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Introduction and Teaching Notes

Your class will flip – and never flop – when they use *Flip Over Math!*

Flip Over Math pairs five favorite, hands-on manipulatives with exciting new activities that ratchet up number sense, number operations, problem-solving, and reading comprehension skills for grades 2-5. The activities reinforce basic knowledge and proficiency while stimulating cognitive thinking. Working independently or in small groups, students will make the transition from basic counting techniques to a more sophisticated understanding of number relationships, place value, and number operations. They will learn to identify the mathematical operations required to solve a word problem. And last but not least, they will discover that mathematical proficiency is used in many environments beyond the classroom.

According to the NCTM Principles and Standards for School Mathematics,

As students work with numbers, they gradually develop flexibility in thinking about numbers, which is a hallmark of number sense. Students may model twenty-five with bean counters or with two dimes and a nickel, or they may say that it is 2 tens and 5 ones, five more than twenty, or halfway between twenty and thirty.

Flip Over Math puts the power to develop this flexibility of thinking right in your hands. Each set combines five different manipulatives with self-checking activities that reinforce the NCTM Number and Operations strand.

Each activity uses one particular manipulative. As activities progress in difficulty, children will use each manipulative in turn to practice specific skills. By experimenting with a variety of materials, students will be better able to understand the common principles and patterns underlying basic number operations. They will become able to transfer what they have learned from one hands-on tool to another.

This process is not automatic. Young children often associate certain operations with the manipulative they have used to learn those operations. In these situations, a student might perform an operation flawlessly using one manipulative. Yet if the manipulative is changed, the student might not be able to apply what he or she has learned to the new manipulative.

By using several different manipulatives to teach the same concepts and skills, students are better able to grasp the underlying operations. Ultimately, students will progress from working at the level of concrete representation to that of abstract symbol.

NCTM Principles and Standards for School Mathematics, Chapter 4.

NCTM Standards

The activities in this *Flip Over Math* book help students acquire the knowledge and skills needed to achieve the standards set by the National Council of Teachers of Mathematics in the Number and Operations strand. There are activities for each of the recommended skills listed in Principles and Standards for School Mathematics.

	Understand numbers, ways of representing numbers, relationship among numbers & number systems	Understand meanings of operations & how they relate to one another	Compute fluently & make reasonable estimates
Cuisenaire® Rods	Counting; Equivalent Representations of the Same Number; Place Value; the Base 10 Number System; Connecting Number Words to Quantities	Effects of Adding, Subtracting, Multiplying & Dividing Whole Numbers; Grouping	Adding, Subtracting, Multiplying & Dividing Whole Numbers
Connecting People®	Decomposing & Composing Numbers; Regrouping & Sharing	Relationships between Whole Numbers; Relationships between Operations; Grouping	Adding, Subtracting, Multiplying & Dividing Whole Numbers
Bean Counters™	Equivalent Representations of the Same Number; Parts of a Collection; Decomposing & Composing Numbers; Skip Counting	Distributivity of Multiplication over Addition; Relationships between Operations; Relationships between Whole Numbers; Grouping	Adding, Subtracting, Multiplying & Dividing Whole Numbers
Pattern Blocks	Using Models & Equivalent Forms to Understand Fractions & Percents	Grouping; Effects of Various Operations	Adding, Subtracting, Multiplying & Dividing Whole Numbers
Money	Place Value; the Base 10 Number System; Equivalent Representations	Understanding & Using Properties of Operations	Adding, Subtracting, Multiplying & Dividing Whole Numbers; Using Multiplication & Addition to Solve Problems
Fill-in	Equivalent Representations	Grouping; Understanding & Using Properties of Operations	Adding, Subtracting, Multiplying & Dividing Whole Numbers

Flip Over Math Components

Each *Flip Over Math* set features an activity book and a tub of five favorite math manipulatives. The manipulatives are provided in quantities ideal for independent use or for up to four children working together. For ease and convenience, the manipulatives are packaged in a compartmentalized storage tote and contain small parts, not for children under three years of age.

Each tote contains:

- 100 Plastic Pattern Blocks in 6 shapes
- 48 Connecting People®, in 4 colors and 3 sizes
- 74 Connecting Cuisenaire® Rods, in 10 lengths
- 100 Plastic Coins – 25 each of Quarters, Dimes, Nickels and Pennies
- 200 Bean Counters™

This full-color, self-checking convenient flip book contains 46 progressively more challenging addition, subtraction, multiplication and division activities. The free-standing book is perfect for use at a learning center.



Students read the instructions on each activity page. They use the specified manipulative to build and solve the problem. Then students may flip over the page of the book and turn the stand around to see the correct answer and check their work. Students will be asked to write one or more equations for each activity. Please provide students with paper to prevent them from writing directly in the flip book. A reproducible number line has been provided on this page for use with the Connecting Cuisenaire Rod activities. While students will be able to count the number of units in each Connecting Cuisenaire Rod, students may use the number line to quickly determine each rods' length. The number line will be particularly helpful if students are using regular Cuisenaire Rods.

In the *Flip Over Math* activities, students will come across the following terms that describe number operations. You may wish to familiarize your students with these terms before they begin the activities.

Addition

together
in all
in total
add

Subtraction

the difference
are left
remove
take away
left over
subtract

Multiplication

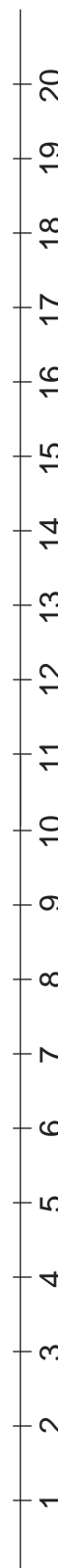
sum of
how many times

Division

the product
how many groups

Comparison

longer than/shorter than
greater than/less than/
fewer than



Basic Addition and Subtraction with Bean Counters™

Use the Bean Counters to solve the story problem. Flip over the page when you are done to check your work.

1. Jen needs 9 stickers to make a trade with Lisa. Jen already has 4 stickers. Subtract to find how many stickers Jen needs?

2. Write the subtraction equation.

3. Min also needs 9 stickers to trade with Lisa. He has 6 stickers. Subtract to find how many stickers Min needs.

4. Write the subtraction equation.

5. Write four more addition equations to make the number 9 only using 2 or 3 numbers.

FLIP OVER MATH



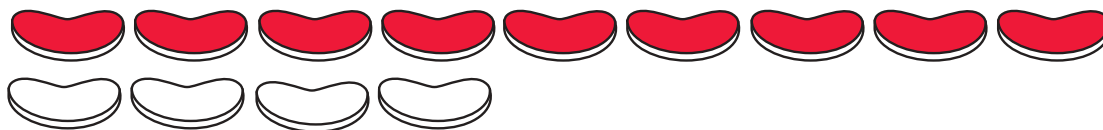
Story Problems

Basic Addition and Subtraction with Bean Counters™

Answer Key

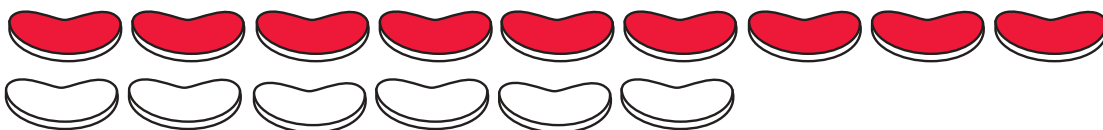
1. Jen needs 9 stickers to make a trade with Lisa. Jen already has 4 stickers. Subtract to find how many stickers Jen needs?

Answer: 5



2. Write the subtraction equation. Answer: $9 - 4 = 5$

3. Min also needs 9 stickers to trade with Lisa. He has 6 stickers. Subtract to find how many stickers Min needs. Answer: 3



4. Write the subtraction equation. Answer: $9 - 6 = 3$

5. Write four more addition equations to make the number 9 only using 2 or 3 numbers. Answers will vary:

$$8 + 1$$

$$3 + 3 + 3$$

$$2 + 2 + 5$$

$$7 + 2$$

$$0 + 9$$

$$1 + 1 + 7$$

$$1 + 2 + 6$$

$$1 + 3 + 5$$

$$1 + 4 + 4$$

$$2 + 3 + 4$$

Basic Division with Pattern Blocks

Use the pattern blocks to solve the story problem. Flip over the page when you are done to check your work.

1. Hannah has 18 green triangles. She wants to make a yellow hexagon shape using her triangles. Use 6 green triangles to make 1 hexagon.
2. How many hexagon shapes can Hannah make all together?
3. Write the division equation.

FLIP OVER MATH

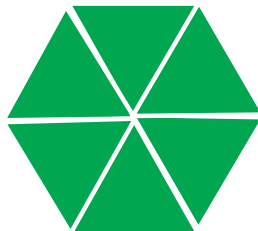


Story Problems

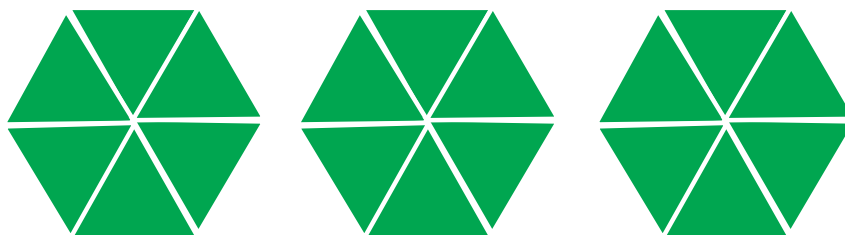
Basic Division with Pattern Blocks

Answer Key

1. Hannah has 18 green triangles. She wants to make a yellow hexagon shape using her triangles. Use 6 green triangles to make 1 hexagon.



2. How many hexagon shapes can Hannah make all together?
Answer: 3



3. Write the division equation. Answer: $18 \div 6 = 3$

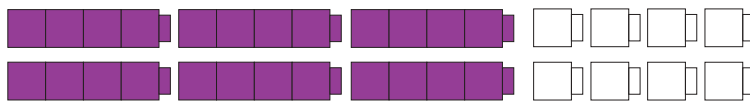
Basic Multiplication “Fill-in” with Connecting Cuisenaire® Rods

Use Connecting Rods to solve the story problem. Flip over the page when you are done with your work.

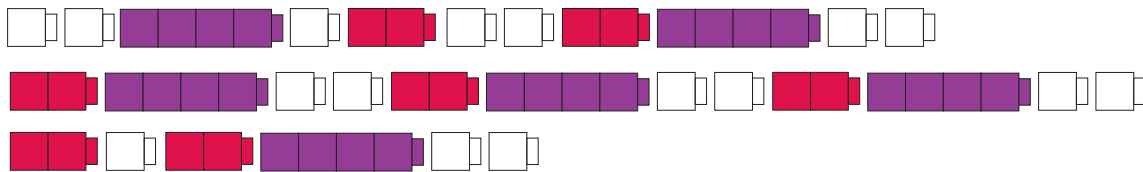
- Rosa is making a necklace. She is planning it out by using Connecting Rods. She uses ___ white rods and ___ red rods. The necklace is ___ units long.



- Rosa decides to add ___ purple rods and ___ more white rods. She adds ___ more units.



- There are ___ units in all.



- Write four equations that describe Rosa’s necklace.

___ x ___ = ___ white units total

___ x ___ = ___ red units total

___ x ___ = ___ purple units total

___ + ___ + ___ = ___ units in all

FLIP OVER MATH



Story Problems

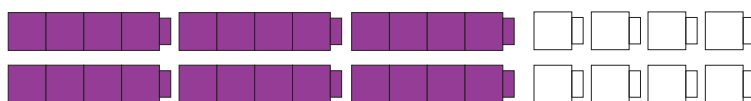
Basic Multiplication “Fill-in” with Connecting Cuisenaire® Rods

Answer Key

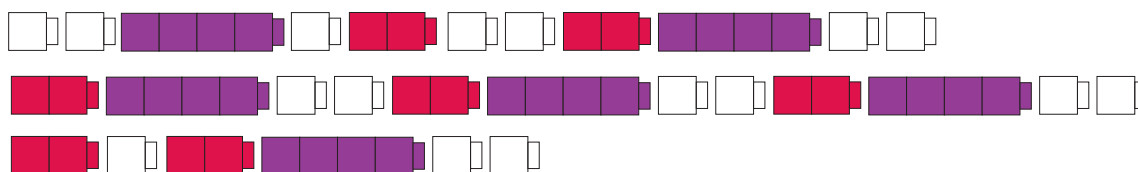
1. Rosa is making a necklace. She is planning it out by using Connecting Rods. She uses 8 white rods and 7 red rods. The necklace is 22 units long.



2. Rosa decides to add 6 purple rods and 8 more white rods. She adds 32 units more units.



3. There are 54 units in all.



4. Write four equations that describe Rosa’s necklace.

Answers:

$$\underline{16} \times \underline{1} = \underline{16} \text{ white units}$$

$$\underline{7} \times \underline{2} = \underline{14} \text{ red units}$$

$$\underline{6} \times \underline{4} = \underline{24} \text{ purple units}$$

$$\underline{16} + \underline{14} + \underline{24} = \underline{54} \text{ units in all}$$