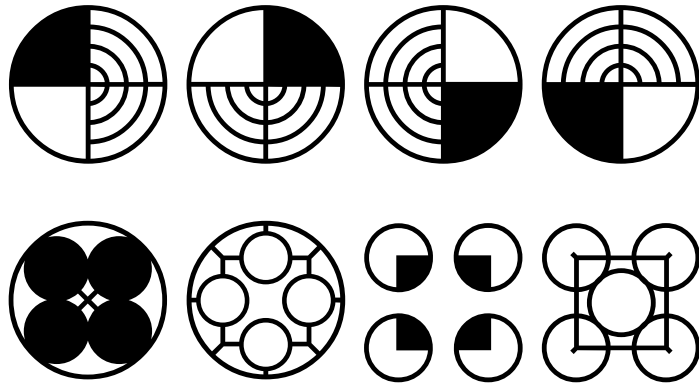


# Common Core

# Math Progress



**Common Core Corps  
Sponsored by Boeing  
Federation for Community Schools**

**Resources developed by the  
Polk Bros Foundation Center for Urban Education at DePaul University**

## What is the Common Core Math Difference?

**Less is more!** Each grade includes core math that students will have more time to learn because the curriculum is not crowded.

### How the Math Grows from Grade to Grade

The Common Core Standards Shift as Students Develop.  
Each level supports the next.

K	1 - 2
<input type="checkbox"/> Counting and Cardinality <input type="checkbox"/> Operations and Algebraic Thinking <input type="checkbox"/> Measurement and Data <input type="checkbox"/> Geometry	<input type="checkbox"/> Operations and Algebraic Thinking <input type="checkbox"/> Number and Operations in Base 10 <input type="checkbox"/> Measurement and Data <input type="checkbox"/> Geometry

3 - 4 - 5
<input type="checkbox"/> Operations and Algebraic Thinking <input type="checkbox"/> Number and Operations in Base Ten <input type="checkbox"/> Number and Operations—Fractions <input type="checkbox"/> Measurement and Data <input type="checkbox"/> Geometry

6 - 7 - 8
<input type="checkbox"/> Ratios and Proportional Relationships <input type="checkbox"/> The Number System <input type="checkbox"/> Expressions and Equations <input type="checkbox"/> Geometry <input type="checkbox"/> Statistics and Probability

High School
<input type="checkbox"/> Number and Quantity <input type="checkbox"/> Functions <input type="checkbox"/> Modeling <input type="checkbox"/> Geometry <input type="checkbox"/> Statistics and Probability

**The standards build level by level to college and careers.**

## Common Core Focuses on Habits of Thinking

### **Think clearly.**

Make sense of the problem, then solve it persistently!

That's Math Practice Standard 1—a good habit for everyone solving any problem.

Be careful and clear—check your work! That's what standard 6 requires—“attend to precision.” Use the correct words, make sure you have completed the solution and checked your answer.

## **These are the Common Core**

### **STANDARDS FOR MATHEMATICAL PRACTICE**

**that students apply when they learn and use math.**

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

**Standards 1 and 2 are part of solving every math problem—and can be applied any time students have to solve any problem.**

**Each Grade is Clearly Organized, and the Standards tell you what students need to learn and what it means with clear examples.**

### **Third Grade Operations and Algebraic Thinking—Common Core**

#### **Represent and solve problems involving multiplication and division.**

##### 3.OA.1. Interpret products of whole numbers,

e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as  $5 \times 7$ .

##### 3.OA.2. Interpret whole-number quotients of whole numbers,

e.g., interpret  $56 \div 8$  as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.

For example, describe a context in which a number of shares or a number of groups can be expressed as  $56 \div 8$ .

##### 3.OA.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities,

e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

##### 3.OA.4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

For example, determine the unknown number that makes the equation true in each of the equations  $8 \times ? = 48$ ,  $5 = \_ \div 3$ ,  $6 \times 6 = ?$

#### **Understand properties of multiplication and the relationship between multiplication and division.**

##### 3.OA.5. Apply properties of operations as strategies to multiply and divide.

Examples: If  $6 \times 4 = 24$  is known, then  $4 \times 6 = 24$  is also known. (Commutative property of multiplication.)  $3 \times 5 \times 2$  can be found by  $3 \times 5 = 15$ , then  $15 \times 2 = 30$ , or by  $5 \times 2 = 10$ , then  $3 \times 10 = 30$ . (Associative property of multiplication.) Knowing that  $8 \times 5 = 40$  and  $8 \times 2 = 16$ , one can find  $8 \times 7$  as  $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$ . (Distributive property.)

##### 3.OA.6. Understand division as an unknown-factor problem.

For example, find  $32 \div 8$  by finding the number that makes 32 when multiplied by 8.

#### **Multiply and divide within 100.**

##### 3.OA.7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division

(e.g., knowing that  $8 \times 5 = 40$ , one knows  $40 \div 5 = 8$ ) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

#### **Solve problems involving four operations; identify and explain arithmetic patterns**

##### 3.OA.8. Solve two-step word problems using the four operations.

Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

##### 3.OA.9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

## Coaching Math Learners at Home and in Extended Day Programs

What can we do to help our students get the Common Core math habits?

Give them opportunities to practice using math facts.

Ask students to think before they answer a math question.

### MATH COACH GUIDE

Here are some ways to help students master math.

#### KNOW WHAT: Math Facts

- Post math words and symbols with pictures/examples
- “Practice Pack”—students make their own facts on small pieces of paper, match them with words and examples.
- “Math Fact of the Day”
- Fact “Bingo”

#### KNOW HOW: Math Skills and Strategies

- Model different ways to solve same problem
- Work a problem out step by step
- Student models problem solving
- Learning “partner”
- Work in groups
- Post example
- Post a path—steps to follow
- “Math Smart Pack”—practice with cards that hold numbers and symbols.
- Draw the problem
- Start with simpler problem, build in more challenges.

*Send a note to parents:*

*Make More Math Progress*

- Practice math with your child. For example, use flashcards you make to review math facts.
- Play math fact matching games.
- Solve real-life math problems with your child. For example, make a shopping list and estimate what the cost will be.

**Ask teachers to give you math samples—problems solved showing the steps. The next page is an example of a note to teachers.**

## **Example of a note to teachers asking for help with math problem solving examples.**

Dear Teacher:

When you send students with math homework, please give us an example of how to solve the problems your students need to work on. A step-by-step guide would be great--it will help us reinforce the strategies you teach the students to use.

If you want us to help with any math skills, whether for homework or to help students who need to work on skills you taught earlier in the school year, please send a solution guide. We will use the example to coach students who need help.

Thank you.

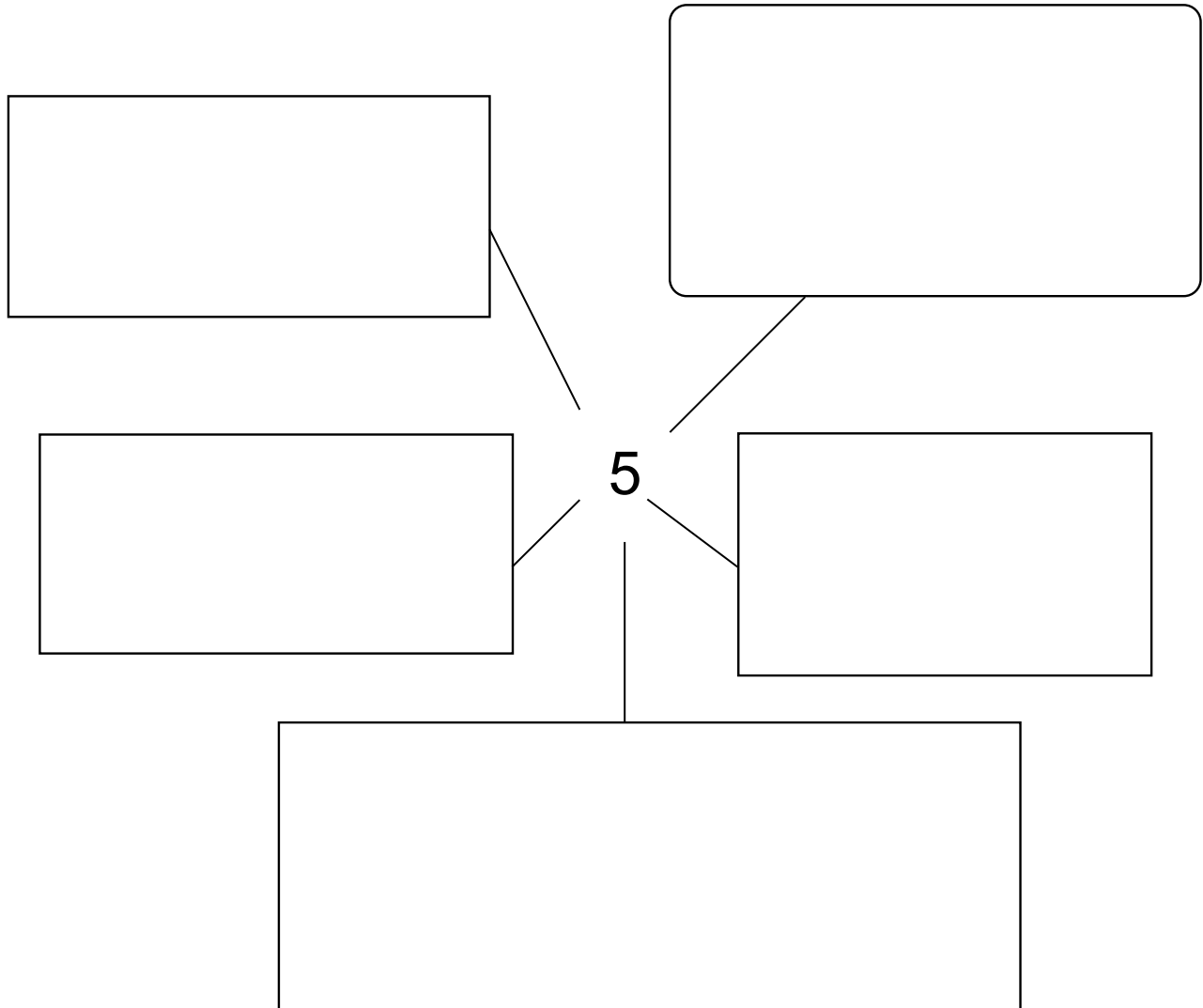
Sincerely,

*Your Community School Partner*

## ***Apply math facts and operations.***

CCSS Math Practice Standard 2. Reason abstractly and quantitatively.

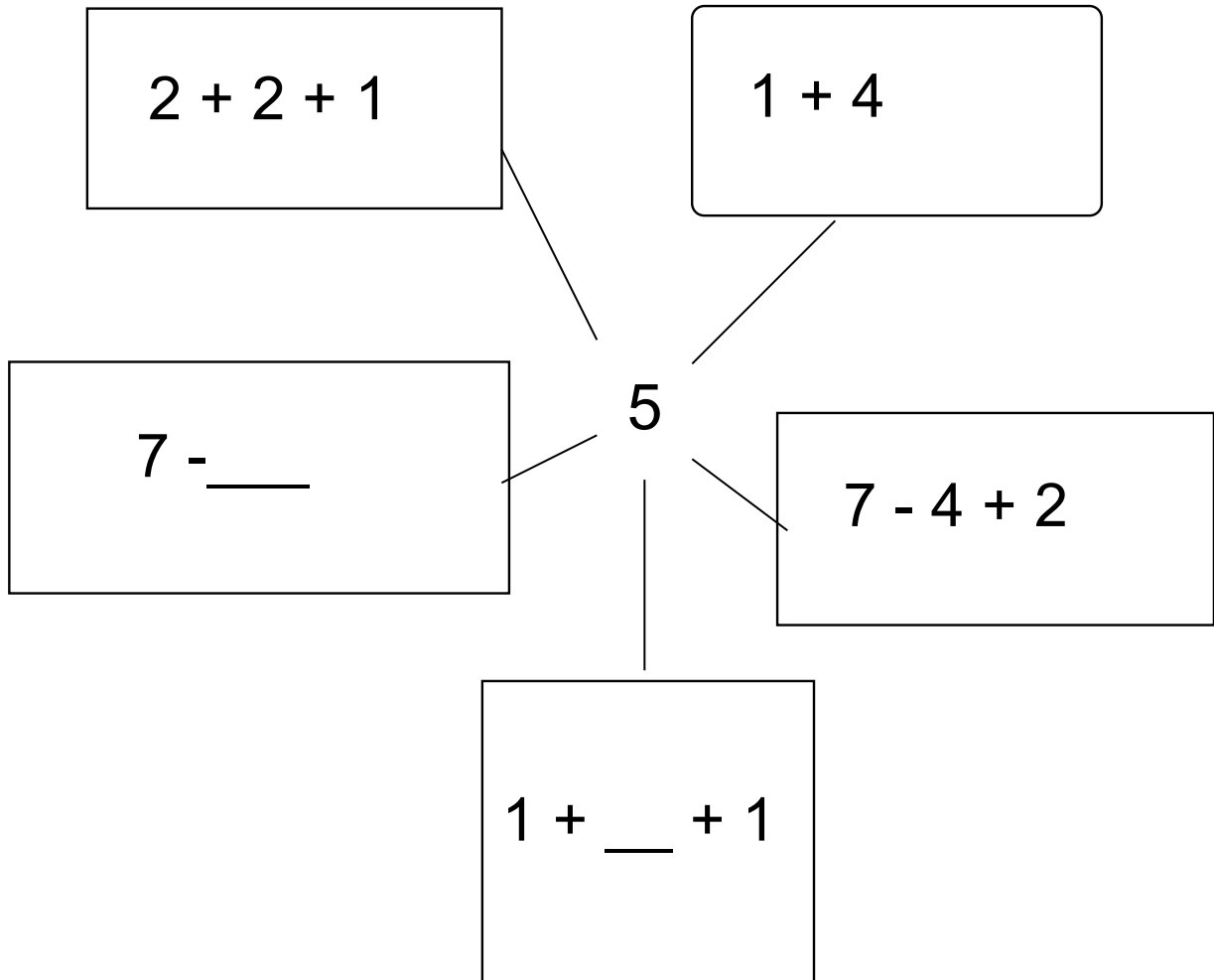
Task: Use the math you know to show five different ways to make equations that result in 5. It could be fraction equations or multi-step addition or...



It could get bigger—imagine 50 ways to make a 50...

## Cinco Maneras de Hacer un Cinco

Este ejemplo está parcialmente completo. Una vez que los estudiantes aprendan como organizar este tipo de diagrama, ellos pueden hacer su propio--diez maneras de hacer un diez, veinte maneras de hacer un veinte....





## Math Problem Solver

**The Problem**—What will you figure out?

***Your Strategy***

***Solve it here!***

***Answer:***

## I can solve a word problem strategically!

*Common Core Math Practice Standard 1: Make sense of problems and persevere in solving them.*

What is the question asking me to figure out? Tell it in your own words.	
How will I solve it?	
What information do I need to solve it?	

You may complete it by yourself or...

*pair and share*—*work together with another student to solve it*

*or*

*pair to compare*—*solve it yourself then compare your work with another student's*

## ACTIVE MATH

These activities can be used to respond to students' needs you identify through formative assessment or to provide assessments if the student does the task independently.

<p><b>Make a math picture glossary.</b> Write the important words of math. Then for each word, draw a picture showing what it means.</p>	<p><b>Make a Math Step-By-Step Guide.</b> What's that? You write the steps to solve a kind of problem. For example, how to figure out how much money you have after you spend some.</p>	<p><b>Make a math multiple choice question.</b> Write the question as a situation. Then give a few possible answers.</p>	<p><b>Make up a math game.</b> To win the game, you need to know math facts. You can play the game as a card game or as a board game. If it's a board game, then the players would get to move ahead when they know a math fact.</p>
<p><b>Write a Number Diary.</b> What's That? You're a Number (pick any number). Tell what happens to you during a day.</p>	<p><b>Make a measurement book.</b> Measure anything and record its dimensions. First, estimate its size. Then check your estimate.</p>	<p><b>Tell what you would buy if you had \$100.</b> Figure out what everything would cost and how much you would have left after you bought things.</p>	<p><b>Write a page in a math textbook.</b> Explain the math. Then give an example. Then ask a question.</p>
<p><b>Invent a number game.</b> Write the rules to the game. Then play it.</p>	<p><b>Make a fraction book.</b> Write about what a fraction is, how people use them, and how people can add and subtract them.</p>	<p><b>Write about your day and how numbers help you.</b> For example, numbers tell what time it is.</p>	<p><b>Make a sports scores graph.</b> Then explain what your graph tells about the way the teams are playing this season.</p>
<p><b>Make a Math Number Connector.</b> What's that? You take one number and put it in the center of a page. Then write the number combinations that would make that number. For example, what are five ways to make a five?</p>	<p><b>Write a letter to someone who is having difficulty with math.</b> Explain what that person could do to figure out how to use the math</p>	<p><b>Make a math diary—</b> what numbers are part of your day?</p>	<p><b>Make a math test prep guide—</b> what will you include?</p>