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6th grade public research lesson on May 19, 2005 at the St. Josaphat School

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**Mathematics Lesson Plan for 5th grade**

For the lesson on May 19, 2005

At St. Josaphat, Jen Kowieski's class

Instructor: Jen Kowieski

Lesson plan developed by: Heather Brown, Kathleen Fink, Lorna Holliday, Jen Kowieski,  
and Donna Thigpen

1. Title of the Lesson: Applying Proportionality in Scale Drawings

Goal of the Lesson:

Students will apply their understanding of proportionality to similar figures and scale drawings.

Students will express relationship between a scale drawing and an actual drawing as a proportion.

Students will recognize the importance of working with their peers in order to deepen their understanding of mathematics.

Relationship of the Lesson in the Illinois Learning Standards for Mathematics.

STATE GOAL 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios and proportions.

Solve problems using comparison of quantities, ratios, proportions and percents.

6.D.2 Describe the relationship between two sets of data using ratios and appropriate notations (e.g.,  $a/b$ ,  $a$  to  $b$ ,  $a:b$ ).

STATE GOAL 9: Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.

Identify, describe, classify and compare relationships using points, lines, planes and solids.

9.B.2 Compare geometric figures and determine their properties including parallel, perpendicular, similar, congruent and line symmetry.

This Lesson

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### Instruction of the Lesson

Much time in the late elementary grades is devoted spent studying fractions. Students recognize fractions as parts of a whole and parts of a set. Students explore computations involving fractions, namely addition, subtraction, multiplication, and division. And most importantly, students are able to use their understanding of fractions to solve every day problems.

While our students leave fifth grade with much experience of working with fractional quantities and recognizing the relationship of part to whole, students spend very little time exploring proportional relationships. As educators, we may falsely believe that once students can easily recognize fractional relationships, they will be able to extend that thinking to proportions. However, the two concepts are distinct. Common mistakes that students make in working with proportions underlines the need to teach proportions. Because students are familiar with using a fraction to represent part to whole relationships, they have difficulty using the fraction to represent  $a$  to  $b$  relationships correctly.

Proportional relationships abound in everyday life. Therefore, the unit plan that we have constructed was designed to include some instances of proportions in real-life situations, so students would recognize the importance of proportional relationships.

### Unit Plan

#### Lesson 1: Introduction of Proportions

#### Lesson 2: Punch Mix-Up

See attached lesson plan

#### Lesson 3:

#### Lesson 4: Similar Figures – Proportionality in Geometry

#### Lesson 5: Applying Proportionality in Scale Drawings

#### Learning Process (or Plan of Lesson)

Steps, Learning Activities Teacher's Questions and Expected Student Reactions	Teacher's Support	Points of Evaluation
<b>1. Introduction</b>  Students will recall properties of similar figures and identify similar figures. Students will look at a blue print for a room. Students will discuss reasons for using blue prints. Students will discuss use of scale in blue prints.	Display a blue print. Lead students in discussion.	Do students recall properties of similar figures? Can they correctly identify similar figures? Are students able to recognize that the same scale is used throughout the blue print?

<p><b>2. Posing Problem</b></p>		
<p>Part 1: Your family is moving to a new home, and you get to pick out a rug for your bedroom. You find a rug that is 11 ft by 15 ½ ft. You want to check if that will fit in your new room. So, your parents gave you a scaled drawing of your bedroom, but something is missing – the scale! When you ask your parents what the scale is, they say, “We don’t know. But if it helps you, we do know that the closet is 1 ft by 2 ft.”</p> <p>(Students will be given a scale drawing of a room. The scale will be 3 inches to 8 feet. Dimensions will not be given on the drawing. Students will have to measure the walls in the drawing.)</p>		
<p><b>3. Solving Problem</b></p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Anticipated Students’ Solutions</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Students will use ruler to find dimensions of drawing.</li> <li><input type="checkbox"/> Students will use fractions to create proportional relationship of drawing to actual bedroom.</li> <li><input type="checkbox"/> Students will use multiplication to solve for missing dimensions.</li> <li><input type="checkbox"/> Students will use division to solve for missing dimensions.</li> <li><input type="checkbox"/> Students will create a chart to express proportional relationship.</li> <li><input type="checkbox"/> Students will recognize that some dimensions are equal, and use quantities already calculated.</li> </ul> </div>	<p>Students will have a copy of the scale drawing and a ruler.</p>	
<p><b>4. Comparing and Discussing</b></p> <p>Students will be given the time to work with their team in finding the dimensions of the scale drawing and the dimensions of the bedroom.</p> <p>Groups of students will be called up to the board to explain their solutions.</p>	<p>Teacher will monitor teams and observe strategies for solving the problems.</p> <p>Call students to board in order of increasing difficulty of solutions. Ask students, “How can we check this solution?” Have other students explain solution.</p>	<p>Are there any groups that were stuck as to how to solve the problem?</p> <p>Do all the groups understand that there is more than one way to solve the problem?</p> <p>Do the students recognize the different ways of expressing the proportional relationship?</p>
<p><b>4. Summing up:</b></p> <p>In journal, students will write, “What are the different ways that you can use a scale drawing to find dimensions of an actual place?”</p>		<p>Do students understand how to use a proportional relationship to find unknown quantities?</p>