Addition & Multiplication Number Bubbles (+ Number Bubbles x) by Unripe Grape

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Grades: K – 4

Subject: Math

CCLS Standard Addressed:

**Addition**

*K.OA.3.* Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).

*K.NBT.1.* Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

*1.OA.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.

*1.OA.5*. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

*1.OA.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).

 *1.OA.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 = \_. *2.OA.2.* Fluently add and subtract within 20 using mental strategies. (See standard 1.OA.6 for a list of mental strategies). By end of Grade 2, know from memory all sums of two one-digit numbers.

**Multiplication**

*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 × ? = 48, 5 = \_ ÷ 3, 6 × 6 = ?.

*3.OA.7.* Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

*4.OA.4.* Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

 Description of application:

 The “Addition” feature of this app helps students develop the number sense needed to compose and decompose numbers. Students can choose from three options when playing the addition feature: Child, Survival, or Time, and the levels of difficulty increase, respectively. When on “Child” mode, students get 120 seconds of playing time. They are given a “target number” less than or equal to 10, and need to decompose the number using any combination of bubbles labeled 1 through 5. In other words, students must select number bubbles whose sum is equal to the target number. If given a target number of 10, students can pop two bubbles labeled 5; five bubbles labeled 2; 3 bubbles labeled 3 and one bubble labeled 1; ten bubbles labeled 1; etc. When students race to decompose the target numbers, they are relating addition to subtraction to help create number combinations.

When playing the next level, “Survival,” students are challenged to decompose target numbers ranging from 1 to 20 using bubbles labeled 1 through 9; however, once they make 5 mistakes, the game is over. Finally, the “Time” version gives students 60 seconds to create as many number bonds as possible for target numbers ranging from 1 to 20 using bubbles labeled 1 through 9.

 The “Multiplication” feature is very similar to the “Addition” feature, so students will make a smooth transition as they progress through the grades. In the “Child” round, students are given 120 seconds to select two number bubbles (labeled 1 through 5) whose product is equal to the target number (products 1 through 20). It is important to note that students can only choose two factors when decomposing target numbers. For example, when given the target 20, students can only choose 4 and 5; the combination 2 x 2 x 5 is not accepted in this game though it is mathematically correct. In the next round, “Survival,” students need to find the factors of target numbers up to 81 using bubbles labeled 1 through 9. Finally, the “Time” mode challenges students to decompose as many target numbers (1 through 81) as they can in 60 seconds using bubbles labeled 1 through 9.

Incorporation explanation:

In the common core, “Operations and Algebraic Thinking” is one of the major domains in the primary grades. If students do not understand how to compose and decompose numbers starting in the younger grades, they are going to have an extremely difficult time mentally adding and subtracting numbers once they get to 2nd and 3rd grade. In K, students are expected to know all of the number bonds that create numbers less than or equal to 10; for example, they may need to show all the possible number bonds that show 6: 0 + 6, 1 + 5, 2 + 4, and 3 + 3. With this in mind, the “Child” version of the addition feature would be a great way to reinforce standard K.OA.3.

In grade 1, students use their prior knowledge of composing and decomposing numbers to help them add mentally. When adding 8 and 6, a first grader might think, “I know 8 + 2 = 10 (a number that is so easy to use when adding), so let me break 6 into 2 and 4. My new number sentence will be (8 + 2) + 4 or 10 + 4 which equals 14!” Students continue this way of thinking in grade 2 when they add larger numbers. If a student wanted to mentally add 48 and 26, he or she may again think of ways to compose and decompose these bigger numbers to create a simpler problem. By decomposing 26 into 2 and 24, a second grader can in turn compose 50 from 48 and 2. With the new addends of 50 and 24, the second grader can easily get a sum of 74. Therefore, the “Survival” and “Time” features of the app would be best for students in grades 1 and 2.
 In 3rd grade, students continue to build on the idea of composing and decomposing numbers, but instead of adding and subtraction, they are now multiplying and dividing. By the end of 3rd grade, students are expected to know from memory all products of two one-digit numbers. The “Child” version of the multiplication app will help students in grade 3 as they begin to explore multiplication as well as the relationship between multiplication and division. Students can use this version as they begin working with numbers 1 through 5 as factors. The next two levels of the game, “Survival” and “Time,” can be played by students as they begin to master multiplication facts. The more difficult levels can also be played by 4th grade students as they begin to explore factor pairs for whole numbers 1 – 100. When given a target number of 24, students may challenge themselves to think of all the factors that make 24, selecting bubble combinations of 6 and 4 or 8 and 3. Overall, Number Bubbles is a fun app that helps students truly understand numbers as well as the relationship between addition and subtraction and multiplication and division.