

Singapore Math: Common Core Connections

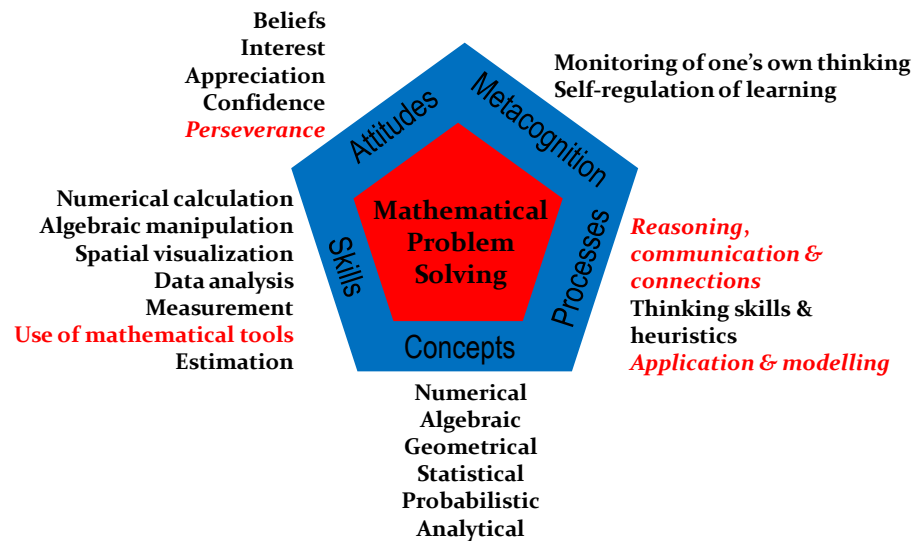
Dr. Richard Bisk - Professor of Mathematics, Worcester State University

rbisk@worchester.edu

<https://sites.google.com/site/singmathproject/>

NCTM Annual Conference – April, 2014

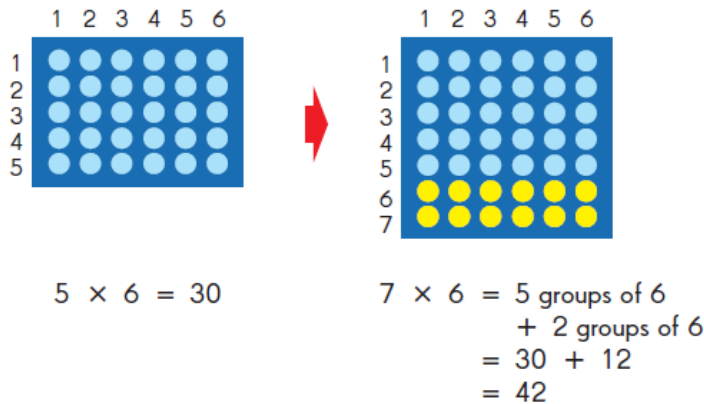
Mathematics Curriculum Framework Ministry of Education 2007



Mathematical Practices - Common Core

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**.

Note: Color added for emphasis



MP7: “Mathematically proficient students look closely to discern a pattern or structure ... students will see 7×8 equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property.”

Learn Name fractional parts.

How do you read fractional parts?

Fraction	Read As
$\frac{1}{2}$	one-half
$\frac{1}{3}$	one-third
$\frac{1}{4}$	one-quarter or one-fourth

$\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ are unit fractions.
A **unit fraction** names one of the equal parts of a whole.

3.NF.A.1 Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into b equal parts;

Learn You can use related multiplication facts to help you divide when you share equally.

Divide 12 sharpeners into 2 equal groups.
How many sharpeners are in each group?

$12 \div 2 = ?$

6 sharpeners are in each group.

$6 \times 2 = 12$
So, $12 \div 2 = 6$.

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.

Learn You can use related multiplication facts to help you divide when you put things in equal groups.

Divide 35 cubes into equal groups.
There are 5 cubes in each group.
How many groups are there?

$35 \div 5 = ?$

There are 7 groups.

$7 \times 5 = 35$
So, $35 \div 5 = 7$.

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.

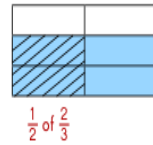
Use models to multiply fractions.

Find $\frac{1}{2} \times \frac{2}{3}$.

Margie drew a rectangle and colored $\frac{2}{3}$ of it blue.

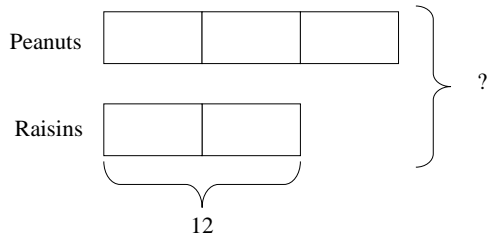


She then drew stripes over $\frac{1}{2}$ of the colored parts.



5.NF.B.4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

Example: To make trail mix peanuts and raisins are mixed in the ratio 3:2. If 12 pounds of raisins are used, how many pounds of trail mix are made?



2 units = 12

1 unit = 6

5 units = 30

Twelve pounds of trail mix are made.

6.RP.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

AMERICAN INSTITUTES FOR RESEARCH Report prepared for the U.S. Department of Education (2005): "What the United States Can Learn From Singapore's World-Class Mathematics System."

"A mathematically logical, uniform national framework that develops topics in-depth at each grade guides Singapore's mathematics system.

"... The framework covers a relatively small number of topics in-depth and carefully sequenced grade-by-grade, ..."

Common Core - First sentence

"For over a decade, research studies of mathematics education in high performing countries have pointed to the conclusion that the mathematics curriculum in the United States must become substantially more focused and coherent in order to improve mathematics achievement in this country."