Grade Level	Content Area	Course Title *(9-12 Samples Only)*	Unit Title
First	**Mathematics**	**N/A**	Equivalent Quantities

Length of Unit	Time of Year Taught	Expected Prior Knowledge
3 – 6 weeks	Fall	Experience working with quantities 1 -100 using Montessori teen and tens boards, Montessori short bead chains, and Montessori hundred board

Unit Description

Using Montessori golden bead materials and bead bars, students will construct various models for quantities through 100 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 up to 100, 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. 35 = 10 + 10 + 10 + 5, 35 = 20 + 15, 35 = 5 + 5 + 5 + 5 + 5 + 5 + 5, 35 -10 + 20 +5, 35 = 20 + 5 + 5 + 5)
Assessment Scoring	Assessments will be scored with the attached rubric. A score of 4 represents “exceeding,” 3 “meeting,” 2 “needs additional practice,” 1 “needs intervention.”
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, and a square consisting of ten ten-bars joined together representing one hundred. • Numeral cards 1 - 9, 10 – 90, and 100 which can overlap to form numbers such as 47. • 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 • Bead bar exercise cards: teacher-made cards with problems such as 5+7+4=_ or 26+59_

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5
Lesson Instruction	Golden Bead Quantities The students have worked with the golden bead units and tens with the Montessori teens and tens boards. Show and identify the 100 square. Elicit from the students that it is composed of ten ten-bars. Show the students how to write that 100 = 10+10+10+10+10+10+ 10+10+10+10. Have a student compose a numeral with the cards (e.g. 32). Take the cards apart to show that 32=30+2 and write the equation. Have a student put out the golden beads for the quantity (e.g. 32 is 3 tens and 2 units). Show that 32 can be written as 32=10+10+`10+1+1. Note that the two equations are equal (e.g. 30+2=10+10+10+1+1). Do other examples with the students.	Grouping Golden Beads Check for student's understanding of lesson 1by having them form quantities and record equations. Introduce the idea that some of the tens and/or units could be grouped thus changing the equations. Have a student group some of the units together (e.g. 32 can now be written as 32=10+10+10+2). Record the new equation. Have another student group some of the tens (e.g. 32 can be written as 32=20+10+2). Record the new equation. Note that the equations are equal (e.g. 10+10+10+2=20+ 10+2). Challenge the students to find as many ways as possible to form and write the number as a combination of other numbers. Do a few other examples with the students.	Quantities with Bead Bars The students have worked with the Montessori bead bars with the teens board and short chains. Have a student form a quantity with the numeral cards (e.g. 15). Ask another student to put out bead bars to equal that quantity (e.g. a ten and a five). Record the equation (e.g. 15=10+5). Ask if there is another way to form the quantity (e.g. 3 five-bars, 5 three-bars, 7 two-bars and a one-bar). Record the equations (e.g. 15=5+5+5). Note that two equations are equal (e.g. 10+5=5+5+5). Do a few other examples with the students.	Grouping Bead Bars Check for student's understanding of lesson 3by having them form quantities and record equations. Introduce the idea that some of the bead bars could be grouped thus changing the equations. Have a student group some of the bead bars together (e.g. 15 can be made with 5 three-bars. If 3 three-bars are grouped 15=9+3+3). Record the new equation. Note that the two equations are equal (e.g. 3+3+3+3+3=9+3+3). Challenge the students to find as many ways as possible to form and write the number as a combination of other numbers. Do a few other examples with the students.	Bead Bar Exercise Cards Show the students the sets of bead bar exercise cards. Show the first problem on card 1(e.g. 5+7+4=_). Have a student put out bead bars for the problem and answer (e.g. a five-bar, a seven-bar, and a four-bar = a ten-bar and a six-bar). Record the equation (e.g. 5+7+4=16). Ask if each addend could be formed in a different way (e.g. 5 could be 3+2, 7 could be 2+5, and 4 could be 3+1). Record the new equation. (e.g. 3+2+2+5+3+1=16). Note that the two equations are equal (e.g. 5+7+4=3+2+2+5+3+1). 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 tens, units, or both 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 students take turns making the number with bead bars. 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 makes the number with bead bars. The students take turns combining bead bars to construct the number. Both students record the equations. The students reverse roles and continue.	A student chooses a bead bar exercise card, forms each problem with bead bars and finds the sum and records the equation. He then replaces each addend with an equivalent amount, places the 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.
Examples:
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
First Grade Mathematics - Equivalent Quantities

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

Grading Scale:

Classification	**Points**	**Percentage**
Exceeding	14.4 - 16	90-100%
Meeting	12.8 - 14.3	80-89%
Needing Additional Practice	11.2 – 12.6	70-79%
Needing Intervention	11.1 and lower	0-69%