

## INTRODUCTION

The **Color Tiles Activity Book** is a resource providing hands-on activities and ideas that allow the teacher to lead students in an active exploration of the world of mathematics. The activities presented involve students in the process of exploring abstract concepts through the use of manipulatives. Students are encouraged to think critically, plan strategy, and share conclusions.

The **Color Tiles Activity Book** emphasizes:

- communication
- exploration
- problem solving
- analysis

Each set of **Color Tiles** consists of 400 plastic 1” tiles (100 of each color—red, yellow, blue, and green).

**Color Tiles** can be used to:

- sort, match, and count
- identify and create patterns
- explore numerical representations

### Exploring with Color Tiles

Students at all grade levels should be allowed time to freely explore and experiment with **Color Tiles** before guided activities begin.

## INTRODUCING AND SORTING COLOR TILES

**Group Size:** Pairs or Small Groups

**Procedure:** Provide a handful of the **Color Tiles** for each student group. Each group of students must have at least one red, blue, yellow, and green **Color Tile**.

- How many sides does each **Color Tile** have? (4)
- What do we call the shape of the **Color Tile**? (square)

Instruct students to sort the **Color Tiles** into unique groups. Encourage students to verbalize the process/attribute they selected to organize each group of tiles.

- Each Color Tile has four equal sides. We call this shape a square.
- How did you sort the tiles? (by color)
- How many groups did you create? (four—red, yellow, green, blue)

Observe students as they sort the tiles. Be mindful of students who might need additional experiences with sorting tiles by color. Watch for students who group a few, but not all, of the tiles correctly. These students may not understand the attribute of color and may need additional sorting experiences. Be aware of students who sort correctly but cannot verbalize sorting strategy. These students may have difficulty communicating. Provide additional support in vocabulary and language development.

## PATTERNS

**Group Size:** Pairs or Small Groups

**Warm-Up:** Before beginning this activity, write the word “pattern” on the chalkboard. Invite students to describe or define the term. (**Possible student answers: a design, something that repeats.**) Ask students to describe things or situations where patterns occur. (**clothing, sound rhythm patterns, wallpaper...**)

**Procedure:** Place Color Tiles in front of each group of students. Begin with a simple pattern using two different colors of tiles. **For example: red-yellow-red-yellow-red-yellow.**

Invite students to talk about what they see. Allow students ample opportunity to express their finding. Communication is a key component of mathematical literacy. Communication also allows you to informally assess the understanding your students have of the concept.

Repeat this exercise using other tile pairings. You may also wish to have each group of students create its own unique pattern. Allow each group to share its pattern with the rest of the class.

Once your students have mastered basic pattern identification you may wish to create more challenging patterns. These patterns may incorporate three and four colors or a more complex combination of two colors.

For example: red-yellow-blue-red-yellow-blue... (**red**)  
green-yellow-green-yellow-green-yellow... (**green**)

The patterns created should be developmentally appropriate for your students.

Students should be allowed to freely manipulate the Color Tiles. Many students really enjoy creating patterns. Encourage students to create patterns that move in many directions. Once students feel comfortable with straight-line, train-like patterns, they will be ready to create more complex patterns.

## SAME, MORE , LESS

**Group Size:** Groups of Three

**Procedure:** Provide 5 Color Tiles for each student. Draw 3 squares on the chalkboard. Say the word "same." Instruct students to lay out the same number of **Color Tiles. (3)**

Draw 4 squares on the chalkboard. Say the word "more." Instruct students to lay out more than 4 **Color Tiles. (5)**

Draw 5 squares on the chalkboard. Say the word "less." Instruct students to lay out less than 5 Color Tiles. **(Answers will vary: 4, 3, 2, 1, or 0.)**

Three students are to work in each group. Provide each group of students with 10 Color Tiles – 5 tiles of one color, 5 tiles of another color **(5 red, 5 blue).**

One student is to lay out a number of tiles of one color. A second student is to lay out a number of tiles of the second color. The third student is to compare the two groups of tiles using the words "same," "more," and "less."

Every student in the group should have an opportunity to both lay out tiles and verbalize comparisons.

## NUMBER SENSE (0-10)

**Group Size:** Whole Class or Small Groups

**Procedure:** Allow students a few minutes to explore the Color Tiles. Encourage students to slide the tiles together to create different trains, shapes, and patterns.

- What did you build with the tiles? **(answers will vary)**
- What are the colors of the tiles? **(red, yellow, blue, green)**

Hold up an empty hand.

- How many tiles do I have? **(0)**

Write the numeral "0" and word "zero" on the chalkboard. Discuss the concept of zero.

Hold up 1 tile.

- How many tiles do I have? **(1)**

Write the numeral "1" and word "one" on the chalkboard. Repeat this procedure using 2, then 3 tiles.

Instruct students to continue creating tile arrangements using 4, 5, through 10 tiles. Continue to write the corresponding numerals and number names on the chalkboard.

## MAKE TEN (NUMBER SENSE)

**Group Size:** Pairs

**Procedure:** Provide 10-15 tiles to each pair of students.

Model a train created from 10 Color Tiles. Allow a student to separate the train into two sections.

- How many tiles did we have in the train altogether? (10)
- How many tiles are now in the first section? second section?

(answers will vary)

- Make a train using 10 tiles. Ask your partner to separate the train into two sections. Count the number of tiles in each section.

Create a chart on the chalkboard, listing all the possible combinations that can make a 10-tile train.

First Section	Second Section	Complete Train
1	9	10
2	8	10
3	7	10

You may continue this activity creating trains of any number of tiles. Match the number of tiles to the developmental level of your students.

## MEASURING

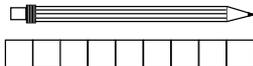
**Group size:** Pairs or Small Groups

**Procedure:** Provide 10 Color Tiles and 4 common classroom objects (pencils, crayons, blocks, erasers, etc.) for each student group.

Write the following words on the chalkboard: length, longer, shorter, same.

Instruct students to select 2 objects for comparison. Have students compare their objects and estimate which object is longer.

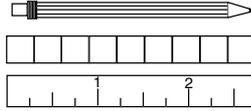
Direct students to check their estimates by placing Color Tiles side by side to measure each object.



Instruct students to write the name of each object and its length measured in Color Tiles. Students may also draw a representation of each object and write the length in Color Tiles next to the drawing.

Encourage students to compare the objects and lengths. Students may arrange the objects in length order from shortest to longest.

**Extension:** Challenge students to measure the Color Tile lengths of each object using a metric or customary ruler.



## TILE RIDDLES

**Group Size:** Whole Class

**Procedure:** Provide Color Tiles for students to use as manipulatives to solve the following riddles. You also may wish to review the terms odd and even before you begin this activity.

**Riddle #1:**

- There are 10 tiles in two colors. Each color has an odd number of tiles. How many tiles of each color are there? (3, 7), (1, 9), (5, 5)

**Riddle #2:**

- There are an odd number of tiles. There are more than 4 tiles but less than 16 tiles. You can use all the tiles to make 3 towers, all the same size. How many tiles are there? (9)

**Riddle #3:**

- There are an even number of tiles. There are more than 8 tiles but less than 22. You can use all the tiles to make 4 trains, all the same length. *Hint Is there more than one possible answer? (yes)*
- How many tiles are there? (12, 16, or 20)

Invite students to talk about how they solved the riddles. Students may discuss using tiles as concrete aids, paper-and-pencil strategies, deductive reasoning, and process of elimination.

## ONE MORE AND ONE LESS

**Group Size:** Pairs

**Procedure:** Provide 20 tiles to each pair of students.

Slide together 3 tiles into a train.

- How many do you have? (3)

Slide together 4 tiles into a train.

- How many do you have? (4)

Place the train of 3 tiles next to the train of 4 tiles.

- Which train is longer? (4-tile train)
- How much longer? (1 tile)

Write the following on the chalkboard:

1 more than 3 is \_\_\_\_\_. (4)

Have students continue this exercise, comparing consecutive numbers 4 and 5, 5 and 6, and so on. Invite students to display their findings on the chalkboard.

Example:

1 more than \_\_\_\_ is \_\_\_\_\_.

Reverse the procedure by having students build 2 trains of consecutive numbers and identifying the shorter train.

Slide together a train of 9 tiles and another train of 8 tiles.

- Which train is shorter? (8-tile train)
- How much shorter? (1 tile)

Write the following on the chalkboard:

1 less than \_\_\_\_ is \_\_\_\_\_.

Have students continue this activity by comparing numbers and completing the chalkboard example.

## ADDITION

**Group Size:** Whole Class or Cooperative Groups

**Procedure:** Allow students a few minutes to manipulate the Color Tiles. Invite students to build numbers through 20.

Slide together 4 red tiles. Slide together 3 green tiles. Slide the 4 red and 3 green tiles together.

- How many tiles are there in all? (7)

Slide together 5 yellow tiles.

Write "5" on the chalkboard. Slide together 3 blue tiles. Write "3" on the chalkboard.

- How many tiles are there in all? (8)

Write "8" on the chalkboard.

Emphasize that “How many in all?” denotes addition.

- The symbol for addition is the plus sign.

Write "+" on the chalkboard.

Continue this activity. Write addition sentences on the chalkboard as students identify how many tiles they have placed together in all.

Introduce addition sentences in horizontal form initially.

3 plus 4 equals 7.

$$3 + 4 = 7$$

Once your students have a good understanding of the terms and symbols **plus** (+) and **equals** (=), introduce addition in vertical form.

$$\begin{array}{r} 3 \\ + 4 \\ \hline 7 \end{array}$$

You may also identify the **addends** and **sum** in addition sentences.

3	+	4	=	7	3 addend
addend/addend/sum		$\begin{array}{r} + 4 \\ \hline 7 \end{array}$		addend	7 sum

Have the students use the tiles to show each of the following addition sentences horizontally and vertically. Then ask:

- How many in all?

$$2 + 3 = 5$$

$$4 + 4 = 8$$

$$9 + 1 = 10$$

$$6 + 3 = 9$$

## FRACTIONS

**Group Size:** Pairs

**Procedure:** Draw a circle on the chalkboard. Divide the circle into two equal parts. Shade in one part of the circle.

- What shape is drawn on the chalkboard? (**circle**)
- How many parts in all make the circle? (**2**)

Write the numeral 2 in the position of a denominator on the chalkboard.

- Are the two parts the same size or equal? (**yes**)
- How many parts of the circle are shaded? (**1**)

Write the numeral 1 in the position of a numerator above the 2 on the chalkboard.

- The circle is divided into two equal parts. One of the two parts of the circle is shaded.
- We can say one-half ( $\frac{1}{2}$ ) of the circle is shaded.

Distribute 1 red and 1 blue Color Tile to each student. Direct students to slide the 2 tiles together to form a train.

- What shape did you build? (**rectangle**)
- Your shape is divided into how many equal parts? (**2**)

Write the numeral 2 in the position of a denominator on the chalkboard.

- Are the two parts the same size or equal? (**yes**)
- How many parts of the rectangle are blue? (**1**)

Write the numeral 1 in the position of the numerator on the chalkboard.

- How much of the rectangle is blue? ( $\frac{1}{2}$  **or one of two equal parts**)

Distribute 3 yellow and 3 green Color Tiles to each student. Direct students to slide 3 yellow tiles together to form a train.

- What shape did you build? (**rectangle**)
- Your shape is divided into how many equal parts? (**3**)

Write the numeral 3 in the position of a denominator on the chalkboard.

- Are the three parts the same size or equal? (**yes**)

Direct students to replace one yellow tile with a green tile.

- How many parts of the rectangle are green? (**1**)

Write the numeral 1 in the position of a numerator on the chalkboard.

- How much of the rectangle is green? ( $\frac{1}{3}$  **or one of three equal parts**)
- How many parts of the rectangle are yellow? (**2**)
- How much of the rectangle is yellow? ( $\frac{2}{3}$  **or two of three equal parts**)

Write  $\frac{2}{3}$  on the chalkboard.

Distribute 4 red and 4 blue Color Tiles to each student. Direct students to slide 4 red tiles together to form a train.

- What shape did you build? (**rectangle**)
- Your shape is divided into how many equal parts? (**4**)

Write the numeral 4 in the position of a denominator on the chalkboard.

- Are the four parts the same size or equal? (**yes**)

Direct students to replace 1 red tile with 1 blue tile.

- How many parts of the rectangle are blue? (**1**)

Write the numeral 1 in the position of a numerator on the chalkboard.

- How much of the rectangle is blue? ( $\frac{1}{4}$  **or one of four equal parts**)
- How many parts of the rectangle are red? (**3**)
- How much of the rectangle is red? ( $\frac{3}{4}$  **or three of four equal parts**)

Write  $\frac{3}{4}$  on the chalkboard.

You may continue this activity using 5 tiles for fifths, 6 tiles for sixths, and so on.

# PROBABILITY

**Group Size:** Cooperative Groups

**Materials:** Color Tiles and one paper bag for each Cooperative Group.

**Procedure:** One student in the group will take the role of Materials Manager. The second student will be the Picker. A third student will be the Recorder. A fourth student will be the Presenter.

Provide each Cooperative Group with a paper bag, 3 green tiles, and 6 yellow tiles.

The Materials Manager will place the tiles in the paper bag and will create the following tally sheet.

	Pick 1	Pick 2	Pick 3	Pick 4	Pick 5
Round 1 Green Yellow					
Round 2 Green Yellow					
Round 3 Green Yellow					
Round 4 Green Yellow					

The Picker will reach into the bag, select a tile and hand it to the Recorder. The Recorder will mark the selected tile on the tally sheet and return the tile to the paper bag. This process will continue for five selections. The Presenter will present the group's findings to the class.

This process will continue for four rounds. The students will switch roles during each round. After the four rounds, call the class together for a whole-class discussion.

- Did you always get the color you thought? (answers will vary)
- What color was picked more often? (yellow)
- Why? (There were more yellow tiles than green in the bag.)
- Did each round have the same tallies?
- Why or Why not?

# LOGICAL THINKING

**Group Size:** Pairs

**Procedure:** Place a handful of tiles in front of each pair of students. Listen to the story. Use the tiles as flowers to solve the question.

- Dave put 4 flower pots in a row.
- The green flower was second.
- The yellow flower was last.
- The blue flower was not first.
- Where was the red flower? (**first**)

Question students about the process they used to answer the question. Listen to another story. Use tiles to act out the story.

- Mom put out fruit snacks for a treat.
- Jim took 3.
- Rachel took 1 less than Jim.
- Marta took 1 more than Jim.
- How many fruit snacks were taken? (**9 snacks**)

Again, question students about the steps they took to answer the problem.

Listen to the third story. Use tiles as beads. Be sure to use only three colors of tiles to solve the problem.

- Sandra wanted a necklace with 3 beads hanging from it.
- She wanted 1 green, 1 yellow, and 1 red bead.
- Find the different ways the beads could be put on the necklace.

Possible Solutions:

green - yellow - red  
green - red - yellow  
red - green - yellow  
red - yellow - green  
yellow - red - green  
yellow - green - red

Talk about how students used the tiles to solve the problem.