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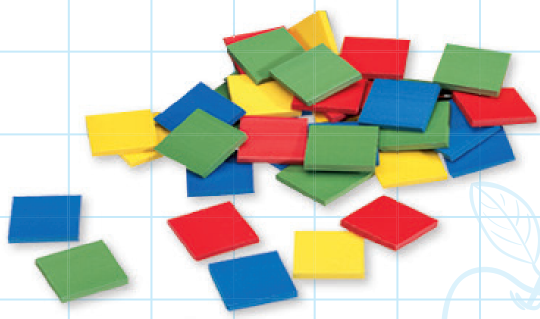
Manipulatives at Home

Activity Guide

Kit de materiales didácticos para aprender matemáticas en casa
Kit d'objets mathématiques à manipuler à la maison • Mathematik zu Hause – Arbeitsmaterial-Set



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⚠ WARNING:
CHOKING HAZARD - Small parts.
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At-Home
Math Manipulative Kit
Grades K-2

❑ 100 Connecting Cubes

❑ 40 Color Tiles

❑ 10 Base Ten Flats

❑ 74 Cuisenaire® Rods

❑ 20 Base Ten Rods

❑ 27 Pattern Blocks

❑ 20 Base Ten Units

❑ 1 Geared Clock

At-Home Math Manipulative Kit Getting Started Guide
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What are Manipulatives?

Manipulatives are objects that are used to help visualize abstract concepts. The manipulatives provided in this kit are versatile and can be used to model many different math concepts. This guide provides activities for each manipulative to give you an idea of how to use each of them. Once you do that, you and your students will be able to use the manipulatives to model and solve a wide variety of math problems.

What are Base Ten Blocks?

Base Ten Blocks provide a 3-dimensional model of the base ten number system. They help physically represent concepts of place value, addition, subtraction, multiplication, and division of whole numbers. The blocks serve as visual models for understanding the processes students use when doing paper-and-pencil arithmetic.

What are Color Tiles?

Color Tiles are 1-inch squares that come in 4 colors. Younger students start by using Color Tiles to recognize and build patterns. As their mathematical understanding grows, they will be able to use them for addition, subtraction, multiplication, and division. Color Tiles can represent numbers in a number sentence or objects in a word problem.

What are Cuisenaire® Rods?

Cuisenaire Rods are a collection of rectangular rods of 10 colors. Each color is a different length. Because the lengths are proportional, Cuisenaire Rods can be used to develop a wide variety of mathematical skills at many different levels of complexity. They can be used for basic operations, fractions, decimals, and algebra.

What are Pattern Blocks?

A set of Pattern Blocks consists of blocks in 6 geometric, color-coded shapes. Pattern Blocks help students explore many mathematical topics, including congruence, similarity, symmetry, area, perimeter, patterns, fractions, and graphing. They can also be used to explore spatial relations and designing patterns.

What are Connecting Cubes?

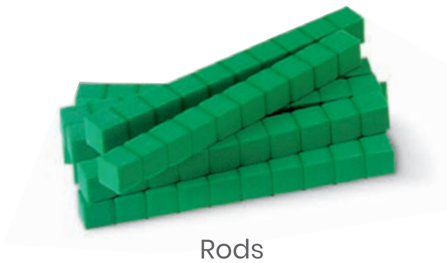
Connecting Cubes are interlocking cubes thats connect on all 6 sides. Since they snap together firmly, they are useful for young students in developing skills in number sense, estimation, measurement, patterns, and basic concepts of addition, subtraction, and multiplication.

What is a Geared Clock?

This clock is geared so that as the student moves the minute hand, the hour hand moves. This helps students understand that the hour hand moves slowly from 1 number to the next as the minute hand goes more quickly around the whole clock. The numbers and hands are color coded. The red hand points to the red numbers to tell us the hour. The blue hand points to the blue numbers to tell us the minutes.

Base Ten Blocks

Units



Rods

Flats

Beginning with Base Ten Blocks

Overview: In this activity, students practice trading units for rods, rods for flats, etc.

Materials: Base Ten Blocks, 3 pieces of blank paper

- Have students take 3 pieces of paper, labeling them “1s”, “10s”, and “100s”.
- Place 1 unit at a time on the page labeled “1s” counting aloud for each unit.
- Once there are 10 units on that page, have students trade them in for a rod and place the rod on the page labeled “10s”.
- Continue placing units on the 1s page counting aloud (11, 12, 13, ...19, 20), trading in units for a rod once there are 10 units. Keep going (21, 22, 23, ...29, 30, trade).
- When there are 10 rods on the page labeled “10s” (96, 97, 98, 99, 100), have students trade the rods in for a flat and put the flat on the page labeled “100s.” Keep going until students understand the concept.

Sum it Up!

Overview: In this activity, students use Base Ten Blocks to model a number as the sum of 2 addends. Then, they find ways to model the same number with different pairs of addends.

Materials: Base Ten Blocks, Sum it Up! Work Mat (see next page), 2 dice

- Make a copy of the Sum It Up! Work Mat so all of your students can enjoy the activity.
- Roll the dice. Use the 2 numbers rolled to make a number using the Base Ten Blocks. If you roll a 3 and a 4, decide if you want 3 rods and 4 units or 4 rods and 3 units.
- Put the Base Ten Blocks at the top of the Sum It Up! Work Mat.
- Write the number on the worksheet as a sum (43).
- Rearrange the Base Ten Blocks 6 or more different ways to make number sentences that equal your sum. (40 + 3, 20 + 23, etc). Remember you can trade 10 units for a rod or 1 rod for 10 units.
- Continue rolling the dice and building/rebuilding numbers in different ways.

Sum It Up!

Put your blocks here:

Your Sum: ______

1.

____ + ____ = ____

2.

____ + ____ = ____

3.

____ + ____ = ____

4.

____ + ____ = ____

5.

____ + ____ = ____

6.

____ + ____ = ____

Color Tiles

Estimation Jars

Overview: In this activity, students estimate and then count the number of Color Tiles that fill a variety of containers.

Materials: Color Tiles, plastic containers of different sizes (3 or more)

• Put an assortment of Color Tiles in each container.

• Ask your students how many Color Tiles they think are in each container. List the guesses—each time ask your students to explain why their guesses or estimates make sense..

• Begin counting the contents of each container aloud. Halfway through each container, ask your students whether they would like to change their estimates and, if so, why. Record your student's new estimates next to the original ones.

• Finish counting the Color Tiles and ask your students to compare their estimates with the actual number of Color Tiles. Try this activity with Connecting Cubes instead of Color Tiles.

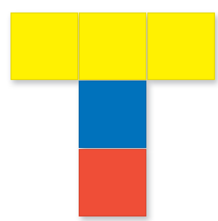
Follow Me!

Overview: In this activity, students use spatial visualization skills to compose shapes, think strategically, and use transformations (reflections and rotations) to determine congruence.

Materials: Color Tiles, large book or box

• Put a large book or box up between you and your students.

• Make a simple secret design using some Color Tiles.



• Give clues to your students so the design can be duplicated.

• Here are some sample clues:
  - **Clue 1:** The design makes a letter of the alphabet.
  - **Clue 2**: It has 3 Color Tiles of 1 color in the top row.
  - **Clue 3:** The top Color Tiles are not red, green, or blue.
  - **Clue 4:** It has 2 Color Tiles going down from the middle tile.
  - **Clue 5:** For those Color Tiles, 1 Color Tile is blue and 1 is red. Blue is not the bottom Color Tile.

• When you're done, reveal your design and see if the students' designs are the same.

• Take turns making designs and giving clues.

Cuisenaire® Rods

Build a Boat

Overview: In this activity, children practice trading units for rods, rods for flats, etc.

Materials: Base Ten Blocks, 3 pieces of blank paper

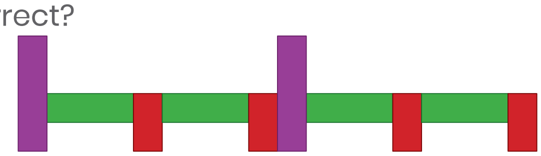
- On the paper, arrange 5–10 Cuisenaire Rods so they look like a boat. You can use any rods you want, except the white ones.
- With your pencil, carefully trace your boat on the paper.
- Remove the rods from your drawing.
- Estimate (make a smart guess) how many white rods it will take to cover the drawing of your boat.
- Cover your drawing with white rods and then count them. Was your estimate right?
- Repeat again with other shapes you design.

Copy and Repeat

Overview: In this activity, children create patterns and convert those patterns to number sentences to estimate how many rods they need to repeat the pattern.

Materials: Cuisenaire Rods, paper, pencil

- Use your Cuisenaire Rods to create one of the patterns shown here.
- Each pattern is repeated twice. The first pattern is green, red, green, red, repeat.
- If doing that pattern once, requires 2 reds and 2 greens, and doing it twice (as shown) requires 4 reds and 4 greens, how many rods of each color would you need to repeat 5 times? The number sentence might be (2r + 2g) + (2r + 2g) + (2r + 2g) + (2r + 2g) + (2r + 2g) = 10r + 10g
- Build the pattern so it repeats 5 times. Was your estimate correct?
- Do this again with the other pattern.



- For extra fun—
    - On your paper, design your own pattern with at least 2 repeats.
    - Trace it in onto the paper.
    - Remove the Cuisenaire Rods and give it to a friend. See if they can figure out how you made your pattern.

Pattern Blocks

Green Triangle | Orange Square | Blue Parallelogram | Tan Rhombus | Red Trapezoid | Yellow Hexagon

Discover Pattern Blocks

Overview: In this activity, students discover the relationships between the different Pattern Blocks and express them as equations.

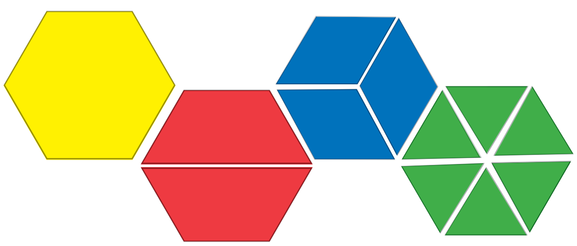
Materials: Pattern Blocks, paper, pencil

- Have students sort the Pattern Blocks by color. Have them take away 1 yellow hexagon.
- Have students make a hexagon from the red trapezoids. How many red trapezoids did it take?
- On a piece of paper have students write: 1 yellow hexagon = 2 red trapezoids.
- Now ask students to use a different color pattern block to make a hexagon and write the "formula" on their paper.
- Now that they figured out how all the pieces relate to the hexagon, see if they can figure out how each pattern block relates to each other.

Cover the Caterpillar

Overview: In this activity, students learn how to record and observe how different patterns can create the same shape.

Materials: Pattern Blocks, paper, crayons



- Have students put Pattern Blocks together to make a caterpillar outline like the 1 shown here.
- Have students trace and color the caterpillar outline on a sheet of paper to record their solution.
- Now, challenge students to make another caterpillar outline using a different arrangement of Pattern Blocks.
- Ask students, "How is your second caterpillar outline different from the first caterpillar outline? Did you use more or less Pattern Blocks in your second caterpillar design?"
- Repeat this activity with different shapes for variety.

Connecting Cubes

How Long Is It?

Overview: In this activity, students work with nonstandard units of measurement and determine the length of objects by placing multiple copies of the unit end to end.

Materials: Connecting Cubes, crayons, "How Long Is It?" Recording Sheet (see next page), items to measure

- Make a copy of the "How Long Is It?" Recording Sheet so all of your students can enjoy the activity.
- Put a crayon and a Connecting Cube on the table. Ask your students to think about how many Connecting Cubes they would need to snap together to equal the length of the crayon. Record your students' estimates on the "How Long Is It?" Recording Sheet.
- Have your students put their Connecting Cubes together until the length of the cube train matches the length of the crayon. Have them write their answers down on the recording sheet.
- Have your students compare and contrast the estimates to the actual answer. Ask if their estimates were too long, too short, or exactly right.
- Repeat the activity using other objects around your classroom.

The Disappearing Train

Overview: In this activity, students roll a die to determine how many cubes to remove from a Connecting Cube train. They collect data about how many rolls of the die it would take to make their train disappear.

Materials: Connecting Cubes, 1 die, "The Disappearing Train" Recording Sheet (see page 10)

- Build and display a Connecting Cube Train with 10 cubes.
- Ask your students to take turns with you rolling the die. The number rolled is how many cubes to take off the train. If the number rolled is greater than the number of Connecting Cubes left, then roll again.
- Record each roll on "The Disappearing Train" Recording Sheet.
- Continue until the train has disappeared. Play again with a longer train.

Roll	Number Rolled	Number Sentence
1st	3	10 - 3 = 7
2nd	5	7 - 5 = 2
3rd	6	2 - 6 = (Impossible)
4th	2	2 - 2 = 0

How Long Is It?

Object: ____

Estimate of length (in Connecting Cubes): ________________

Actual length (in Connecting Cubes): ____________________

Our estimate was:
- ❑ too long
- ❑ too short
- ❑ just right

Object: ____

Estimate of length (in Connecting Cubes): ________________

Actual length (in Connecting Cubes): ____________________

Our estimate was:
- ❑ too long
- ❑ too short
- ❑ just right

Object: ____

Estimate of length (in Connecting Cubes): ________________

Actual length (in Connecting Cubes): ____________________

Our estimate was:
- ❑ too long
- ❑ too short
- ❑ just right

The Disappearing Train

Roll	Number Rolled	Number Sentence

Geared Clock

Beginning with the Geared Clock

Overview: In this activity, students practice moving the minute hand and watching how the hour hand moves.

Materials: Geared Clock

- Ask students to turn the blue minute hand until both the minute and hour hands point straight up at 12.
- When both hands point at 12 it is **12:00**. Ask students to read the red number first, then the blue number.
- Have students move the minute hand, saying the blue numbers as they pass them. Stop at 30.
- Did the red hour hand get to the 1? If it has not gotten all the way to 1, have them still read it as 12. What time is it now? **12:30**
- Ask students to keep moving the minute hand around back to 12. What time is it? **1:00**
- Ask students to keep moving the minute hand until you are back to **12:00**. Stop them so they can read the time at least 10 times. Be sure to have them stop at different places on the clock.

Around the Clock

Overview: In this activity, students practice telling time and associate time with their daily schedules.

Materials: Geared Clock, paper, pencil

- Have students set the clock to 6:00.
- Ask students to write a schedule for their school day and to use the clock to show what time it is when they do certain things every day (wake up, eat breakfast, arrive at school, have recess, eat lunch, get home, eat supper, etc.).
- When they are not in school, how is their schedule different? Write the at-home schedule and circle the things that are the same.

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