the dice and created equations from the numbers?

# GAME DIRECTIONS

## Game 1: Addition Table Trail

### Objective

Players take turns covering sums across or down the game board (the addition table) in an attempt to build a trail. The first player to complete his or her trail (from one side of the game board to the other) is considered the winner.

### Materials

- Addition Table 0–10 (REPRODUCIBLE 1)

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

Reproducible 1: Addition Table 0-10.

- two dice labeled 0–5
- two dice labeled 5–10
- fifty counters in two different colors (twenty-five of each color)

### Players: 2

### Directions

1. Each player chooses which color counter they will use (must be different).
2. Each player will be moving within the addition table in a different direction. Decide who will move horizontally and who will move vertically.
3. Take turns rolling the dice. Only two dice are rolled at a time. When it is the first player's turn, he or she selects two of the four dice to roll. Any combination of dice to roll can be chosen: both labeled 0–5, both labeled 5–10, or one of each. For example, a player might choose to roll both the 0–5 dice if he is trying to get a sum in the upper left quadrant of the board. Or, the player might roll both the 5–10 dice to get a sum in the lower right quadrant of the board. A player may also roll one of each.
4. The numbers that come up are the addends. Cover the sum that represents the roll on the addition table with one of that player's colored counters.
5. If the sum has already been covered up, roll one of the dice again. If the sum of the new roll is covered up, it is the other player's turn.
6. Take turns playing. The goal is to be the first player to make a trail across or down the addition table. The path may move up, down, forward, backward, and diagonally, as long as the path is continuous and connects the sides of the table in the player's designated direction (vertically or horizontally).





# ADDITION TABLE 0–10

Reproducible 1

<b>+</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>0</b>	0	1	2	3	4	5	6	7	8	9	10
<b>1</b>	1	2	3	4	5	6	7	8	9	10	11
<b>2</b>	2	3	4	5	6	7	8	9	10	11	12
<b>3</b>	3	4	5	6	7	8	9	10	11	12	13
<b>4</b>	4	5	6	7	8	9	10	11	12	13	14
<b>5</b>	5	6	7	8	9	10	11	12	13	14	15
<b>6</b>	6	7	8	9	10	11	12	13	14	15	16
<b>7</b>	7	8	9	10	11	12	13	14	15	16	17
<b>8</b>	8	9	10	11	12	13	14	15	16	17	18
<b>9</b>	9	10	11	12	13	14	15	16	17	18	19
<b>10</b>	10	11	12	13	14	15	16	17	18	19	20



# ADDITION TABLE 0-5

Reproducible 2

<b>+</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>0</b>	0	1	2	3	4	5
<b>1</b>	1	2	3	4	5	6
<b>2</b>	2	3	4	5	6	7
<b>3</b>	3	4	5	6	7	8
<b>4</b>	4	5	6	7	8	9
<b>5</b>	5	6	7	8	9	10



# MULTIPLICATION TABLE 0–10

Reproducible 3

<b>×</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>0</b>	0	0	0	0	0	0	0	0	0	0	0
<b>1</b>	0	1	2	3	4	5	6	7	8	9	10
<b>2</b>	0	2	4	6	8	10	12	14	16	18	20
<b>3</b>	0	3	6	9	12	15	18	21	24	27	30
<b>4</b>	0	4	8	12	16	20	24	28	32	36	40
<b>5</b>	0	5	10	15	20	25	30	35	40	45	50
<b>6</b>	0	6	12	18	24	30	36	42	48	54	60
<b>7</b>	0	7	14	21	28	35	42	49	56	63	70
<b>8</b>	0	8	16	24	32	40	48	56	64	72	80
<b>9</b>	0	9	18	27	36	45	54	63	72	81	90
<b>10</b>	0	10	20	30	40	50	60	70	80	90	100

