**Session One: Addition of Whole Numbers**

**Common Core Standards Addressed**

#### Grade 1

#### Represent and solve problems involving addition and subtraction.

[CCSS.Math.Content.1.OA.A.1](http://www.corestandards.org/Math/Content/1/OA/A/1/)
Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.1

[CCSS.Math.Content.1.OA.A.2](http://www.corestandards.org/Math/Content/1/OA/A/2/)
Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

#### Understand and apply properties of operations and the relationship between addition and subtraction.

[CCSS.Math.Content.1.OA.B.3](http://www.corestandards.org/Math/Content/1/OA/B/3/)
Apply properties of operations as strategies to add and subtract.2 *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)*

[CCSS.Math.Content.1.OA.B.4](http://www.corestandards.org/Math/Content/1/OA/B/4/)
Understand subtraction as an unknown-addend problem. *For example, subtract 10 - 8 by finding the number that makes 10 when added to 8.*

#### Add and subtract within 20.

[CCSS.Math.Content.1.OA.C.5](http://www.corestandards.org/Math/Content/1/OA/C/5/)
Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

[CCSS.Math.Content.1.OA.C.6](http://www.corestandards.org/Math/Content/1/OA/C/6/)
Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 - 4 = 13 - 3 - 1 = 10 - 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 - 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).

#### Work with addition and subtraction equations.

[CCSS.Math.Content.1.OA.D.7](http://www.corestandards.org/Math/Content/1/OA/D/7/)
Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 - 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.

[CCSS.Math.Content.1.OA.D.8](http://www.corestandards.org/Math/Content/1/OA/D/8/)
Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = \_ - 3, 6 + 6 = \_*.

#### Grade 2

#### Represent and solve problems involving addition and subtraction.

[CCSS.Math.Content.2.OA.A.1](http://www.corestandards.org/Math/Content/2/OA/A/1/)
Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.1

#### Add and subtract within 20.

[CCSS.Math.Content.2.OA.B.2](http://www.corestandards.org/Math/Content/2/OA/B/2/)
Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.

#### Work with equal groups of objects to gain foundations for multiplication.

[CCSS.Math.Content.2.OA.C.3](http://www.corestandards.org/Math/Content/2/OA/C/3/)
Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

[CCSS.Math.Content.2.OA.C.4](http://www.corestandards.org/Math/Content/2/OA/C/4/)
Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

#### Grade 3

#### Solve problems involving the four operations, and identify and explain patterns in arithmetic.

[CCSS.Math.Content.3.OA.D.8](http://www.corestandards.org/Math/Content/3/OA/D/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

[CCSS.Math.Content.3.OA.D.9](http://www.corestandards.org/Math/Content/3/OA/D/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*.

#### Grade 4

#### Use the four operations with whole numbers to solve problems.

[CCSS.Math.Content.4.OA.A.3](http://www.corestandards.org/Math/Content/4/OA/A/3/)
Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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.

#### Students Grade 5 to Grade 8 should demonstrate mastery of the skills presented in this session.