Algebra/Geometry Institute Summer 2005
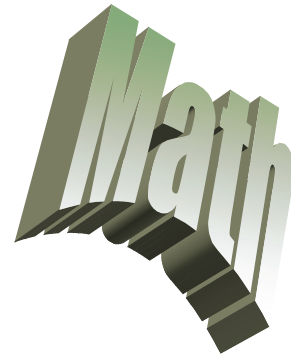
Lesson Plan 3: Ratios

Faculty Name: Steven Thompson
School: McEvans Elementary
Grade Level: 6th

1   Teaching objective(s)

Given ten problems, the students will determine whether ratios form a proportion and determine actual sizes of scale drawings with no more than two errors.

2   Instructional Activities

A. Introduction/Motivation
   1. Remind students of yesterday's lesson on ratios and unit rates.
   2. Pass out the students' tests from the yesterday.
      - Go over the test with the students and ask if they have any questions.
   3. Show the students a floor plan for a house.
      - Ask students if they know how to read a floor plan.
      - Tell the students carpenters use such ratios to design floor plans for our homes before they build them.
      - Inform students that these floor plans are called scale drawings.
      - Inform the students that the scale drawings are based on ratios.
   4. Tell students that it is important to be able to determine if ratios are proportional and read scale drawings because one day they will buy or rent a house. Tell students that sometimes they will have to look at the scale drawing to determine the actual size of the house.
   5. Inform students that by the end of the day, they will be able to determine if ratios are proportional and determine the actual size of figures using scale drawings.
   6. Tell the students to take out their KWL chart and fill in the K and W section for today's lesson on proportions and scale drawings.

B. Study Learning
   1. Write the meaning of proportion on the board (two equal ratios that are in the same units).
      - Tell students that when two ratios are equal such as 4/5 and and 12/15, they form a proportion. Tell the students that they can determine if ratios are a proportion by multiplying both

terms of the one ratio by the same number and get the terms of the second ratio. For example: 4x3=12 and 5x3=15. Tell students since 12 and 15 are the numbers in the second ratio, then 4/5 and 12/15 form a proportion.
   - Put more examples on the board and work them out for the students.
2. Tell the students that we can also determine if ratios are proportions by cross multiplying.
   - Tell the students that when we cross multiply, and the cross products are equal, then the ratios form proportion. For example, 3/5 and 12/20 form a proportion because 3x20=60 and 5x12=60. Since the cross products are equal, the ratios are equal.
   - Put more examples of using cross products to find proportions on the board. Ask students if they have any questions.
   - Explain to students how to solve proportions using cross products. Put examples on the board and go over them.
3. Show the students the floor plans that was shown to them in the introduction.
   - Inform the students that the scale drawing lets us know that the scale is 1cm=5 yards.
   - Tell the students that if we know that a bedroom is 4cm, then its actual size is 4x5= 20 yards because we have 4cm and each cm equals 5 yards.
   - Put more examples on the board using scale drawings and show the students how to work them step by step.
Ask students if they have any questions.

Guided Practice
1. Call out about five to ten pairs of ratios to the class.
   - Tell the students that I will call out two ratios, and they will use thumbs up if they think the ratios are proportions and thumbs down if they do not.
   - Go over each answer with the students and work it out on the board to explain why or why aren't the ratios a proportion.
   - Ask the students if they have any questions.

Independent Practice

1. Pass out a worksheet on scale drawings to the students.
   - Tell the students to solve the problems using the scale drawing on the page.
   - Allow about ten minutes for the students to complete the worksheet.
   - Go over the sheet with the students. Ask if they have any questions.

C. Culmination/Closure
1. Divide the students into three groups according to their learning
   styles: Group 1- Ratios, Group 2 -Proportions and Group 3-Percents.
   - Tell the students to look at the grouping chart.
   - Tell the students that we will be working in groups today.
   - Remind the students of the group rules.
2. Tell each group where they will work in the room.
   - Allow students to go to their assign places.
   - Inform the students that I will come around to each group and
     give the directions. Remind the groups to remain quiet until I
     come to their group.
3. Pass out a bag of skittles and construction paper to each group.

- Go to the Ratio group and give them directions on a handout.
     The handout will inform them to determine the ratio of
     orange to red skittles and red to purple skittles. The students
     will write the ratios on the paper and illustrate the ratios using
     the skittles, and determine if the ratios are a proportion. Inform
     the students that they will have to show their work to the class.
   - Go to the Proportions group and tell them to determine the ratio
      of red to yellow skittles and purple to orange skittles. Tell the
      students to illustrate the ratios by using the skittles and
      determine if the ratios are a proportion. Tell the students that
      they will have to tell the class their ratios and whether they are
      proportion or not.
    - Go to the Percents group and tell them to determine the ratio
      of green to yellow skittles and purple to yellow skittles. Tell the
      students to illustrate the ratios by using the skittles and
      determine if the ratios are a proportion. Inform the group that
      they will have to demonstrate the ratios by using their
      classmates. Give the example 3/5, tell the students that they
      will have to put three classmates on one side and five classmates
       on the other side to represent the ratio of 3 to 5.
  4. Ask students if they have any questions.
     - Allow time for the students to complete the activity and share
       with the class.

D. Follow-Up
1. Tell each student to take everything off their desk.
   - Pass out a quiz on proportions and scale drawings.

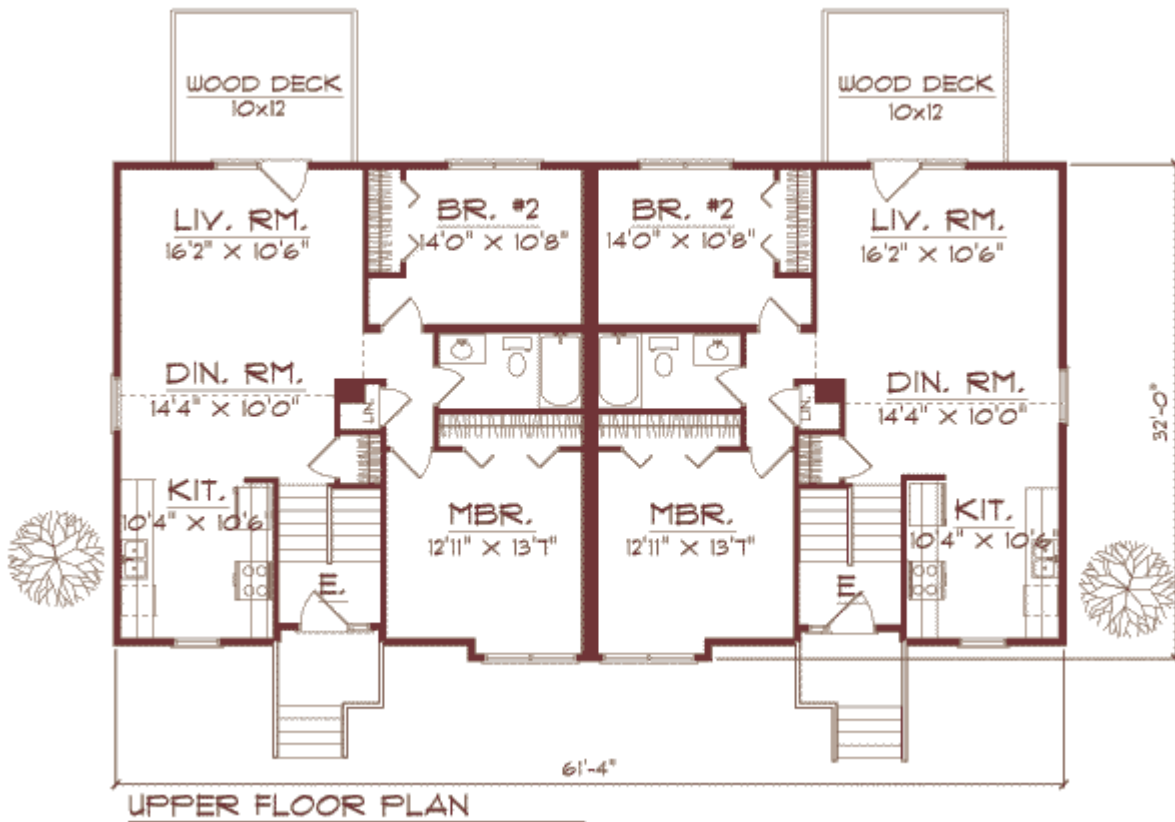## 3   Materials and Resources
   Throughout this lesson on ratios I will incorporate the use of scale drawings and a
grouping chart, skittles and construction paper. I will also be using note cards, notebook
paper, worksheets (Problems provided by http://www.edhelper.com/math/ratios206.htm,

http://www.edhelper.com/math/ratios215.htm, www.houseplans.com), http://www.teachrkids.com and a KWL chart.

4   Assessment

I will check papers for valid responses through observations and record results on progress chart. The students will be given a quiz

Floor Plan

WOOD DECK
10x12

WOOD DECK
10x12

LIV. RM.
16'2" X 10'6"

BR. #2
14'0" X 10'8"

BR. #2
14'0" X 10'8"

LIV. RM.
16'2" X 10'6"

DIN. RM.
14'4" X 10'0"

DIN. RM.
14'4" X 10'0"

KIT.
10'4" X 10'6"

MBR.
12'11" X 13'7"

MBR.
12'11" X 13'7"

KIT.
10'4" X 10'6"

32'-0"

61'-4"

UPPER FLOOR PLAN

Quiz

Name_____ Date_____

State whether the ratios are proportional. Write *yes* or *no*.

1. $\dfrac{21}{9} = \dfrac{7}{3}$	2. $\dfrac{9}{2} = \dfrac{8}{36}$	3. $\dfrac{12}{21} = \dfrac{4}{5}$	4. $\dfrac{5}{10} = \dfrac{50}{1}$
5. $\dfrac{5}{1} = \dfrac{10}{2}$	6. $\dfrac{50}{40} = \dfrac{4}{5}$	7. $\dfrac{3}{10} = \dfrac{16}{30}$	8. $\dfrac{6}{33} = \dfrac{2}{11}$
9. $\dfrac{9}{7} = \dfrac{14}{12}$	10. $\dfrac{6}{5} = \dfrac{32}{25}$	11. $\dfrac{48}{18} = \dfrac{8}{6}$	12. $\dfrac{15}{25} = \dfrac{5}{3}$
13. $\dfrac{28}{20} = \dfrac{16}{8}$	14. $\dfrac{33}{22} = \dfrac{3}{2}$	15. $\dfrac{30}{9} = \dfrac{10}{3}$	16. $\dfrac{1}{6} = \dfrac{8}{48}$
17. $\dfrac{3}{1} = \dfrac{21}{7}$	18. $\dfrac{20}{40} = \dfrac{1}{2}$	19. $\dfrac{11}{3} = \dfrac{15}{7}$	20. $\dfrac{40}{28} = \dfrac{10}{7}$
21. $\dfrac{51}{5} = \dfrac{36}{4}$	22. $\dfrac{7}{4} = \dfrac{49}{28}$	23. $\dfrac{29}{29} = \dfrac{3}{3}$	24. $\dfrac{24}{16} = \dfrac{12}{8}$
25. $\dfrac{22}{16} = \dfrac{8}{11}$	26. $\dfrac{6}{30} = \dfrac{9}{45}$	27. $\dfrac{20}{25} = \dfrac{16}{20}$	28. $\dfrac{1}{8} = \dfrac{4}{32}$
29. $\dfrac{24}{12} = \dfrac{7}{14}$	30. $\dfrac{12}{8} = \dfrac{14}{6}$	31. $\dfrac{22}{24} = \dfrac{44}{48}$	32. $\dfrac{65}{50} = \dfrac{50}{35}$
33. $\dfrac{28}{5} = \dfrac{7}{1}$	34. $\dfrac{12}{11} = \dfrac{24}{22}$	35. $\dfrac{15}{30} = \dfrac{21}{42}$	36. $\dfrac{14}{24} = \dfrac{28}{48}$
37. $\dfrac{8}{32} = \dfrac{6}{30}$	38. $\dfrac{57}{47} = \dfrac{40}{30}$	39. $\dfrac{9}{36} = \dfrac{1}{4}$	40. $\dfrac{45}{40} = \dfrac{43}{32}$