Grade Level	**Content Area**	**Course Title** *(For 9-12 Samples Only)*	**Unit Title**
Grade 4	Mathematics		Taming Multiplication Problems

Length of Unit	**Time of Year Taught**	**Expected Prior Knowledge**
4 Days	2nd quarter of first semester	Add and subtract whole numbers to four digits. Multiply and divide whole numbers Multiplication: 12s table. Division: division by 12. Be familiar and be able to use a variety of problem solving strategies: guess and check, draw a picture, make a table, make a number sentence, find a pattern, using manipultives, and working backwards.

Unit Description

Problem solving focuses on the following aspects: Identifying key words in the problem (the information given and the question asked), being able to identify the concept (what are the triggers that signal that the problem is a multiplication problem), and the equation needed to solve the problem. Prior to solving problems, the student needs to understand the concepts that signal a multiplication problem – such as "each, total, times, sets, groups, rows, columns, and arrays." Problem solving strategies play an important role in solving problems. Use of manipulatives, working backwards, and making a picture are some of the many helpful tools to solve a multiplication word problem. This unit focuses on strategies to solve multiplication problems.

Bloom's taxonomy target: Application. Upon acquiring knowledge and understanding multiplication concepts, the student applies their knowledge to solving problems. These problems can be logic problems, multiplication sentence problems, and/or word problems in which multiplication problem solving strategies need to be identified and used.

Standards: Common Core Domain: Operations and Algebraic Thinking **Standard #1 Cluster:** Use the four operations with whole numbers to solve problems **Standard #1:**	**Standard #1:** Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

Summative Assessment	Students will be assessed based on teacher observation and their written ability to • Display different methods to represent multiplication: sets, arrays, rows & columns, and number sentences • To solve multiplication word problems using multiple strategies
Assessment Scoring	Students will be assessed on the following scale: A (90 – 100%), B (80 – 89%), C (70 – 79%), D (60 – 69%), and F (59% and below). A total of 9 points represents unit mastery. 11 - 10 points = A, 9 points = B, 8 points = C, 6 - 7 points = D, 5 points and below = F The summative assessment is derived from **Saxon Math 5/4** Lesson 49 (11 questions – 1 point each)
Materials/Resources Needed	***One Hundred Hungry Ants*** by Elinor Pinczes; counters; yarn; student work mats; "Equal Sets" activity sheet; Unifix cubes; toothpicks; index cards; "Intersection Stoplights" activity sheet; in-class computer; projector; PowerPoint presentation, "How to Tame Those Beastly Multiplication Word Problems"; **Saxon Math 5/4** textbook; individual computers for each student (or one computer for every student pair); internet access; and "BBC Multiplication" worksheet.

This table is consistent with the methods of instruction and assessment described in the narrative.

	Lesson 1 (Day 1)	Lesson 2 (Day 2)	Lesson 3 (Day 3)	Lesson 4 (Day 4)
Instruction and Timeline	Activate Prior Knowledge: Obtain from the Phoenix public library, ***One Hundred Hungry Ants*** by Elinor Pinczes. Read the book through one time. Read the story again, but this time as the ants arrange themselves in different groups, ask the students to tell you the multiplication number sentence; for example, "There are five rows of 20 ants."	Introduce the lesson: Remind students of the book read yesterday and the many ways that the ants made 100. Solicit answers as to how 100 was made by the ants. Provide the children with Unifix cubes. Ask the children to arrange a set of 24 Unifix cubes into arrays in as many ways as possible. As necessary, remind them that columns go up and down, and rows go across. Ask them to record the number of rows and columns each array contains. Have the children share their results.	Introduce the Lesson: Have the students view the PowerPoint presentation "How to Tame Those Beastly Multiplication Word Problems." Use the classroom computer and projector. Guided Practice: Using the **Saxon Math 5/4** textbook, introduce Lesson 49, "Stories	Practice multiplication word problems and multiplication logic problems using computer math games. Using the in-class computer and projector, go to websites: "BBC Camel Times Table," *http://www.bbc.co.uk/schools/ks1bitesize/numeracy/multiplication/index.shtml* and "IXL Multiplication

	Provide students with 150 counters, 12 pieces of yarn, and a work mat. Tell them that they will be making equal sets and finding out how many counters there are in all. Ask them to make 5 sets of 4 counters, with each set inside its own yarn circle. Observe student work. Then tell them to determine in any way they wish how many counters they have used – note those that use counting, those that use an addition sentence, those that use skip counting, and those that use a multiplication sentence. Have students share their different methods. Next draw on the board an empty table with several rows and three columns. Label the three columns "Number of Sets, Number in Each Set, and Number in All". Using their 5 sets of 4 counter displays, have them suggest what will go in each column (5, 4, and 20). Hand out to each student the pre-made activity sheet, "Equal Sets." Then have them work in pairs to create new equal set models. When the students have identified the product, have them enter their	Guided Practice: Next, present the children with toothpicks and an index card. Ask them to place four toothpicks in parallel columns on the index card. Remind students as to what parallel means as necessary. Then ask them to place 3 toothpicks across the four columns at right angles. Explain that this represents a map of a town — the horizontal toothpicks represent streets, and the vertical toothpicks represent avenues, so this model shows four streets crossed by three avenues. Have them predict how many stoplights would be needed if one were placed at each intersection. Then, have them check their predictions. Ask the students, "How many stoplights are needed if there are no avenues? Will that always be true?" [If there are no avenues, no stoplights are needed.] Ask the students, "How many stoplights are needed when there is only one avenue?" [The number of stoplights will be equal to the number of streets. Independent Practice: Have the students try other numbers of streets and avenues and to again predict how many stoplights that would be needed. Have them record their information on the "Intersection Stoplights" activity chart with columns headed Number of	About Equal Groups, Part 1." When reviewing the sample problems focus on the patterns and key trigger words: each, groups, total Summative Assessment: **Saxon Math 5/4**, Lesson 49: "Stories About Equal Groups, Part 1," pp 226 – 227, Problems a, b, c, 1, 2, 3, 4, 8, 18, 20, and 22. Note to the Teacher: This is the student's first introduction to concept of multiplication word problems using the Saxon textbook. The concept of multiplication problem solving will continue to be taught with increasing difficulty in Saxon Lessons 52, 57, 83, and 94.	Word Problems," *http://www.ixl.com/math/grade-3/multiplication-word-problems-facts-to-12* and "Illuminations Product Game," *http://illuminations.nctm.org/ActivityDetail.aspx?ID=29* Model how to use the program games. Arrange for students to have their own computer (or two students for every one computer) such that each student (or pairs of students) can play on their own game. After playing the games, have the children complete the worksheet, "BBC Multiplication," word problems. Encourage the students to use the problem solving strategies of looking for a pattern, writing a number sentence, and working backwards. When reviewing the sample problems focus on the patterns and key trigger

	findings on their activity sheet. Provide individual help as necessary.	Streets, Number of Avenues, and Number of Stoplights.		words: each, groups, total
Student Activities and Timeline	Students will participate by giving oral answers to literature multiplication lesson, ***One Hundred Hungry Ants*** by Elinor Pinczes. Students will make a multiplication sets using counter manipulatives and yarn. Students will then identify corresponding multiplication sentences.	Students will make multiplication arrays (rows and columns) using Unifix cubes and then toothpicks. Students will begin to relate the array to a multiplication number sentence. Students will practice making arrays and corresponding multiplication number sentences. .	Students will listen and engage in the multiplication problem solving PowerPoint presentation. Students will build on their understanding by engaging in the Saxon Lesson 49 and complete for summative assessment problems from that lesson.	Students will play the three on-line games to practice their multiplication problem solving skills. Students will complete the worksheet, “BBC Multiplication.”

Saxon Math 5/4

Lesson 49: Stories About Equal Groups, Part 1

Lesson Practice:

Practice set Solve each "equal groups" problem. Write a multiplication pattern for each problem.

a. There were 8 birds in each flock. There were 6 flocks. How many birds were there in all?

b. There are 6 people in each car. There are 9 cars. How many people are there in all?

c. Four dozen doughnuts is how many doughnuts?

Mixed Practice:

Problem set

1. There were 8 boys in each row. There were 4 rows. How many boys were in all 4 rows? Write a multiplication pattern and solve the problem.

2. There were 7 girls in each row. There were 9 rows. How many girls were in all 9 rows? Write a multiplication pattern and solve the problem.

3. Write four multiplication/division facts using the numbers 5, 6, and 30.

4. The bigger animal weighed four hundred seventy-five pounds. The smaller animal weighed one hundred eleven pounds. How much more did the bigger animal weigh?

8. Draw a rectangle that is 4 cm by 2 cm and shade 7/8 of it.

18. 6N = 30

20. 45 x 6

22. $34 x 8

Saxon Math 5/4

Lesson 49: Stories About Equal Groups, Part 1

Lesson Practice:

Practice set Solve each "equal groups" problem. Write a multiplication pattern for each problem.

a. There were 8 birds in each flock. There were 6 flocks. How many birds were there in all?
Number of groups x number in each group = total; 6 x 8 = 48 birds

b. There are 6 people in each car. There are 9 cars. How many people are there in all?
Number of groups x number in each group = total; 9 x 6 = 54 people

c. Four dozen doughnuts is how many doughnuts?
Number of groups x number in each group = total; 4 x 12 = 48 doughnuts

Mixed Practice:

Problem set

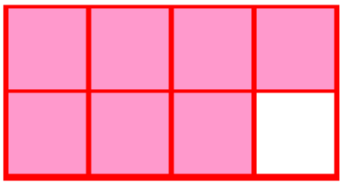
1. There were 8 boys in each row. There were 4 rows. How many boys were in all 4 rows? Write a multiplication pattern and solve the problem.
Number of groups x number in each group = total; 4 x 8 = 32 boys

2. There were 7 girls in each row. There were 9 rows. How many girls were in all 9 rows? Write a multiplication pattern and solve the problem.
Number of groups x number in each group = total; 9 x 7 = 63 girls

3. Write four multiplication/division facts using the numbers 5, 6, and 30.
5 x 6 = 30; 6 x 5 = 30; $30 \div 5 = 6$; $30 \div 6 = 5$

4. The bigger animal weighed four hundred seventy-five pounds. The smaller animal weighed one hundred eleven pounds. How much more did the bigger animal weigh?
364 pounds

8. Draw a rectangle that is 4 cm by 2 cm and shade 7/8 of it.



18. 6N = 30 N = 5

20. 45 x 6 270

22. $34 x 8 $272

Grading and Scoring Rubric for 4th Grade Math

Students will be assessed based on teacher observation and their written ability to

- Display different methods to represent multiplication: sets, arrays, rows & columns, and number sentences
- To solve multiplication word problems using multiple strategies

Grade	Number of Answers correct
A	10-11
B	9
C	8
D	6-7
F	5 and below

Mastery is at 80% and above (9 or more questions answered correctly)