

Grade Level: 5<sup>th</sup> and 6<sup>th</sup> grade lesson (Mills) Date: 12/12 9:45 am

Title: Decimal Draw Content Area: Math

## Lesson Study: Collaborative lesson plan

<p><b>OVERARCHING GOAL:</b> <b>Build Problem Solving Abilities and the Five Strands of Math Proficiency. (U.C.A.R.E)</b></p>	<p><b>OBJECTIVE:</b> Standard of Learning (SOL) <b>Related Standard of Learning</b> 5.4 The student will find the sum, difference, and product of two numbers expressed as decimals through thousandths, using an appropriate method of calculation, including paper and pencil, estimation, mental computation, and calculators. 6.4 The student will compare and order whole numbers, fractions, and decimals, using concrete materials, drawings or pictures, and mathematical symbols.</p>	<p><b>NCTM STANDARD(S)</b> <b>Number and Operations: Developing an understanding of and fluency with addition and subtraction of fractions and decimals</b> Students apply their understandings of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They apply their understandings of decimal models, place value, and properties to add and subtract decimals. They develop fluency with standard procedures for adding and subtracting fractions and decimals. They make reasonable estimates of fraction and decimal sums and differences. Students add and subtract fractions and decimals to solve problems, including problems involving measurement.</p>	<p><b>MATERIALS:</b></p> <p>Decimal Draw game in a ziplock bag for pairs. Decimal place value mat, number cards</p> <p>Revised game recording sheet designed by Michelle ☺</p> <p>Double Decimal grid sheet overhead to demo shading Rule poster.</p>
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### IMPORTANT MATHEMATICS CONTENT BACKGROUND: MATH CONCEPT MAPPING

Relating fractions and decimals and visualizing benchmarks (0, .5,  $\frac{1}{2}$ , and 1)



Decimal Draw: Estimating addends and sums to get to a target number

Steps of the lesson: learning activities and key questions (and time allocation)	Student activities/ expected student reactions or responses Potential Barriers & Misconceptions	Teacher's response to student reactions / things to remember DIFFERENTIATION: List adaptations for GT, ESOL, LD	Assess for Evidence of learning Attach assessments Question to reveal students' thinking
<p><b>LINK</b> Start at the think and share circle. (5min)</p> <p>Review Place value name. Build the Greatest number using digit cards and use the decimal grid to shade in the appropriate amount. Pass around decimal grid and name with a partner. Use a sticky to name it. Practice reading the number accordingly. Use what you know about fractions. <math>.5 = 5/10</math>, <math>.45 = 45/100</math></p>	<p>Students might not be familiar with the decimal grid. Name the different place value and review how to read a decimal number</p>	<p>Place value chart available with decimal grid model cards.</p>	<p>Look at your decimal grid. How far away are you from 1 whole?</p>
<p><b>ENGAGE &amp; EDUCATE(10min)</b></p> <p>Vocabulary:</p> <ul style="list-style-type: none"> <li>• Decimal, decimal fractions, tenth, hundredth, thousandth...</li> <li>• Addends and sum</li> <li>• Benchmark numbers (0, <math>\frac{1}{2}</math> and 1)</li> <li>• Estimating &amp; rounding</li> <li>• Difference</li> </ul> <p>1. Introduce the game of Decimal Draw using the poster.</p> <p><b>Object of the game: arrange your addends to get closest to the sum of 1.</b></p> <p>2. Model how to play with teacher.</p> <ul style="list-style-type: none"> <li>• What is the best arrangement of the digit cards on the place value mat to reach our benchmark number?</li> <li>• How can I estimate the addends to estimate the sum?</li> <li>• How can I shade this number? What</li> </ul>	<p>ESOL students will not know some of the vocabulary critical to the lesson.</p> <p>Model the game with some strategic situations so that student can think about the moves that are possible without explicitly telling them the strategy.</p>	<p>ESOL: Vocabulary cards available on the board.</p>	<p>Take notes on responses to: What happens to the lines when you find the next equivalent fraction? What do you notice about the numbers?</p> <p>Can you predict when you will find the next equivalent fraction?</p> <p>If this applet, can divide a fraction up to 100 pieces, what will be the equivalent fraction closest to having a denominator of 100 pieces?</p> <p>Can you have a denominator of 100 pieces with this fraction, why or why not?</p>

<p>would it look like as a decimal fraction?</p> <ul style="list-style-type: none"> <li>Who is closer to 1? By how much? How did you figure that out?</li> </ul> <p>AS you play, think about the arrangement of the digits and how playing your numbers right can help you get closest to your benchmark numbers.</p>			
<p><b>ACTIVE LEARNING(25min)</b></p> <p><b>First play:10min</b> Students will pair up and play a couple rounds. (10min)</p> <p><b>Timeout: 5 min</b> I will call time out and ask what strategy they are using. I will give them one scenario with 5 numbers. Ask them to tell me possible addends and sum. (5min)</p> <p>Discuss how the drawing these same digits can yield to different sums. Is that a strategy that we can use? Does the tenth place make bigger difference or the hundredth place make a bigger difference in helping us get to the benchmark numbers? Why is that?</p> <p>As you were playing were there times when you wished you had a wild card? Well, let's add more excitement to this game. Your teacher will give you a blank card which can be any number that you wish. Let's play for another 10 minutes and see what happens.</p> <p>Now play with wild card. Second play: 10 min.</p>	<p>For our special education students, teacher can ask some probing questions while playing that will facilitate their strategic thinking. For the first round, special ed. teacher can play with the small group of students to access their thinking and ask some thinking question.</p> <p>For ESOL students come by and ask them what we call the addends and sum so that they can make the connection between the vocabulary with the numbers they are manipulating. Listen to them say the decimal name and assess if they are saying it correctly</p>	<p>Pair up students accordingly</p> <p>Small group with special ed. teacher for the first round.</p> <p>Ask students reasoning questions like: Why did you decide to put the 8 digit there?</p> <p>What can this number rounded to?</p>	<p>Checklist with students name: Items to assess:</p> <ol style="list-style-type: none"> <li>1) Assess students' shading of the decimal number on the grid.</li> <li>2) Assess students saying the decimal name to their partner.</li> <li>3) Can they find the difference from 1? Are they using subtraction algorithm or adding up to or counting down to the target number 1?</li> </ol>

REFLECT (20 min)

Gather students to the think and share circle:

Follow up this lesson immediately with these questions.

Challenge students to communicate the strategies that they used to get closest to 1.

Turn to your buddy and share your closest sum to 1.

Students will come to the board and record their addition problem that gave a sum closest to 1 whole.

What do you notice about the addends of 1?

If we rounded to the nearest tenths, what pattern would we see.

1.0	+	0	=	1.0
.9	+	.1	=	1.0
.8	+	.2	=	1.0
.7	+	.3	=	1.0
.6	+	.4	=	1.0
.5	+	.5	=	1.0
.4	+	.6	=	1.0
.3	+	.7	=	1.0
.2	+	.8	=	1.0
.1	+	.9	=	1.0
0	+	1.0	=	1.0

How did the picture help you see who got closest to 1?

How can estimating addends help us get the closest estimate to the sum of 1?

Examples of addends that helped them get closest to 1.

$$.89 + .12 =$$

$$.58 + .39 =$$

Assess their reasoning ability and their strategic thinking.

<p>NOW AND THEN</p> <p>Connect</p> <p>Play different variation of this game using</p> <ul style="list-style-type: none"><li>• Different target number</li><li>• To the thousandths</li><li>• Difference</li><li>• Products</li><li>• Fractions</li></ul>			

REFLECTION: After the lesson, reflect on what went well and what didn't go well. Write changes you might implement the next time the lesson is taught.

# Decimal Draw Mat

Place value	<b>Ones</b>	• decimal point	<b>Tenths</b>	<b>Hundredths</b>
Addend	0	•		
Addend	0	•		
Sum		•		