

NCSC UDL Unit Concept Reinforcement Activity for Math HS Lesson 4

*If the student has not had experience (or has had very little experience) with the concepts of ratios and unit rates, it might be helpful to provide instruction using this Concept Reinforcement Activity (CRA) before the Introduction to Lesson 4. It might be helpful to provide the exploratory activity both before starting Lesson 4 and again after the Body of Lesson 4. Provide the scripted activity and data collection prior to the Practice of Lesson 4. Just as with any other student, it is unlikely that he/she will learn these concepts or skills after being instructed only once so you can provide this activity at other times during the unit. But do not expect or require mastery of this CRA before the student takes part in the unit. The CRA is supplemental instruction and should only be provided **in addition to** the instruction in the unit; it does not take the place of the unit.*

**If during the course of your instruction, you find that the student could use more instruction on finding the area and perimeter of 2-dimensional rectangular shapes, refer back to the scripted activity about area and perimeter in the elementary school unit Concept Reinforcement Activity.*

Key Vocabulary: The following key vocabulary terms are used in the reinforcement activities and the unit. It is important to provide these terms in the student’s communication system and describe the meaning using the definitions in the unit as provided or paraphrased as needed. The purpose is to build understanding of the terms rather than teaching the student to recite the definitions. For example, when identifying the ratio of one area to another area, consistently state, “Let’s find the ratio; that is when we compare two things to each other.” Model the use of the communication system when talking about area and complex shapes.

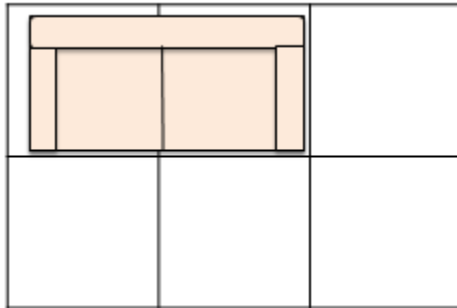
Unit Definition	Possible Paraphrased Definition
Area – the amount of space an object occupies	Area – the space inside the edges of a figure
Perimeter – the distance around a figure along its edges	Perimeter – the edges around a figure
Ratio – a compared relationship between two numbers	Ratio – two things compared to each other
Unit Rate – A ratio with the second term being a unit of one. For example, miles per hour, dollars per hour, etc.	Unit Rate – how many of the first thing compares to one of the other. For example, how many miles can you drive in one hour or

	how many dollars can you earn in one hour.
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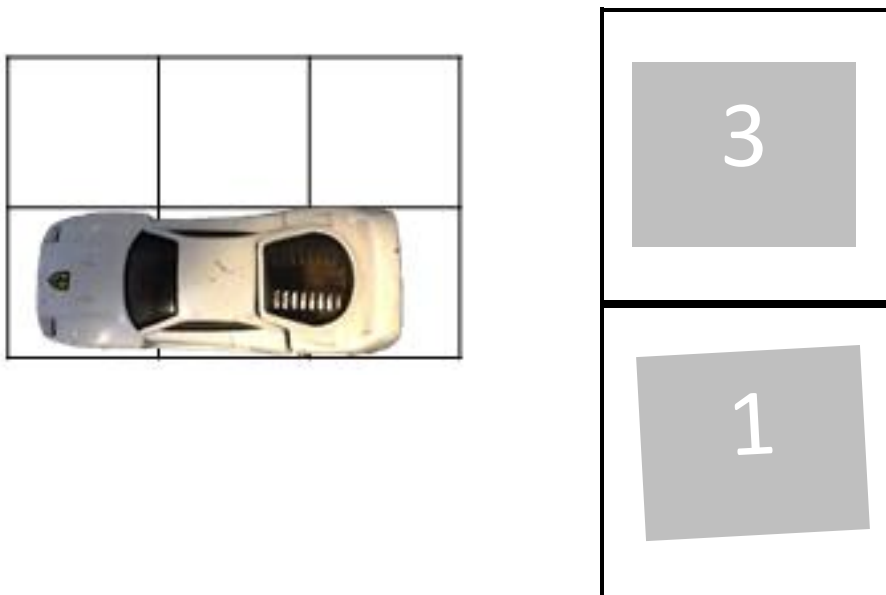
Exploratory Activity

Purpose: The orientation activity is designed to build an understanding of unit rates.

1. Provide and show how to express examples of unit rate using tangible examples as much as possible. Possible examples:
 - a. 50¢ for one can of soft drink
 - b. \$3.00 for 1lb of oranges
 - c. \$5.00 for 1 hour of work
2. Demonstrate unit rate using area by providing a grid or a Geoboard and pictures of people or objects. For example: 2 units/1 loveseat; 3 units/1 car



3. Assist the student in placing the pictures or objects on the grid, counting the units and writing or placing correct number in a template. Example:



Scripted Activity with Data Collection

Purpose: This activity is designed to provide extra practice to learn or refine the skills of using a single unit rate to determine an unknown quantity. You can use this activity to reinforce the skills and concepts of multiplication, ratio, and (by selecting different types or activities using unit rate) area, money skills, time, etc.

There are three versions of this activity – Version A, Version B, and Version C. Each version follows the same instructional script but the materials are different (provide whatever individualized supports your student needs to interact with the materials). Use as many versions of the activity as your student needs to further develop the skill; you may need to only do one version or you may need to do all three. Mastery of this skill is not expected nor required to continue working within this unit. Instead, this activity should be used solely as practice whenever it can be worked in during instruction on the unit or at other times during the school day. It does not take the place of instruction with peers on the UDL unit; it supplements that instruction.

Based upon the student and the skill, choose any one of the instructional strategies from the NCSC Instructional Resource Guide to use during instruction throughout the practice activity. Use the data to give you more information on what part of the skill the student may need more focused instruction on throughout the unit.

<i>Materials and Directions for Teacher</i>				
<p>Version A: manipulatives, photos, etc. to illustrate the unit rate problem (optional: calculator, multiplication table)</p> <p>Version B: manipulatives, photos, etc. to illustrate a different unit rate problem than the one in Version A (optional: calculator, multiplication table)</p> <p>Version C: manipulatives, photos, etc. to illustrate a different unit rate problem than the ones in Versions A & B (optional: calculator, multiplication table)</p> <p><i>Hint: Vary the type of unit rate problem in each version (quantity/price, pay or work/hour or day, miles/gallon, space/object, etc.) to help your student develop a broader concept of using unit rate.</i></p>				
<i>Instructional Cue</i>	<i>Student Expected Response</i>	<i>Version A Date:</i>	<i>Version B Date:</i>	<i>Version C Date:</i>

<p>As you read the script, model counting the sets and writing the ratio you are describing.</p> <p>Let's review how to write a ratio. A ratio shows two things compared to each other. If I want to compare (insert name of first set) to (insert the name of the second set), I have to count each set. First I count the first set and write that number down. Then I count the second set and write that number down. Then I separate the numbers with either :, /, or "to." Now you do it.</p>	<p>Student counts each set, writes the numbers down and separates them with :, /, or "to."</p>			
<p>As you read the script, model counting the sets and writing the ratio you are describing.</p> <p>When we work with unit rate we have a special kind of ratio called a single unit rate. A single unit rate always has the number "1" as the number of the second set. If I want to make a ratio showing a single unit rate like (insert name of first set) "to" 1 (insert name of second set), I count the first set and write that number down and then I write down the number "1" which stands for the second set (remember that in a single unit rate the second set or number is always "1"). Then I separate the first number and the number "1" with either:, /, or "to." Now you do it.</p>	<p>Student counts the first set, writes the number down, writes the number "1", and separates the two numbers with either:, /, or "to."</p>			
<p>As you read the script, demonstrate how to write the problem; you can use another number other than "3" in the script and in the problem but do not use "1"; step-by-step assist the student in writing the problem when you get to the "Now you do it" part (do not take data about the student's performance here as writing the problem is not something he/she is expected to do).</p>	<p>Student writes the problem</p>			

<p>When you know what 1 thing is compared to (which is single unit rate) you can figure out what more of those same things would be compared to. So if I know that (insert number and name of first set) is compared to 1 (insert name of second set), I can figure out how many (insert name of first set) would be compared to 3 (insert name of second set). I would write that problem like this:</p> $\frac{\#(\text{insert actual number and name of set})}{1(\text{insert name of set})} = \frac{x(\text{insert name of set})}{3(\text{insert name of set})}$ <p>Now you do it.</p> <p>(An example of the problem you would write is: $\frac{4 \text{ peppermints}}{\\$1} = \frac{x \text{ peppermints}}{\\$3}$.)</p>			
<p>Show the student the number of the first set in the first ratio as you read the script.</p> <p>So to solve for X in this problem, I need to multiply the number of the first set in the first ratio by the number of the second set in the second ratio. This is the number of the first set in the first ratio. Show me the number of the first set in the first ratio.</p>	<p>Student indicates the number of the first set in the first ratio.</p>		
<p>Show the student the number of the second set in the second ratio as you read the script.</p> <p>This is the number of the second set in the second ratio. Show me the number of the second set in the second ratio.</p>	<p>Student indicates the number of the second set in the second ratio.</p>		
<p>Demonstrate how to multiply the two numbers as you read the script, using the same method as the student will be using (e.g., mental math, multiplication table, calculator, etc.).</p> <p>I need to multiply the number of the first set in the first ratio by the number of the second set in the second ratio. The answer to</p>	<p>Student multiplies the number of the first set in the first ratio by the number of the second set in the second ratio.</p>		

<i>the problem is (insert the product or answer to the multiplication problem). Now you do it.</i>				
<p><i>Demonstrate how to rewrite the problem with the product in place of X in the second ratio.</i></p> <p><i>I can rewrite the problem like this by putting the answer to the multiplication problem in place of X. Now you do it.</i></p>	Student rewrites the problem and puts the answer to the multiplication problem in place of X.			

Transition Activity: Back to the UDL Lesson

To help the student develop an understanding of unit ratio and equivalent ratios and to work within the UDL unit, it might be helpful to provide the exploratory activity both before starting *Lesson 4* and again after the *Practice of Lesson 4*. Have the student complete the activities in the Introduction, the Body and the Practice using:

- appropriate systematic instruction as needed;
- communication system terminology or symbols;
- grid or geoboard used in the orientation activity; and
- Additional Considerations for Emerging Readers and Emerging Communicators provided at the end of the lesson (e.g., using a template to express the ratio).