# Learning About...®
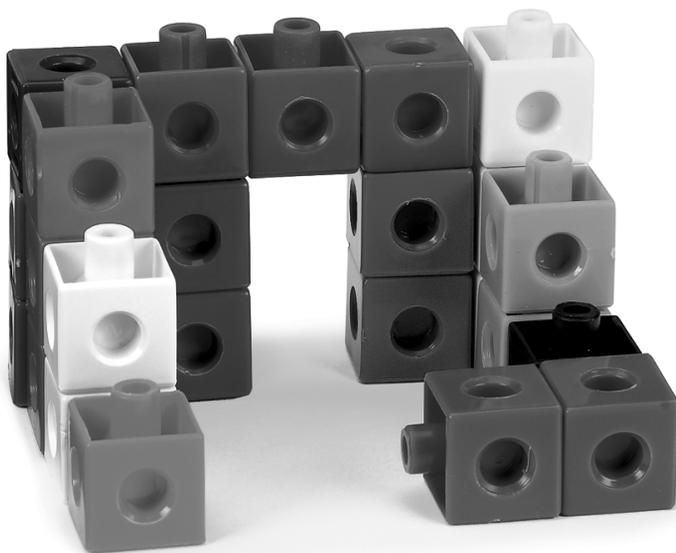
# Snap Cubes®

**A Guide to Teaching Strategies, Activities, and Ideas**

ETA hand2mind®

hands-on learning for growing minds

# INTRODUCTION

This **Learning About®... Snap Cubes® Activity Book** provides hands-on activities and ideas that allow you 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.

Snap Cubes are ¾-inch interlocking cubes that connect on every side. They come in sets of 100, 500, and 1,000, each containing an equal amount of 10 different colors.

Activities with Snap Cubes are suitable for children in all grade levels. They help students learn about whole numbers (counting, more and less, place value, addition, subtraction), measurement, probability, graphing, and geometry. They are ideal for exploring rhythmatic patterns as well as growth patterns, and for doing spatial reasoning tasks.

A set of 100 cubes is sufficient for four to six students.

**This *Learning About... Snap Cubes Activity Book* emphasizes**

- communication
- exploration
- problem solving
- analysis

**Snap Cubes are easy-to-manipulate, ¾-inch cubes in 10 bright colors that match Cuisenaire Rods. They can be used to investigate**

- number concepts
- patterns
- comparisons
- more or less
- addition
- logical thinking
- volume
- probability

**Exploring with Snap Cubes**
Students should be allowed time to freely explore and experiment with the Snap Cubes before guided activities begin.

# NUMBER SENSE

**Objective:** Exploring the numbers 0 through 10

**Group Size:** Whole class or small groups

Procedure: Allow students three to five minutes to explore the Snap Cubes. Encourage them to snap the cubes together to create different towers, trains, and shapes.

**Ask—**
- ■ What did you build with your cubes? [Answers will vary.]
- ■ What are the colors of the cubes? [There are 10 colors in all: white, red, green, purple, yellow, dark green, black, brown, blue, and orange.]

Hold up your hand with nothing in it.

**Then ask—**
- ■ How many cubes do I have in my hand? [0]

Write both the numeral 0 and the word zero on the board. Discuss the concept of zero.

Hold up one cube.

**Ask—**
- ■ How many cubes do I have in my hand? [1]

Write the numeral 1 and the word one on the board. Repeat this procedure using two cubes, then three cubes, and so on until you think students are comfortable with the relationships between numerals and their word names.

Instruct students to snap three Snap Cubes together. Invite them to show and describe the shapes they created using different combinations of cubes. Encourage students to continue making cube arrangements using 4, 5, 6,…10 cubes. Continue to write the corresponding numerals and number names on the board. You may wish to make a tally chart or graph of the possible arrangements for each number.

# COLOR PATTERNS

**Objective:** Exploring and creating color patterns

**Group Size:** Small groups or pairs

Procedure: Provide at least 20 Snap Cubes to each group. Create a pattern using only two colors of cubes, such as red–white–red–white–red. Invite a volunteer to use four additional blocks to continue the pattern.

**Ask—**
- ■ What color will the last block be? [red]

Begin a different two-color pattern: blue–red–red–blue–red–red–blue. Instruct students to continue the pattern by adding six more cubes.

**Ask—**
- ■ What color is the last cube? [blue]

Invite students to play a pattern game with a partner. One student creates a pattern. Another student then adds six more cubes to the pattern, announcing the color of the sixth cube.

Patterns can be varied according to the developmental level of your students. To extend this activity, encourage students to create patterns using more than two colors. Students also may explore the creation of patterns that progress both horizontally and vertically.

# MAKE TEN

**Objective:** Increasing number sense by investigating the combination of Snap Cubes needed to make a train of 10 cubes

**Group Size:** Pairs

**Procedure:** Provide 10–15 Snap Cubes to each group of students.

Model a 10-cube train. Allow a student to break the train into two sections.

**Ask—**
- How many cubes did we have in the train altogether? [10]
- How many cubes are now in the first section and the second section? [Answers will vary.]

Have student pairs make trains using 10 Snap Cubes. One partner should break the train into two sections. The other partner then counts the number of cubes in each section.

Discuss the results with the class. Create a chart on the board listing all the possible combinations that can be used to make a 10-cube train.

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

You may extend this activity by creating trains using any number of cubes. Match the number of cubes to the developmental level of your students.

# CUBE RIDDLES

**Objective:** Using logical thinking to solve riddles

**Group Size:** Whole class

**Procedure:** Provide Snap Cubes for students to use while solving the following riddles. You also may wish to review the terms odd and even before you begin this activity.

**Riddle 1**
There are 10 Snap Cubes in two colors. Each color has an odd number of cubes. How many cubes of each color are there? [5 and 5, 7 and 3, or 9 and 1]

**Riddle 2**
You have an odd number of Snap Cubes. There are more than 4 cubes, but less than 14. You can use all the cubes to make 3 towers that are the same size. How many cubes are there? [9]

**Riddle 3**
You have an even number of cubes. There are more than 8 cubes, but less than 22. You can use all the cubes to make 4 trains that are all the same length. (Hint—There is more than one possible answer.)

**Ask—**
■ How many Snap Cubes are there? [12, 16, or 20]

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

# ONE MORE AND ONE LESS

**Objective:** Comparing numbers 1 through 10

**Group Size:** Pairs

**Procedure:** Provide 20 Snap Cubes to each pair of students.

Snap three cubes together into a train.

**Ask—**
- ■  How many Snap Cubes do you have? [3]

Snap four cubes together into a train.

**Ask—**
- ■  **How many Snap Cubes do you have? [4]**

Place the 3-cube train next to the 4-cube train.

**Ask—**
- ■  Which train is longer? [the 4-cube train]
- ■  How much longer? [1 cube]

Write the following sentence on the board:

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 board by writing sentences.

1 more than ____ is ____. [Answers will vary.]

Reverse the procedure by having students build two trains of consecutive numbers and then identify the shorter train.

Snap together a train of 9 cubes and another train of 8 cubes.

**Ask—**
- ■  Which train is shorter? [the 8-cube train]
- ■  How much shorter? [1 cube]

**Write the following sentence on the board:**

1 less than ___ is ___.

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

# ADDITION

**Objective:** Developing the concept of addition

**Group Size:** Whole class or small groups

**Procedure:** Allow students a few minutes to manipulate the Snap Cubes. Invite them to build numbers through 20.

Snap 4 red cubes together. Snap 3 black cubes together. Snap the 4 red and 3 black cubes together.

**Ask—**
- ■ How many Snap Cubes are there in all? [7]

Snap 5 yellow cubes together. Write 5 on the board. Snap 3 blue cubes together. Write 3 on the board.

**Ask—**
- ■ How many cubes are there in all? [8]

Write 8 on the board.
Emphasize that the question "How many in all?" denotes addition.

Explain that the symbol for addition is the plus sign "1". Write "1" on the board.

Continue this activity. Write addition sentences on the board as students identify how many cubes they have snapped together in all.

Initially, introduce addition sentences in horizontal form.

    3 plus 4 equals 7    3 1 4 5 7

Once your students have a good understanding of the terms plus and equals and their symbols, "1" and "5", introduce addition in vertical form.

      3
   14
    7

You also may identify the terms addend and sum in addition sentences.

| 3 | 1 | 4 | 5 | 7 | | addend | 3 |
|---|---|---|---|---|---|---|---|
| ↑ | | ↑ | | ↑ | | addend | 14 |
| addend | addend | | sum | | | sum | 7 |

Have students use Snap Cubes to show each of the following addition sentences in both horizontal and vertical formats.

**Ask—**
- ■ How many are there in all?
  | 2 1 3 5 [5] | 4 1 4 5 [8] |
  |---|---|
  | 9 1 1 5 [10] | 6 1 3 5 [9] |

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# UNDERSTANDING VOLUME

**Objective:** Exploring the concept of volume

**Group Size:** Pairs

**Procedure:** Place two handfuls of Snap Cubes in front of each pair of students. Allow them a few minutes to build three-dimensional figures with the cubes.

Hold up 1 cube and identify it as 1 unit. Hold up 2 cubes and identify them as 2 units. Instruct students to build shapes using 3, 5, and 7 units. Question students about the variety of shapes that can be built with any number of units.

**Example of a Rectangular Prism Activity**
- Build 2 groups of 4 Snap Cubes
- Place them next to each other
- Build 2 more groups of 4 cubes
- Place them on top of the first grouping
- What three-dimensional figure did you build? [a rectangular prism]
- What is its length? [4 units]
- What is its width? [2 units]
- What is its height? [2 units]
- How many units are there in all? [16 units]

The number of units used to build a space figure is called its volume. The volume of this rectangular prism is 16 cubic units. Point out that volume is given in cubic units.

**Example of a Cube Activity**
- Build 3 groups of 3 Snap Cubes
- Place them next to each other
- Build another 3 groups of 3
- Place them on top of the first grouping
- Build a third group of 3 groups of 3
- Place them on top of the second grouping
- What three-dimensional figure did you build? [a cube]
- What is its length? [3 units]
- What is its width? [3 units]
- What is its height? [3 units]
- How many units are there in all? [27 units]

The volume of this cube is 27 cubic units.

Instruct students to work in pairs. One student will build a three-dimensional figure. The other student will state the length, width, height, and volume of the figure. Have students switch tasks and repeat the activity.

# PROBABILITY

**Objective:** Investigating probability

**Materials:** Snap Cubes and one paper bag for each cooperative group

**Group Size:** Small groups

**Procedure:** Each student in the group will take one of the following roles: Materials Manager, Picker, Recorder, or Presenter.

Provide each group with a paper bag, 3 green cubes, and 6 yellow cubes.

The Materials Manager places the cubes in the paper bag and the Recorder creates 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 reaches into the bag, selects a cube, and hands it to the Recorder. The Recorder marks the selected cube on the tally sheet and returns the cube to the paper bag. Continue this process for 5 selections.

The students switch roles for each of the 4 Rounds.

After 4 Rounds have been completed, call the class together for a discussion. Each group's Presenter will present the findings of the group to the class.

**Ask—**
- Did you always get the color you thought you would? [Answers will vary.]
- What color was picked most often? [most likely yellow]
- Why? [There were more yellow cubes than green ones in the bag.]
- Did each Round have the same tallies? [Answers will vary.]
- Why or why not? [Answers will vary.]

# LOGICAL THINKING

**Objective:** Exploring problem solving and spatial reasoning

**Group Size:** Pairs

**Procedure:** Place a handful of Snap Cubes in front of each pair of students. Read the clues to the students. Instruct students to use the cubes to represent flowers while solving the problem.

- Carmine put 5 pots of flowers in a row.
- The white flower was second.
- The pink flower was in the middle.
- The yellow flower was last.
- The blue flower was not first.
- Where was the orange flower? [It was first.]

Ask students about the process they used to answer the question.

Here is another story. Use Snap Cubes 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.

Have students listen to the third story as you present it. They should use Snap Cubes to represent scoops of ice cream. Be sure to use only 3 colors of cubes to solve the problem.

- Kelly wanted a cone with 3 scoops of ice cream.
- She wanted 1 scoop each of chocolate, vanilla, and strawberry.
- Find the different ways the scoops could be put on the cone.

Possible Solutions:
1: Chocolate – Vanilla – Strawberry
2: Chocolate – Strawberry – Vanilla
3: Vanilla – Strawberry – Chocolate
4: Vanilla – Chocolate – Strawberry
5: Strawberry – Vanilla – Chocolate
6: Strawberry – Chocolate – Vanilla

Discuss how students used the Snap Cubes to solve the problem.

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