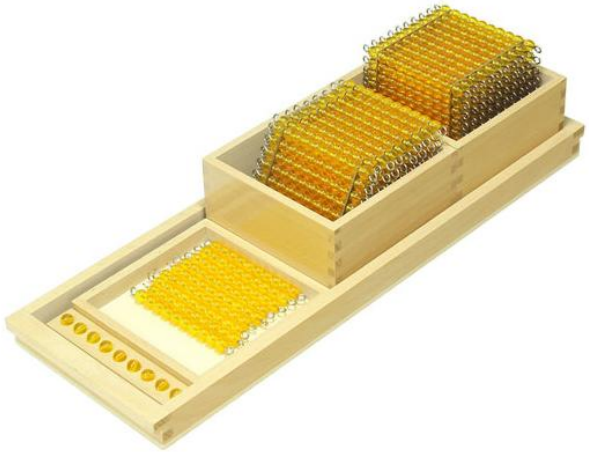
Grade Level	Content Area	Course Title *(9-12 Samples Only)*	Unit Title
Second	**Mathematics**	**N/A**	Equivalent Quantities
Length of Unit	**Time of Year Taught**	**Expected Prior Knowledge**	
2 – 4 weeks	fall	Experience working with quantities through 1000 using Montessori golden bead materials and Montessori long chains	
Unit Description			
Using Montessori golden bead materials and bead bars, students will construct various models for quantities through 1000 and record the equations.			

Strand(s), Concept(s), and PO(s)	**M01-S3-C3-PO1** **Strand 3:** Patterns, Algebra & Functions **Concept 3:** Algebraic Representations Represent and analyze mathematical situations and structures using algebraic representations. **PO 1.** Record equivalent forms of whole numbers to 100 by constructing models and using numbers.
Summative Assessment	When given two quantities between 100 and 1000, students will show five different ways to represent each using Montessori golden bead material and/or Montessori bead bars. Each equation will be recorded (e.g. 543=500+40+3, 543=200+303+40, 543=23+20+100+400, 543=221+322, 543=100+100+100+200+10+30+3)
Assessment Scoring	Assessments will be scored with the attached rubric.
Materials/Resources Needed	• Montessori golden bead materials: a box of single golden beads representing units, a container of bars consisting of ten unit beads joined together representing tens, a set of squares consisting of ten ten-bars joined together representing hundreds, a cube consisting of ten hundreds joined together representing one thousand. • Numeral cards 1 - 9, 10 – 90, 100 - 900, and 1000 which can overlap to form numbers such as 547. • Montessori bead bars: a box containing ten compartments, each of which contains a set of colored bead bars (e.g. A compartment of one-bars with one bead, a compartment of two-bars with two beads,… a compartment of ten-bars similar to the Montessori golden beads

	• Teacher-made problem cards such as 425+217=_. **Montessori Bead Bars**  **Montessori Golden Beads**

	Lesson 1	**Lesson 2**	**Lesson 3**	**Lesson 4**	**Lesson 5**
Lesson Instruction	Golden Bead Quantities Show and identify the 1000 cube. Elicit from the students that it is composed of ten hundreds. Show the students how to write that 1000 = 100+100+100+100+100+100+100+ 100+100+100. Have a student compose a number	Grouping Golden Beads Lesson1 Check for student's understanding of lesson 1by having them form quantities and record equations. Introduce the idea that some of the hundreds, tens and/or units could be grouped thus changing the equations. Have a	Grouping Golden Beads Lesson 2 Check for student's understanding of lesson 2by having them form quantities and record equations. Introduce the idea that hundred, tens and unit could be grouped together thus again changing the equation. Have a student group	Golden Beads and Bead Bars Have a student compose a number with the cards. Have another student form the quantity using golden bead for the hundreds and tens and bead bars for the units (e.g. 237 would be two hundreds, three tens, and a seven-bar). Have the students	Problem Cards Show the students the sets of problem cards. Show the first problem on card 1(e.g. 425+217=_). Have a student put out the golden beads and bead bars for the problem (e.g. four hundreds, two tens, and a five-bar plus two hundreds, one ten and

	with the cards (e.g. 423). Take the cards apart to show that 423=400+20+3 and write the equation. Have a student put out the golden beads for the quantity (e.g. 423 is 4 hundreds, 2 tens, and 3 units). Show that 423 can be written as 423=100+100+100+100+10+10+1+1+1. Note that the two equations are equal (e.g. 400+20+3=100+100+100+100+10+10+1+1+1). Do other examples with the students.	student group some of the units together (e.g. 423 could now be written as 423=100+100+100+100+10+10+2=1). Record the new equation. Have another student group some of the tens (e.g. 423 can be written as 423=100+100+100+100+20+2+1). Record the new equation. Have a student group some of the hundreds (e.g. 423 can be written 423=200+200+20+2+1). Note that the equations are equal (e.g. 100+100+100+100+20+2+1=200+200+20+2+1). Challenge the students to find many possible ways to form and write the number as a combination of other numbers. Do a few other examples with the students.	some of the units and tens together (423 could now be written as 423=100+100+100+100+12+10+1). Record the new equation. Have another student group hundreds and tens (e.g. 423=310+100+12+1). Record the new equation. Note that the two equations are equal (e.g. 100+100+100+100+12+10+1=310+100+12+1). Challenge the students to find many possible ways to form and write the number as a combination of other numbers. Do a few other examples with the students.	examine the hundreds and tens to group them. Have them also examine the units. What other bead bars would be equivalent? (e.g. 237 could be represented with two hundreds, three tens, a five-bar and a two-bar which could be grouped as 125+112 or could be grouped as 105+ 120+12). Note that the equalities (e.g. 125+112=105+120+12). Challenge the students to find many possible ways to form and write the number as a combination of other numbers. Do a few other examples with the students.	a seven-bar). Record the equation including the answer (e.g.425+217=642). Ask if each addend could be formed in a different way (e.g. 425 could be 215+210 and 217 could be 203+14). Record the new equation. (e.g. 215+210+203+14=642). Note that the two equations are equal (e.g. 425+217=215+210+203+14). Do a few other examples with the students.

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5
Student Activities	Working in pairs, one student forms a number with the numeral cards. The other student decomposes the number and put out the appropriate golden bead materials. Both students record the equations. The students reverse roles and continue.	Working in pairs, one student forms a number with the numeral cards. The other student decomposes the number and put out the appropriate golden bead materials. Students take turns grouping the hundreds, tens, and units to represent the number. Both students record the equations. The students reverse roles and continue.	Working in pairs, one student forms a number with the numeral cards. The other student decomposes the number and put out the appropriate golden bead materials. Students take turns grouping the hundreds, tens, and units together to represent the number. Both students record the equations. The students reverse roles and continue.	Working in pairs, one student forms a number with the numeral cards. The other student decomposes the number and put out the appropriate golden bead and bead bar materials. Students take turns finding equivalent bead bars for the units then grouping the hundreds, tens, and units together to represent the number. Both students record the equations. The students reverse roles and continue.	A student chooses a problem card, forms the problem with golden beads and bead bars, finds the sum, and records the equation. He then replaces each addend with an equivalent amount, places the golden beads and bead bars, and records the new equations.

Summative Assessment

When given two quantities up to 1000, students will show five different ways to represent each using Montessori golden bead material and/or Montessori bead bars. Each equation will be recorded (e.g. 543=500+40+3, 543=200+303+40, 543=23+20+100+400, 543=221+322, 543=100+100+100+200+10+30+3)
Students will be given points for demonstrating accuracy based on the following scoring: 3 POINTS OR MORE IS CONSIDERED MASTERY

4 points will be given if:
9/10 of the golden bead and/or bead bar models are correct.
9/10 equations are correct and match the models.

3 points will be given if:
8/10 of the golden bead and/or bead bar models are correct.
8/10 equations are correct and match the models.

2 points will be given if:
7/10 of the golden bead and/or bead bar models are correct.
7/10 equations are correct and match the models.
THIS STUDENT REQUIRES INTERVENTION BY TEACHER DIRECTLY WITH ADDITIONAL LESSON, OR PREVIOUS LESSON IN SEQUENCE.

1 point will be given if:
6/10 or less of the golden bead and/or bead bar models are correct.
6/10 or less equations are correct and match the models.
THIS STUDENT REQUIRES INTERVENTION BY TEACHER DIRECTLY WITH ADDITIONAL LESSON, OR PREVIOUS LESSON IN SEQUENCE.

Score: _____
16

Student _____

Assessor _____

Date _____

Assessment Rubric
Second Grade Mathematics - Equivalent Quantities

	Exceeding (4 points)	**Meeting (3 points)**	**Needing Additional Practice (2 points)**	**Needing Intervention (1 point)**	**Score**
Quantity #1: Number of Equations correct	10-9	8	7	6	
Quantity #1: Number of Equations meet the models	10-9	8	7	6	
Quantity #2: Number of Equations correct	10-9	8	7	6	
Quantity #2: Number of Equations meet the models	10-9	8	7	6	

Grading Scale:

Classification	**Points**
Exceeding	15 - 16
Meeting	13 - 14
Needing Additional Practice	11 - 12
Needing Intervention	10 and lower