

## NCSC UDL Unit Concept Reinforcement Activity for Math HS Lesson 2

*If the student has not had experience (or has had very little experience) with the concepts of ratios and proportions, it might be helpful to provide instruction using this Concept Reinforcement Activity (CRA) before the Introduction to Lesson 2. It might be helpful to provide the exploratory activity both before starting Lesson 2 and again after the Introduction of Lesson 2. Provide the scripted activity and data collection prior to the Body of Lesson 2. 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 of 2-dimensional rectangular shape (that would include calculation of area using a formula and understanding the concept of area), refer back to the scripted activity about area 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
<b>Area</b> – the amount of space an object occupies	<b>Area</b> – the space inside the edges of a figure
<b>Length</b> - a measurement of the distance from one point to another	<b>Length</b> – how long something is from one point to another
<b>Ratio</b> – a compared relationship between two numbers	<b>Ratio</b> – two things compared to each other
<b>Width</b> – measurement of the distance from one side or edge to the opposite side or edge	<b>Width</b> – how wide something is from one side to the other

## Exploratory Activity

*Purpose: The orientation activity is designed to build an understanding of ratios of two areas*

1. Provide practice with multiple opportunities to compare two amounts using familiar materials. Possible examples:
  - a. Red candies to green candies
  - b. Boys to girls
  - c. Pencils to pens
2. Demonstrate how the ratio can be expressed (e.g., with pictures, 2:4, 2 to 4,  $2/4$ ).
3. Review the description of area verbally and in some type of concrete representation (e.g., drawing of a rectangle with the edges being one color or texture and the middle being a different color texture; label each part of the rectangle).

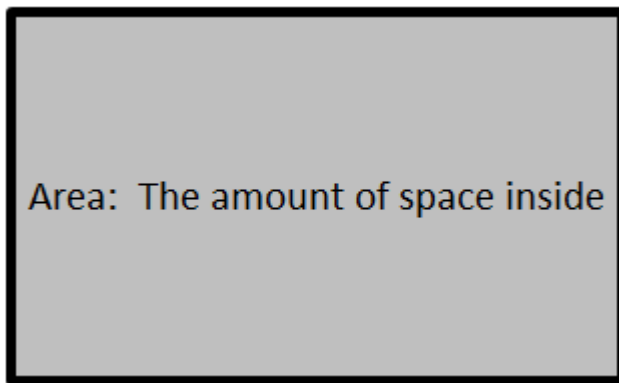


Figure 1 Example of representation of area

4. Provide a rectangle drawn on a grid or made on a geoboard.
5. Model placing a tile or cube in each cell and counting to determine the area.
6. Repeat steps 3 and 4 with a different rectangle.
7. Model comparison of the area of the first shape to the second shape using a ratio.
8. Model how to express the ratio.
9. Repeat steps 3 through 8 with additional rectangles.

10. Use systematic instruction (see NCSC Instructional Resource Guide) to teach the student to measure the area of two different rectangles and express the ratio of one to the other.

**Scripted Activity with Data Collection**

*Purpose: This activity is designed to provide extra practice to learn or refine the skill of expressing ratios which will be used throughout this unit. There are extra opportunities embedded for the student to work on solving a simple subtraction word problem (Version C), measuring width (Version B), and determining area (Version C)*

There are three versions – 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, but 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>
Version A: two sets of objects, photos, etc.
Version B: two sets of objects, photos, etc. that are different than in Version A
Version C: two sets of objects, photos, etc. that are different than in Versions A & B
<i>Hint: if you would like the student to practice measuring have the sets be about the number of units long or wide two objects are.</i>

Provide two objects or figures to measure and a ruler. If you would like the student to practice determining area, have the sets be about the number of square units two rectangles with different areas have. Provide two rectangular grids with inch cubes or paper squares to determine the area. Optionally, you might also provide a ruler, multiplication table, and/or a calculator.

Instructional Cue	Student Expected Response	Version A Date:	Version B Date:	Version C Date:
<p>As you read the script, indicate each of the sets the student will be comparing; demonstrate counting the first set.</p> <p><b>When we determine the compare two things with different numbers to make a ratio, we have to know how many of each thing there are. If I want to show the ratio of (insert name of first set) to (insert name of second set), I have to count the number of (insert name of first set). This first set has (insert number and name of set). Now you do it.</b></p>	<p>Student counts the number in the first set.</p>			
<p>As you read the script, demonstrate writing the number of the first set.</p> <p><b>When we make a ratio we always write down the number of the first set first. Now you do it.</b></p>	<p>The student writes the number of the first set.</p>			
<p>Demonstrate counting the second set.</p> <p><b>Now I have to count the number of (insert name of second set).</b></p>	<p>Student counts the number in the second set.</p>			

<p><b><i>This second set has (insert number and name of set). Now you do it.</i></b></p>				
<p><i>As you read the script, demonstrate writing the number of the second set; substitute the words “next” or “last” for the second “second” in the script if you think your student would understand one of those better.</i></p> <p><b><i>When we make a ratio we always write down the number of the second set second. Now you do it.</i></b></p>	<p>Student writes the number of the second set.</p>			
<p><i>Demonstrate separating the number of the first set and the number of the second set with /, :, or “to”; substitute the phrase “separate the two numbers with this” for “put this between the two numbers” in the script if you think your student would understand that better.</i></p> <p><b><i>To compare the number of the first set to the number of the second set and show it as a ratio, we put this between the two numbers. This shows the ratio of (insert name of first set) to (insert name of second set). Now you do it.</i></b></p>	<p>Student separates the number of the first set and the number of the second set with /, :, or “to”.</p>			

**Transition Activity: Back to the UDL Lesson**

To help the student develop an understanding of ratio of two areas and to work within the UDL unit, it might be helpful to provide the exploratory activity both before starting *Lesson 2* and again after the *Introduction of Lesson 2*. Have the student complete the activities in the *Introduction* and the *Body* 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).