

Armada/Richmond/Romeo Lesson Study Team 2004 / 2005



Dale Kelley - Richmond
Sally Hager - Richmond
Margaret Allemon - Armada
Joe Amabile - Armada
Linda Roose - Armada
Patrick Salembier - Romeo
Jackie Phillips - Lake Shore - Facilitator
Deane Spencer - Utica - Knowledgeable Other

The Individual Team

Facilitator:

Jackie Phillips: I have been teaching at Kennedy Middle school in Lakeshore Schools for 11 years. I teach 7th grade mathematics. I have been involved with Lesson Study for 4 years. I have been to Japan to observe Lesson Study. I was part of the MiCTM Lesson Study Project. I am serving as the Facilitator for the Lesson Study Group.

Knowledgeable Other:

Deane Spencer: I have been working in Utica Community Schools for 9 years. I worked at the middle school level at Jeannette Junior High for 4 years, then taught for 3 years at Henry Ford II High School. I am currently serving as the Mathematics Core Curriculum Specialist on the Curriculum/Technology Team. I am serving as the Knowledgeable Other for the Lesson Study group.

Richmond Community Schools:

Dale T. Kelley: I am a teacher at Richmond for 5 years, 7th and 8th grade. Started in Detroit. Taught in 4th grade in Detroit. Love Math.

Sally Hager: I have been teaching for 23 years. I work in Richmond. I have taught in 2nd grade for one year and the remainder of my years in mathematics at the middle school.

Armada Area Schools:

Margaret Allemon: I have been teaching at Armada Middle School for 8 years. I have taught 6th, 7th and 8th grade mathematics. I am currently a 6th grade Science teacher.

Joe Amabile: I have been teaching in Armada for 2 years. I teach 7th grade mathematics. I had a wonderful mentor teacher who introduced me to NCTM. I am assistant coach for the 8th grade boys' basketball team.

Linda Roose: I have been a teacher in Armada for 13 years. I have taught 6th, 7th and 8th grade mathematics. I am an active NCTM member. I also coach cheerleading. I was part of the MiCTM Lesson Study Project.

Romeo Community Schools:

Patrick Salembier: I have been teaching for 3 years. My first year was teaching 4th grade in the Brandon School District. I now teach 6th grade and 8th grade Math and Language Arts at Powell Middle School in Romeo Public Schools.

How and Why We are Involved in Lesson Study

The opportunity became available, we are clustered geographically, and we had an opportunity to grow. We improved our planning. We are part of a Math-Science Grant, and we are able to enhance our teaching techniques. It was an opportunity to learn and build upon content area knowledge and collaborate with other teachers within the Middle School environment.

School and District Environment

We are each small rural districts. Our population is generally lower to middle class. We have a small amount of ethnic diversity in our student population. We have a small group of students who are part of a migrant population. Our students consistently lack the ability to demonstrate critical thinking skills as part of their daily mathematics.

Planning the Lesson

We initially met at the Macomb Intermediate School District for an introduction to "Lessons Studied, Lesson Learned", a lesson study workshop presented by Deb Ferry. After reviewing MEAP data from the 2003-04 MEAP, we discovered that problem solving was an area of weakness for our students. Problems that required more than a one step process were less likely to be answered correctly. We chose to use the Pythagorean Theorem as a basis for our problem, so we could address both the multi-step problem solving issue as well as the rational/irrational number issue.

| Learning Activities Teacher Questions and Expected Student Reactions | Teacher's Support | Points to Evaluate |
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| <p>Introduction (1:30) You are an NBA Detroit Pistons player playing in a grudge match against the Indiana Pacers. There are 0.2 seconds on the clock. You are in the corner of the court to the right of the Pacers basket. What is the court distance that your winning shot must travel?</p> <p>The dimensions of a professional basketball court are 94x50 ft.</p> <p>In the classroom: Introduce the NBA scenario. Students work independently for a few minutes to calculate the distance of the shot.</p> <p>(1:33) After 3 minutes ask students to get together into small groups to discuss their answers and come to a consensus.</p> <p>5 minute time limit for the group.</p> <ul style="list-style-type: none"> Tell groups to come to consensus and give the teacher their answer to be posted. <p>(1:38)</p> <ul style="list-style-type: none"> Explain next step in lesson to verify the calculations in relation to their own gym <p>Middle School Gym Problem (5 minutes) If you wanted to verify your answer to the NBA problem, you could go to the Palace. Since we can't take everyone out to the Palace, what could we do to check our strategies?</p> <p>(1:43) Take students to the gym. (allow 3</p> | <p>Give the students the NBA court diagram and scenario.</p> <p>Give students a 3minute time limit to solve the problem.</p> <p>Allow students to ask for any materials they think they need.</p> <p><i>Students will establish their own groups based on personal choice.</i></p> <p>If a group is having trouble, have one person from each group approach another group to see what they are doing.</p> <p>Record the answer and give to teacher. Teacher will put all answers up after receiving them from every group.</p> <p>If students don't think of going to their own gym, suggest it.</p> <p><i>Students will use be given the Middle School Scenario</i></p> | <p>Do students cut the width to 25 ft to take in consideration of the position of the basket?</p> <p>Do the students subtract 4 ft from the length to account for the position of the backboard?</p> <p>Are students using the Pythagorean theorem to help them solve this?</p> <p>What strategies are they using to solve the problem?</p> <p>Do students think of physically measuring the actual gym?</p> <p>Where are students starting on the measuring tape?</p> <p>Are students using a consistent unit of feet for measurement?</p> <p>Are the students measuring to the baseline? To the backboard?</p> <p>Are the students measuring from the floor or a standing</p> |

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| <p>min travel time)</p> <p>(1:46) In the Middle School Gym: (25 minutes) Students will then work in groups of five students. Students answer the same scenario question based on their own gymnasium. Students perform the calculation.</p> <p>Students will measure length, width, and diagonal distance to check the calculation plan used in the original scenario. Record the measurement on the middle school diagram.</p> <p>(2:11) The teacher will make sure twine is put down after all groups have completed their measurement to provide a visual for discussion.</p> <p>(2:13) Discussion/Summary of Lesson</p> <ul style="list-style-type: none"> • Did your actual measurement verify your calculation for the middle school gym? • How did you arrive at your answer? • What problems did you encounter? • Does this verify your calculations for the NBA problem? Why or why not? • If the Richmond gym had NOT been regulation size, would what you have done still verified your strategy for solving the NBA problem? | <p>to determine the correct measurement in Richmond.</p> <p>The teacher will verify that an answer has been calculated.</p> <p>Have the tools available for the students to use (twine, tapes, etc)</p> <p>Guiding Questions: What unit was given to you in the scenario? What unit are you using in your calculation?</p> <p>Post the discussion questions on large paper on one side of the rolling chalkboard.</p> <p>Have a rolling chalkboard for the first group to finish correctly demonstrate their problem solving process for this problem to the rest of the class. Students should include actual measurements and calculations (turn the board to face the students when it's time for discussing the strategy used).</p> <p>If students do not mention the Pythagorean theorem as a method of solving the problem, then the teacher will point this out.</p> <p>If time, and if no other strategies besides the Pythagorean theorem were mentioned, ask students to think about alternative ways</p> | <p>position?</p> <p>Were students on task once they were in the gym?</p> <p>Do students conclude that Richmond is a regulation size court?</p> <p>Did students use the twine to help mark off the triangle?</p> <p>Are students rounding their measurements ?</p> <p>Did anyone give their answer in radical form?</p> |
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| <p>Extension questions: You have a teammate standing at the half court line diagonally across from you. If you pass it to him and he shoots what is the total distance the ball travels?</p> <p>Your only open teammate is standing diagonally across the court from you. If you choose to pass it to the open player how far is your pass?</p> | <p>of solving this problem. (scale drawing, etc)</p> <p>Give the extension questions as a worksheet, with a blank diagram on the back.</p> <p>**Have students return to the gym floor and model the half court triangle.</p> <p>Tell students they need to do the extension questions without actually measuring in the gym.</p> | |
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Evaluation:

Lesson Study Lesson Plan for: 8th Grade Mathematics at Richmond Middle School

Lesson Title: What's the longest 3 point shot you can make?

Lesson Goals:

1. Create confident problem solvers who can properly initiate and see through the problem solving process to arrive at a reasonable solution.
2. Apply the Pythagorean theorem to a real-life scenario.

Relationship to Grade Level Content Expectations:

G.GS.08.01: Understand at least one proof of the Pythagorean theorem and use the Pythagorean theorem and its converse to solve applied problems including perimeter, area, and volume.

N.FL.08.05: Estimate and solve problems with square roots and cube roots using calculators.

Michigan Curriculum Framework:

Previous lessons:

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This lesson: II.1.MS.7, IV.2.MS.4, IV.2.MS.5

Future lessons:

Rationale for lesson: After reviewing MEAP data from the 2003-04 MEAP, we discovered that problem solving was an area of weakness for our students. Problems that required more than a one step process were less likely to be answered correctly. After discussing the attitude and abilities of students in our own classrooms, we came to the conclusion that students were often not motivated to persist in solving a “long” problem, not confident in their ability to do so, and did not have good strategies for solving such problems.

An area of weakness in Richmond Middle School in particular was the concept of rational and irrational numbers and their use. We chose to use the Pythagorean Theorem as a basis for our problem, so we could address both the multi-step problem solving issue as well as the rational/irrational number issue.