Step 1: 5E Lesson Plan # __1___

Student Name: Jamie Samos	**Student Name:** Chris Wyatt	
Title of Lesson: Exploring Ratios with '3 Bean Salad' Recipes	**Date/Time to be Taught:** February 11, 10:45 – 11:30	
Mentor/Grade Level/Subject: Ms. Page's 6th grade Math class	**Length of Lesson (min.):** 45	**Using Technology?** YES or NO

1. **Performance Objectives/Expectations-** This is what you want your students to be able to do and know at the completion of the lesson. These should be measureable and clearly the focus of the lesson. (Remember to use Bloom's action verbs.) Begin each objective with:
   Students will be able to (SWBAT).

   SWBAT: *Express a relationship between numbers by writing ratios*
   SWBAT: *Explain why the order of the elements of a ratio is important*
   SWBAT: *Solve problems using ratios*

2. Define the **Vocabulary** that students will be expected to understand:

   RATIO – a comparison between numbers

3. List the primary Content and Practice **Standards –** *You may copy/paste these directly from online standards documents into the boxes below.*
   Common Core State Standards for Mathematics (corestandards.org/math), including at least one of the 8 "Math Practice Standards"
   Next Generation Science Standards (NGSS, nextgenscience.org), including at least one of the 8 Science/Engineering Practices

Standard Number	**Description** *(include only parts of standards that apply to your lesson – you may abbreviate/condense)*
6.RP.A1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
6.RP.A3	Use ratios to solve real world and mathematical problems.
Math Practice Standard #1	Make sense of problems and persevere insolving them.

5. **5E Template-** The table cells below will expand as needed.

Brief Objective to be written on board in classroom:

Using Ratios in Recipes

Introductory Statement: (what is the first thing you're going to say to the students regarding today's lesson…)

"Hello! I'm Ms. Samos and this is Mr. Wyatt, and we are from the University of Arkansas. We are going to do a lesson today about ratios by looking at recipes for '3 Bean Salads'."

	Teacher Plans to: (Include a detailed description of what you will do and say during instruction, and what you expect students to do.)	**Probing Questions, Potential Responses, & Misconceptions:** (What questions might you ask your students to elicit and guide their thinking? How might they respond?)
EST. TIME	**ENGAGE**	
15	Ask students to raise their hand and tell examples of ratios in everyday life. Ask "What is the ratio of boys to girls in the classroom today?" Ask students to write the answer on their whiteboards. Demonstration: Making Kool-aid! Discuss how the Kool-aid Recipe, uses a ratio with 3 elements as opposed to the more usual 2 **1 Kool-aid packet: 1 cup of sugar: 2 quarts water** Ask students to write a ratio to express the relationship of these 3 ingredients (1:1:2) on their whiteboards Take answers from the students, write the correct answer on the board, and **DISCUSS**.	Ask these questions about the boys to girls ratio: • Based on their answers, are there more girls or more boys? Is there another way to write this ratio? (simplifying ratios) • What can we tell from looking at a ratio? (Possible responses: there are more girls than boys) • Ex: what if the boys to girls ratio is 2:3. Does this mean that there are only 2 boys and 3 girls? • How many boys and girls could there could there be? (equivalent ratios of 4:6, 6:9, etc) • We did boys: girls, but what if we did blue: green: brown eyes. Couldn't we still compare those numbers? **DISCUSS:** • What would the Kool-aid taste like if I changed the ratio to 1:3:2? Explain your answer. • (Kool-aid would be really sweet because you've tripled the amount of sugar.) • Is there a way to add 3 cups of sugar yet have the Kool-aid not be too sweet? • (Yes—triple all the ingredients to get 3:3:6 ratio, which is

		equivalent to 1:1:2.) • How could we change the recipe to make the Kool-aid sour? • (Reduce sugar to 1:(1/2):2. • Is there a different way to make the Kool-aid sour without reducing the sugar? • (Add more Kool-aid packets, 3:1:2.)
EST. TIME	**EXPLORE**	
	Introduce bean salad recipe activity. Hand out worksheets, enough beans for each table, and a bowl mat for each student. Place the big laminated bean photos up on board in the order the ratio should be, so that everyone will write their ratios in the same order (with colons in between). Do problem #1 on the overhead or board. Ask students to work on problem #2 with a partner. After enough time, have a student explain their answer to rest of class. Students work on problems 3-8 alone, but can check answers with a partner. Make sure to circulate classroom to check answers/help students. Write the answers on the board (except for numbers 6 and 8) and ask the students to check. Choose a student to explain how they got their answer to one of the 'multiple answer' problems, #6 and 8.	• Explain that just like the Kool-aid example, this is a ratio that has 3 elements. • Did anyone do number two differently than the student who explained it to the class? • Did anyone solve it differently? • Is it possible for you both to be correct?
EST.	**EXPLAIN**	

TIME		
	Ask students: "After discussing the girl to boy ratio, discussing the ratio of koolaid, and the bean salad activity, can anyone raise their hand and tell us what they think a ratio is?" • Looking for an answer along the lines "comparing two quantities" Ask the students "Does the order in which you write the numbers in a ratio matter? Is a 2:3 ratio the same as a 3:2? • Would the bean salad taste different if we switched the order of the ratio?	How would you define ratio? Why does the order matter? (how would a different order change the recipe, or the taste of the Koolaid) Is a ratio the same thing as a fraction?
EST. TIME	**ELABORATE**	
	Lesson 2 (We will elaborate on ratios in Lesson 2 by introducing the special ratio between the circumference of a circle and its diameter, which is called pi.)	
EST. TIME	**EVALUATE**	
	Have students work problem 9 on the worksheet. Once the students finish, have them switch with their partners to solve their salad recipe problems. Exit Cards: (if we have enough time) • 1 thing you learned that you didn't already know • 1 thing that you already knew • 1 question that you still have	What were some problems that you ran into while making your own salad? Did your partner understand your directions?

6. List possible **safety** and/or classroom management issues related to this lesson, and explain how they will be handled in the classroom. Include instructions that will be delivered to the students.
Make sure students don't eat the beans, nor throw them!

(revised 6/2/16 KM)