

Title: Giving It 100%

Brief Overview:

This unit is developed for students to help build a bridge between decimals and percents. In this unit, you will find lessons that will allow students to identify (read and write) decimals, convert decimals to percents, graph percents, and compare decimals and percents. This unit provides instructional lessons, games and assessment activities that allow you to teach, monitor and assess your students' understanding of percent and decimals.

NCTM Content Standard/National Science Education Standard:

- Understand numbers, ways of representing numbers, relationships among numbers, and number systems
 1. understand the place-value structure of eth base-ten numbers system and be able to represent and compare whole numbers and decimals:
 2. Explore numbers less than 0 by extending the number line and through familiar applications
 3. Recognize and generate equivalent forms of commonly used fractions, decimals, and percents.

Grade/Level:

The following lessons can be adapted to third and fourth grade curriculum.

Duration/Length:

This unit should be taught for three to four days. One day should be used for the Summative Assessment.

Student Outcomes:

Students will be able to:

- Use manipulatives in order to illustrate percent amounts
- Use methods to convert decimals to percents
- Use technology as a supportive device in problem solving
- Recognize relationships between decimal and percent
- Read decimal numbers in tenth and hundredths
- Write decimal numbers in tenths and hundredths
- Identify ways in which decimals and percents are used in everyday life
- Graph percentages
- Convert decimals to percentages

Materials and Resources:

Lesson 1

- Chart paper
- Magic markers
- Large index cards
- Class set of scissors
- Magazines, newspaper, supermarkets and department store sales papers
- Sandwich bags
- 100 square grids (enough for each student)
- Overhead markers
- Class set of Cuisenaire rods
- Teacher Resource Sheets
- Student Resource Sheets
- Dice or number blocks (prelabeled 0-5 and 6-10)

Lesson 2

- Calculators
- Overhead calculator
- Scrap paper
- Teacher Resource Sheet pages
- Student Resource Sheet pages
- Blank sheets of paper for each student
- Chart paper
- Scavenger hunt sandwich bags
- Adding machine paper or strips of chart paper
- Chart paper
- Graph paper
- Blank Transparencies
- Large Construction Paper
- **Salt in His Shoes** by Deloris and Roslyn Jordan
- Post-it notes

Development/Procedures:
Preparation for Lessons 1 and 2

Take the large index cards and write the following amounts on each. $\frac{2}{3}$, .66, 1.69, $\frac{69}{100}$, $\frac{1}{5}$, .20, $\frac{1}{2}$, and .5, 1, $\frac{100}{100}$, $\frac{1}{4}$, .25 .

Using a sheet of chart paper, make three columns (with no label) and leave room at the top for a title.

Make transparencies of Teacher Resource Sheets 1- 2

Make copies of Student Resource Sheets 1- 4. On Student Resource Sheet 4 make double sided copies.

Lesson 1 *What in the World are Percents?*

Preassessment-

Gather all of the students in your meeting area (rug). Ask the class if they think that you can have numbers that look different, but represent the same amount? Listen to student feedback. Take your stack of pre-prepared index cards.

Hold up one card and ask "Can anyone identify the number on this card?" Do that for all eight cards. *You are looking for your students' ability to identify and read numbers.* Tell the students that we just reviewed two kinds of number that look different, but represent the same amounts.

Ask: "Can anyone name them?" (decimals and fractions) Then write them as labels on the blank chart and write the title as Number Conversion. (If no immediate feedback, raise one decimal card and ask, "Can anyone tell me what kind number this is?" Raise a fraction card and ask the same question.)

Take each number from the index cards and categorize it with the students, then write it on the chart. Make sure equivalents are next to each other, so $\frac{1}{2}$ would be in the column next to .5. Hang the chart on the board so that it is visible but aside.

Launch

On a large piece of chart paper place a semantic map (big circle with lines pointing outward). In the center of the circle place the percent symbol. Ask students "Does this symbol look familiar? What is it called? What does it look like to you?" Take correct as well as incorrect feedback and place it on the outdrawn lines.

Tell students that this symbol is very important in math and is used quite often in the real world. Explain to the class that today we will learn what this symbol is

called and how it is used. Break students into groups of four and distribute supplies (newspapers, magazines, supermarket and department store paper, scissors, and sandwich bags). Supplies are not to be touched until you model the activity. Students are to search for and cut out samples of media that use the % sign. Model how they should think as they search and how to choose a good sample. Give students about 10 minutes maximum for this.

Teacher Facilitation

Stop students from continuing the launch activity. Have them place samples aside for now. Turn their attention back to the semantic map and the three-column chart. Tell them that the symbol stands for the word percent, that means “per hundred” or “for every hundred”. Have students repeat the word percent. Place the word percent inside of the circle on the semantic map and on top of the third column on the Number Conversion chart.

Explain that percent is just another kind of number and it is used to represent amounts and portions/pieces just like fraction and decimals. Tell them that percent, fraction, and decimal are all like nicknames for each other. Elaborate on this if necessary. Turn to the overhead and use Teacher Resource Sheet 1-*Using Grids to Rename Decimals and Percents*.

Model your thinking by saying “I have one hundred squares here so each square represents 1 % and that’s a total of 100%.” Point to the decimal side of the transparency.

SAY “Let’s say that I want to color some of these square green.” “Randomly” color 10 squares green.

Ask “Can someone tell me what decimal represents the green squares?” A student answers .1(one tenth)

SAY “That’s right all I have to do is count them to figure that out. I colored in 10 of my one hundred squares so that is ten hundreds or one-tenth”.

Write .1 under the **D** column in the center of the transparency. Repeat that step by now coloring in 25 of the 100 squares red. Ask for student assistance again and place .25(twenty-five hundredths) under the **D** column and be sure to line up the decimals so that students can clearly see place value.

Pointing at the percent side, Say: “I know that decimals and percents are really similar. They both can represent the same amounts, but they are expressed differently. So, if I color in ten squares green over here it is still ten out of 100 and can be expressed as ten percent. When you are expressing numbers as percents you need to say the word “percent” and/or use the symbol (%).”

Write 10% under the **P** column. Ask a student what you should call the 25 squares you are coloring red on the percent side. Write 25% under the **P** column. Say, "Remember that decimals and percents can represent the same amount but use different symbols and have different names. They are like nicknames for the same person."

On the decimal side of the transparency color in 15 squares with a blue marker. Ask a student what decimal you should record for the squares you just colored. Record their response under the **D** column. On the percent side of the transparency color in 15 squares. And ask a student what percent of the squares are blue. Then record their response under the **P** column.

Student Application

It is assumed in this portion that students are familiar with Cuisenaire Rods. In this game each rod represents a %. The orange rods is 10%, the blue rod is 9%, the brown rod is worth 8%, etc... I recommend that you place these equivalencies on a color-coded chart or use sentence strips. Use Teacher Resource Sheet transparency 2-*One Hundred Square Grid* and overhead Cuisenaire Rods. If you do not have overhead Cuisenaire Rods use centimeter squares or use large graphing paper and color in squares accordingly. Place materials basket at each table or group before you begin modeling.

Students will play this game in partners (Student Resource Sheet 1). Tell students that they will roll 2 die and add the number on the dice in order to get a percentage. They will combine the Cuisenaire rods if necessary to get the percent they rolled. They will then cover the grid with the Cuisenaire Rods reflective of the percentage. The first person to cover 100% of their board wins.

Model: Roll the dice. Tell them what you rolled and then add the numbers together. On the overhead grid sheet cover the appropriate percent of squares and record your first percentage on the game board/record sheet, Teacher Resource Sheet2 -*Decimal/Percent Game Board*.

Give students 20 –25 minutes to play. Stop the students after about 20 minutes of playing the game and check for winners.

Distribute Student Resource Sheet 2-*Decimal Percent Game Board* as an opportunity to practice renaming.

As a summary or reflection have students write in their math journals for about three to five minutes responding to the following:

- 1) How would you define percent?
- 2) What is a percent?
- 3) Percents and decimals are...

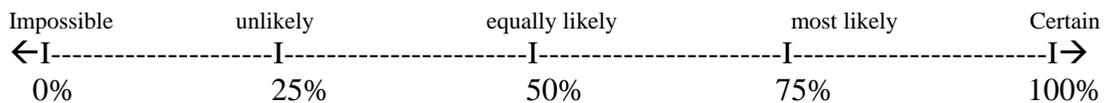
Afterwards call on a couple of students to voluntarily share their journal entries with the class.

Embedded Assessment

Assessment is ongoing through student responses and observation. Check scavenger hunt results and during the game record observations on post-its and stick them in your plan book or use a checklist. Review the record sheet from the game (check to see who actually rolled percents that added up to 100%).

Reteaching/Extension

As an extension or reteach you can bring probability into the lesson. This will provide a “real world” connection to percents. Draw a number line and cut it into four sections.



Use weather (rain) predictions from the newspaper to explain. After this lesson you can distribute copies of weather predictions covering a seven-day period and have the students place the percentages on a number line.

For homework send the “Family Interview” sheet. Make sure you write the word *Percent* after *Introduction of* on the blank line. Student Resource Sheet 8

Lesson 2: *The Great Conversion*

Preassessment

Use the Number Conversion chart from lesson 1. Place it in the center of the board. Provide examples of decimals and fractions in the decimal column. Ask students to complete the Percent column based on the decimal and fraction column. By doing this you can assess student understanding. Walk around and see what types of strategies are being used.

After about 5-6 minutes bring the class together to discuss their answers. Fill in the percent column with correct answers. If you received no correct responses leave the entire chart blank and refer to extension section.

Launch

Distribute student scavenger hunt sandwich bags. Have students categorize their cutouts. They can categorize based on topic (food, clothes, etc.). On large chart paper record all the areas in which percentages are used based on student findings. If findings are not

sufficient give them clues for additional areas. Then record them on the chart. Your chart could be “Percents in the Real World”.

Percents in the Real World	
Cooking Shopping	Weather Sports Olympics

Teacher Facilitation

You can draw a number line on adding machine tape (strips of chart paper) or draw a clear number line on the board. On the number line show decimal values from 0.0 to 1.0 in increments of tenths. Begin by referring to previous lesson(s) on renaming fractions, decimals and percents. Review the use of 1.0 as 1 whole in decimals just as it is 1 in fractions and that 1.0 is the same as 100%. They both represent ALL of something, the TOTAL AMOUNT in question. Use index cards with the percents 0%, 10%, ... 100% written on them. Refer to Teacher Resource Sheet Number 3 -*Index Card Layout* to see full layout. The number line should be taped across the board where it is visible to all students. Teach two conversion methods. One method involves multiplying the decimal by 100 and then adding the percent sign (model A-Multiply By Hand). In the interest of time as well as the integration of technology, I suggest that you show students how to find the answer using a calculator (model B-Multiply With The Calculator). The other involves simply having the students move the decimal two times to the right (model C-Move The Decimal).

Model A	Model B	Model C
100	<i>Type</i> .90	.90
x .9	<i>hit</i> x	90.0

90.0	<i>type</i> 100	90%
90%	<i>hit</i> =	

Say: “Today we are going to learn two ways to turn decimals into percents. For the first method we are going to use our multiplication skills and then a calculator. For the second method we are going to “hop” from one side of the decimal to the other. As we work today keep in mind that it is always important to not only how to do something but why you are doing it. ”

Pointing at one-tenth on the number line, Say: "If I wanted to know what the decimal conversion of 0.1 (one-tenth) was, I would simply multiply 100 by the decimal 0.1." Show students how to multiply and move the decimals. Use "think aloud" strategies. After you get 10% tape the 10% index card above 0.1. Now ask a student if they know why you have to multiply by one hundred? Listen for a relation to the fact that we are looking for percent and that percent means per hundred or that since we are talking about percents it only makes sense to use one hundred.

Allow students to practice this method by finding the percentage equivalent for 0.5 (five tenths). Walk around and take note of students having difficulty multiplying, or those who cannot move the decimal, etc. Once the answer (50%) is found, tape the corresponding index card above 0.5.

For additional practice see Student Application section.

Refer students to their calculators. Using an overhead calculator, model how to multiply a decimal by 100%, use 0.6 (six tenths). Tape the corresponding percentage index card to the board above the equivalent decimal. Have students try using 0.9 (nine tenths). Once the answer is found tape the corresponding index card above the number line.

For additional practice see Student Application section.

I refer to this last step as the "hop." It is most commonly used by students and adults. In this instance, model the conversion using the decimal 0.2 (two tenths). I recommend using a small circular magnet as a decimal so that students can see that the decimal point is no longer where it was originally.

When you do this make a looping motion as the decimal "hops" two places to the right, going from $.2 \rightarrow 2 \rightarrow 20$. At this point the decimal is dropped and replaced by the percent sign. So the answer was **20**, and it's now **20%**. Tape the index card marked 20% above 0.20 of the number line. Ask students to try it using 0.4 (four tenths). Again walk around and monitor student progress. Once the answer is revealed tape the corresponding card to the board. Ask students why they think we move the decimal only two places to the right? Listen for a connection to one hundred. *Once responses are complete tell them it relates to the two zeroes in 100 as a way to remember –two places to the right.*

For additional practice see Student Application section.

Student Application

On Student Resource Sheet 4-*Converting Decimals to Percents* you will see additional practice for each section of the teacher facilitation. You may have the

students practice one section at a time as you model for a quick assessment or you can wait until the end, after you have modeled and they have practiced the three stated examples.

Once the Student Resource Sheet 4 has been completed students will play the game “**Build A Body Conversion**”. This game is normally referred to as “Hangman”. The game should take about 20 minutes. The Build A Body Conversion Price List is below. Copy this onto a chart paper or on the board.

Body Part	Cost
Head	20%
Each arm	7%
Chest (Torso)	15%
Each leg	12%
Pelvis	10%
Each foot	6%
Ears	5%

Please model this game first. Play with one student or another adult in the classroom. Distribute Student Resource Sheet 5-Build A Body Conversion.

The purpose of this game is to give students an opportunity to combine a potentially difficult skill with a game most know very well. The goal of the game is to convert decimals to percents in order to purchase different body parts for the “Body”. The first student to complete the body wins.

Using Student Resource Sheet 6-Build A Body Spinner, the first player spins the spinner. Whatever he/she lands on is in decimal form and must be converted to a percent in order to purchase. This work should be done in the **Conversion Strategy Area**. Each turn can only be used to buy only one body part, the rest must be saved until their next turn. All spins and saved amounts should be placed in the **Tab** column. Every purchase must be listed in the **Purchase** column. Then student draws body part on blank paper.

The second player repeats. Spin the spinner. Record the spin in the **Tab** column. Use the **Conversion Strategy Area** to convert the decimal to percent. Record the purchased body part in the **Purchases** column. Draw body part.

This continues until someone wins. Afterwards have the students go back and code their conversion strategies, using MH, MC, or MD. If time permits, allow students to play the game again.

For about 3-4 minutes turn students to their math journals. Ask them to state the strategy they used most and why. After the journal writing period is up go around the room and make a tally chart for the strategies.

Possible Discussion Points

Discuss the most and least used strategies with the class.

Ask "If they were not playing a game would they have chosen a different strategy?"

Optional journal entry: Why do you think the symbol % was chosen to represent percent?

Embedded Assessment

As usual assessment should be ongoing. Data is gathered through student reactions to modeling, responses to direct questions, and through monitoring during independent activities. Check student performance on Student Resource Sheet 3 -*Converting Decimals to Percents*, the "Build A Body Conversion" (Student Resource Sheet 5) game sheet, and journal entry.

Reteaching/Extension

In an effort to reteach these strategies you can present this lesson using the 100 square grids and exploring with base ten blocks. Increase the use of calculators for those students who have great difficulty with multiplication.

As an extension you can add a fraction number line to the lesson for those who are really ready to convert amongst all three. Keep in mind that you will have to use fractions with denominators of 100 for the transition to be relatively simple. If you choose $\frac{1}{2}, \frac{3}{4}$, be prepared to teach students to divide denominators into numerators. This adds a new component to the lesson.

For homework students can use the cutouts from their scavenger hunt to create a poster for percent. Make the usage of the following words and symbols mandatory on the poster: Percent, decimal, fraction, %, change, convert and equal.

For homework students can also copy the Number Conversion chart in their notebooks and complete it at home.

Lesson 3– "Super Star Percents"

Pre-assessment: Using Student Resource Sheet 7, make a transparency for a visual aid also. Make a class set for the students to use as a daily warm-up. Distribute the warm-up to the students and allow them 7-10 minutes to organize, display, and graph data. Afterwards, using utility sticks (Popsicles sticks with your students names used to allow every student a chance to answer a question), select students to come up and talk and walk through the steps they use to graph the data about the favorite ice cream flavors. (Take this time to clear up any questions the students may have about graphs.)

Launch: Ask for one student volunteer to come to the front to play charades in order to guess a profession or career. Whisper into the ear of the students the word "athlete". Allow the students 1-2 minutes to act it out and guess the word. If they don't guess it after 2 minutes, tell them the answer and move on.

Explain to the students that the professional athlete that the class will be working with today is a basketball player. Then, gather the students on to a central location to read Salt in His Shoes, by Deloris Jordan and Roslyn Jordan. Afterwards, pair the students and distribute to each pair a sticky note to record their responses. Ask the students, "How do you think basketball and percentages are related? Write the question on the board and allow the students 5-7 minutes to Think, Pair, Share." (Think- the students independently think to themselves the answer to the question Pair- Share their answer with a partner and come together and with a response for the both of them. Share- Share your response with the class) Lastly, allow the students to come and stick their responses to the board. Read the responses aloud to the class. Afterwards, have them do an informal vote to see which one of the responses they thought would be the correct answer.

Finally, explain that percentage and basketball are related because percents are used to display data of the performances of each player or team.

Teacher Facilitation:

1. Display a transparency Teacher Resource Sheet 4 on the overhead and ask the class if they know what this object is and what it tells about an athlete. (A trading card, used to display different statistics about a particular player)
2. Ask for volunteers to read the information that is on the card aloud to the class.
3. Explain to the students that today they will be graphing the free throws, 3 pointers, assists and field goals of four different players in order to discover which athlete was the best all around player.
4. Using an overhead marker, highlight the free throw, 3 pointers, assists and field goals stats on the trading card on the screen. Ask the students why would we have difficulty graphing the information as it is listed on the card. (The data is not given in percents) Guide the students to the answer if they are having difficulty. Then ask them what could we do to fix this problem. (Convert the data to percentages.)

5. Using Teacher Resource Sheet 5 to create a chart to use to convert data to percentages. (Try making the chart in advance to save time during the lesson) As a class walk through how one would complete the chart. Take the decimal .477 for field goals and place it in the decimal column. Then model how to slide the decimal over to the right two places. Finally, write the percentage in the percent column. Do the entire first row together. Then call on volunteers to come up and complete the class chart.
6. Leave the chart on the front board and put the transparency of Teacher Resource Sheet 5 on the overhead and model for the students how to graph the data from the chart on the graph paper.
7. As a class, analyze the data and ask the class the following questions: What part of Andre' Midder's game needs more practice? (**Assist** because he had the lowest percentage in that area), What part of Andre Midder's game is he proficient in and doesn't seem to need improve. (**Free Throw** because he had the highest percentage in that area.)

Student Application:

1. Now divide the class into four groups and give each member in the team a number between 1-4.
2. Then distribute one large sheet of graph paper, and Student Resource Sheets 8 –12 to the correct member in each group. Read aloud the directions and answer any questions. Distribute Student Resource Sheet 13 and read the directions.
3. Allow 10-15 minutes for the students to convert and display their data on the group chart. (Each group should make a quadruple bar graph to display all information.)
4. Walk around the room to monitor the students' work and help any students that get lost.

Embedded Assessment:

1. After the students have finished their group graphs, select a number to come up from each group to display their group graphs on the board and discuss their data.
2. Then, as a class, look at the graphs and discuss the data. Go over any mistakes that may be found and correct them together.
3. Using the data from the group graphs, allow the students 5 minutes to independently answer the questions in Part B (Student Resource Sheet 14) of the handouts. Then discuss the answers together.
4. As a closing piece, have the students open their math journal and copy and answer the following question: Based on the graph, which athlete has the best overall game? Be sure to use data from other players to care and support your answer.

Reteaching/Extension: For homework, have the students gather information from the internet, library, or newspaper to find the free throw, 3 pointer, assists and field goal percentage of a player that was not used today and make a trading card

with a graph on the back. Students are to use their trading card from class for a template for their assignment.

Summative Assessment:

The summative assessment, Student Resource Sheets 15-17, contains a three question selected response section and two Brief Constructed Responses. The selected response section is related to lesson three. Brief Constructed Response I relate to lesson 1 and Brief Constructed Response II relates to lesson 2. Use the MSA Rubric to score Step B on both Brief Constructed Responses. Answers can be found on Teacher Resources Sheets 6-10.

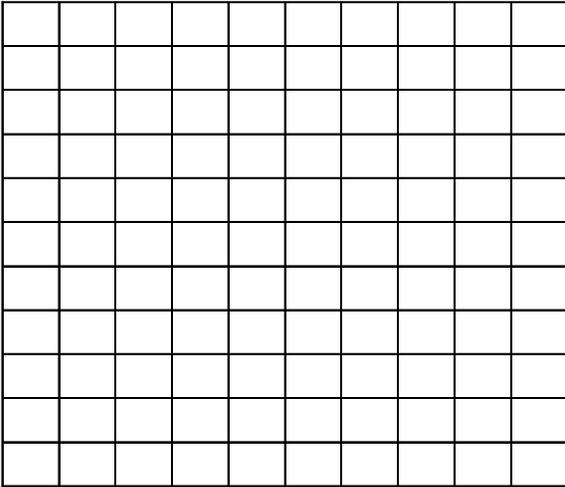
Authors:

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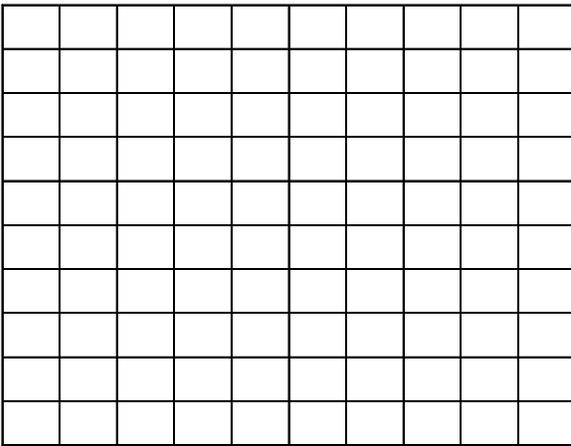
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Using Grids to Rename Decimals and Percents

Decimal (D)



Percent (P)



Decimal/Percent Game Board

Record Sheet

Roll	Percent
1	
2	
3	
4	
5	
6	
7	
8	
9	

Decimal/Percent Game Board

Record Sheet

Roll	Percent
1	
2	
3	
4	
5	
6	
7	
8	
9	

Name:

Date:

Matching Percents and Grids

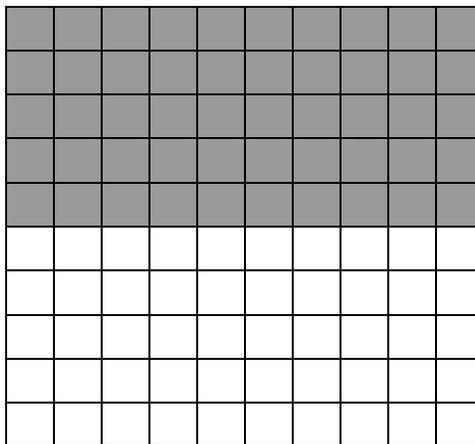
Match the percent with the grid.

A) 65%

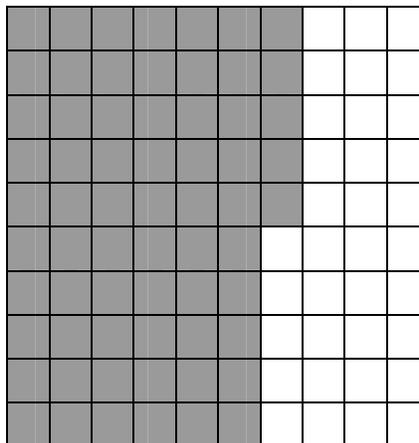
B) 50%

C) 25%

1.



2.

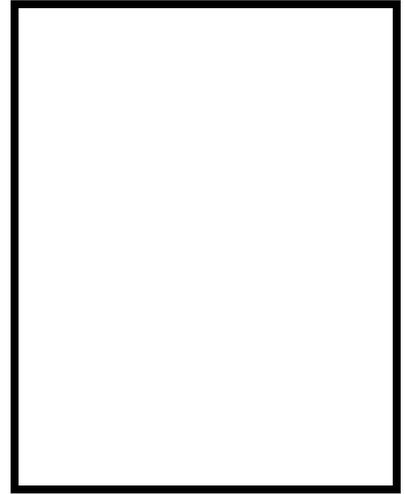
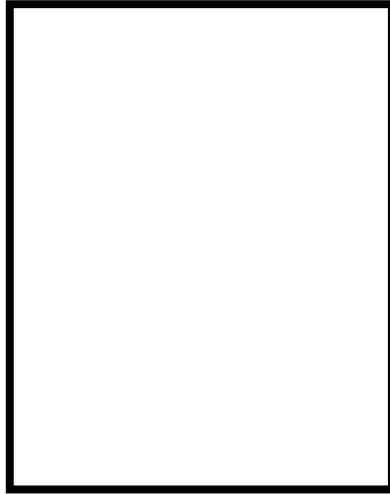
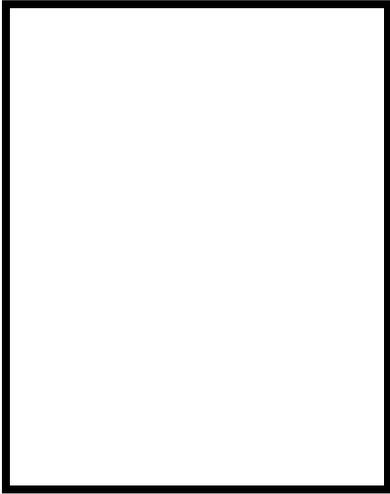


Which percent does not match a grid? Why?

Introduction of _____

Have one member of your family write and diagram about *three things they KNOW about* _____.

Encourage your family to review the questions generated by our class today.



Name _____

Date _____

Index Card Layout

0%	10%
20%	30%
40%	50%
60%	70%
80%	90%
100%	

Build A Body Conversion

Tab Column	Conversion Strategy Work Area		Purchases
Keep track of your spins here	Strategy	Show work	Keep track of the body parts you buy

Strategy key:

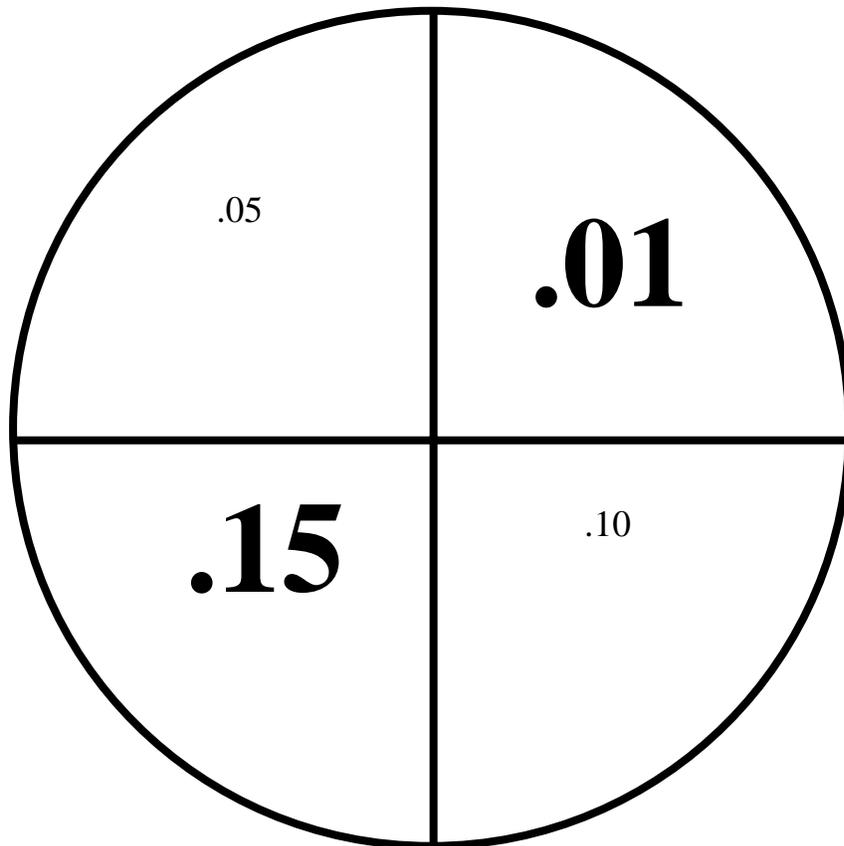
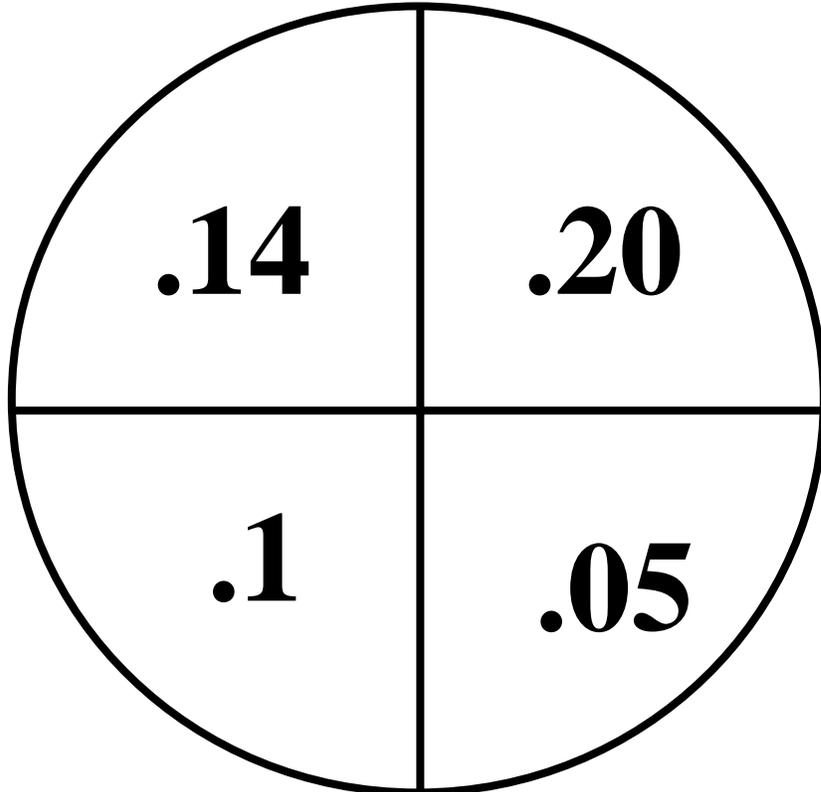
MH- Multiply by hand

MC-Multiply with calculator

MD- Move decimal

Build A Body Spinner

Place one tip of a paperclip in the center of the spinner. Spin the paper clip. Where ever the opposite tip lands determines the decimal.



Converting Decimals to Percents

Multiply By Hand	1) $\begin{array}{r} 100 \\ \times .5 \\ \hline \end{array}$ Answer _____ %	2) $\begin{array}{r} 100 \\ \times .3 \\ \hline \end{array}$ Answer _____ %
Multiply With The Calculator	3) $.95$ Answer _____ %	4) $.12$ Answer _____ %
“HOP” Move The Decimal	5) $.35$ Answer _____ %	6) $.82$ Answer _____ %

Basketball Fun

FRONT

ANDRE MIDDER

SUPER STAR



DENVER MUPPETS

Back



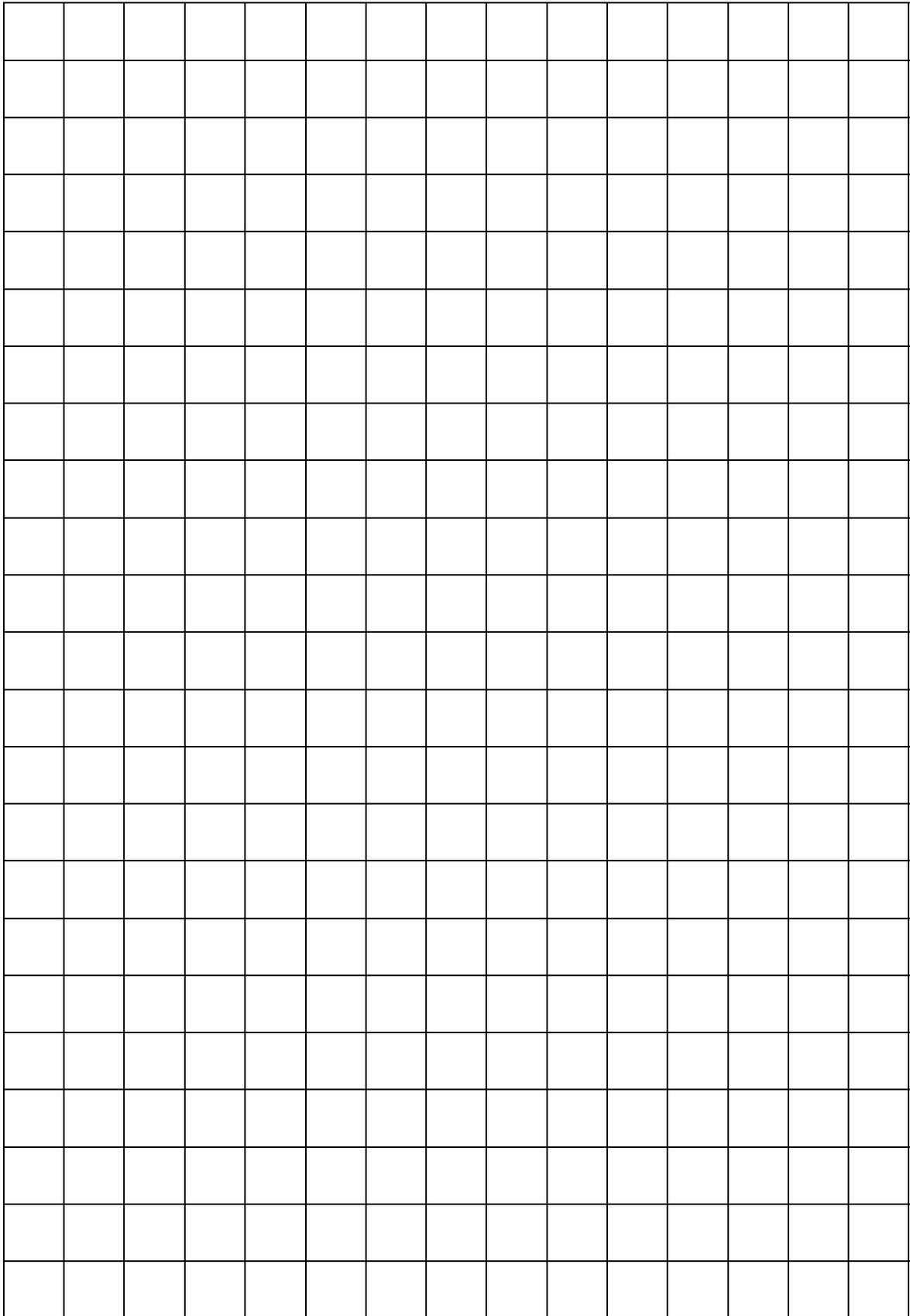
Height: 6-2
Weight: 200 lbs.

SUPER STATS	
FIELD GOALS	.477
3 PTS.	.154
ASSIST	.069
FREE THROWS	.838

Conversion Chart

Skill	Decimal	Slide (Copy & slide)	Percent
Field Goals			%
3 Points			%
Assists			%
Free Throws			%

Graph Paper



FRONT

1

TILBERT ARENA

SUPER STAR



*WASHINGTON
GIZZARDS*

Back



Height: 6-3
Weight: 191 lbs.

SUPER STATS

FIELD GOALS	.431
3 PTS.	.365
ASSIST	.051
FREE THROWS	.814

FRONT

2

CALLLEN IBERSON

SUPER STAR



PHILADELPHIA
26 ers

Back



Height: 6-0
Weight: 165 lbs.

SUPER STATS	
FIELD GOALS	.424
3 PTS.	.308
ASSIST	.080
FREE THROWS	.835

FRONT

3

STEVEN FRANKERS

SUPER STAR



**ORLANDO
PAGIC**

Back



Height: 6-3
Weight: 200 lbs.

SUPER STATS

FIELD GOALS	.424
3 PTS.	.299
ASSIST	.070
FREE THROWS	.823

FRONT

4

JASON KIBS

SUPER STAR



**NEW JERSEY
PICKS**

Back



Height: 6-3

Weight: 200 lbs.

SUPER STATS

FIELD GOALS	.424
3 PTS.	.205
ASSIST	.060
FREE THROWS	.823

Conversion Worksheet

Name _____ Date _____

PART A

Directions: Complete the chart below in order to determine the percentage for each category for your player. Afterwards take your data and graph it on the group graph. Use the color code at the bottom to color your bars on the graph.

Conversion Chart

Skill	Decimal	Slide (copy & slide)	Percent
Field Goals			%
3 Points			%
Assists			%
Free Throws			%

Player	Bar Color
Gilbert Arena	Blue
Callen Iberson	Red
Steven Frankers	Green
Jason Kicks	Purple

PART B

Answer the following questions based on the data collected in **PART A**.

- (1) Which player has the best percentage of field goals?
- (2) Which category has the same percentage for three players?
- (3) Which player needs the most practice with 3-point shots?
- (4) Which player do you think is the best all-around player? Why?

Selected Response Summative Assessment

Name _____ Date _____



Directions:

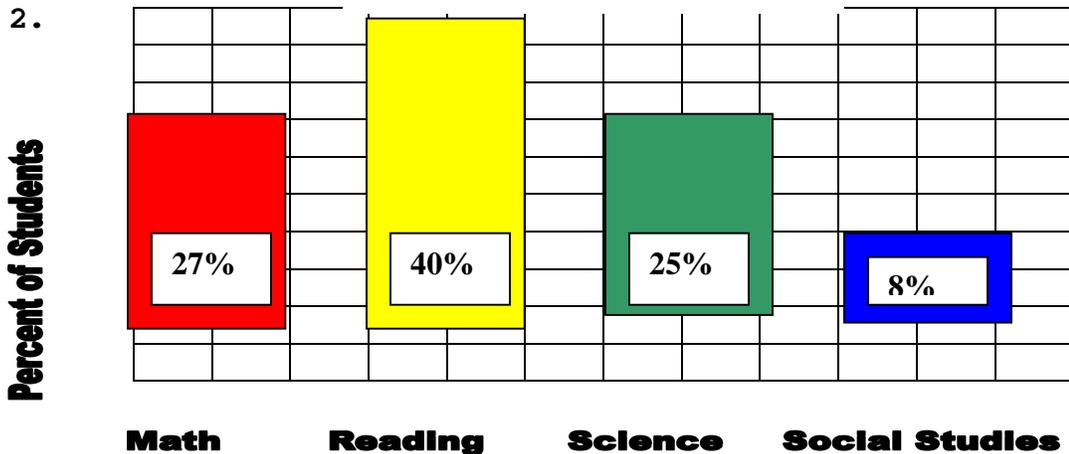
Read each question and answer choice carefully. Select the correct answer and bubble in the circle.

1. Steven Frankers wants to know what percent of free throws he averages during the season. Which percent is correct?

Steven Frankers- Free throws .567

- A. 567% B. 5.67% C. 56.7% D. none

Favorite Subject



Reading Science

Which sign will correctly complete this comparison?

- A. < B. > C. = D. none

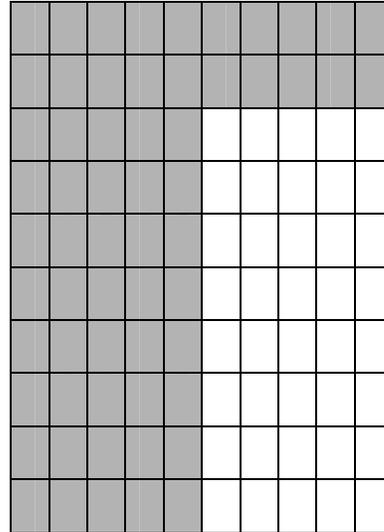
3. Does the graph above show the results of an entire class? Why or why not? Yes No

Selected Response Summative Assessment (ANSWER KEY)

1. **C = 56.7 %**
2. **B = >**
3. **Yes, because the sum of the percentages for Math, Reading, Science, and Social Studies equals 100%.**

Summative Assessment
Brief Constructed Response I

Look at the grid to your right.



Step A

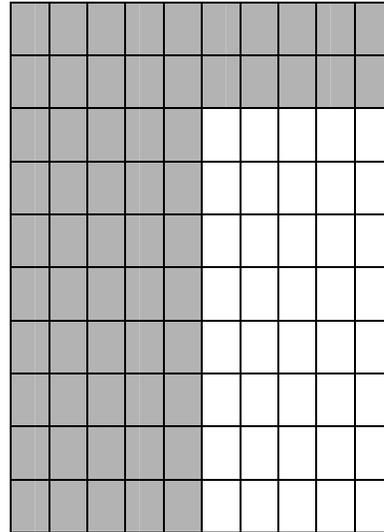
What percent of the grid is shaded?

Step B

Use what you know about decimal and percents to explain why your answer is correct. Use words and/or numbers in your explanation.

Summative Assessment
Brief Constructed Response I

Look at the grid to your right.



Step A

What percent of the grid is shaded?

_____ 60% _____

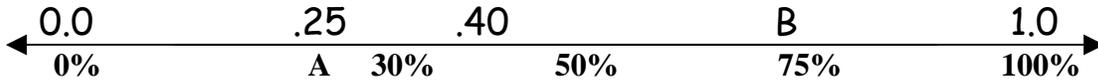
Step B

Use what you know about decimal and percents to explain why your answer is correct. Use words and/or numbers in your explanation.

Refer To Teacher Resource Sheet7 – MSA Rubric

Summative Assessment
Brief Constructed Response II

Look at the decimals and percents on the number line below.



Step A

Assign appropriate values to

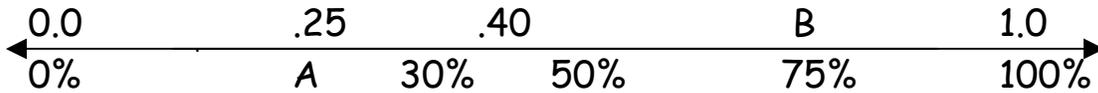
A= _____ B= _____

Step B

Use what you know about decimals and percents to explain why your answer is correct. Use words and/or numbers in your explanation.

Summative Assessment
Brief Constructed Response II

Look at the decimals and percents on the number line below.



Step A

Assign appropriate values to

A = 25% B = .75

Step B

Use what you know about decimals and percents to explain why your answer is correct. Use words and/or numbers in your explanation.

Refer to Teacher Resource Sheet 7 - MSA Rubric

MSA Brief Constructed Response “Kid Speak” Mathematics Grades 1 through 8

Score	
2	<p>My answer shows I completely understood the problem and how to solve it:</p> <ul style="list-style-type: none"> • I used a very good, complete strategy to correctly solve the problem. • I used my best math vocabulary to clearly explain what I did to solve the problem. My explanation was well-organized and logical. • I applied what I know about math to correctly solve the problem. • I used numbers, words, symbols or pictures (or a combination of them) to show how I solved the problem.
1	<p>My answer shows I understood most of the problem and how to solve it:</p> <ul style="list-style-type: none"> • I used a strategy to find a solution that was partly correct. • I used some math vocabulary and most of my reasons were correct to explain how I solved the problem. My explanation needed to be more complete, well-organized or logical. • I partly applied what I know about math to solve the problem. • I tried to use numbers, words, symbols or pictures (or a combination of them) to show how I solved the problem. My answer may not have been completely correct.
0	<p>My answer shows I didn't understand the problem and how to solve it:</p> <ul style="list-style-type: none"> • I wasn't able to use a good strategy to solve the problem. • My strategy wasn't related to what was asked. • I didn't apply what I know about math to solve the problem. • I left the answer blank.

Mathematics BCR Rubric

- 2 The response demonstrates a complete understanding and analysis of a problem.**
- Application of a reasonable strategy in the context of the problem is indicated.
 - Explanation¹ of and/or justification² for the mathematical process(es) used to solve a problem is clear, developed, and logical.
 - Connections and/or extensions made within mathematics or outside of mathematics are clear.
 - Supportive information and/or numbers are provided as appropriate.³
- 1 The response demonstrates a minimal understanding and analysis of a problem.**
- Partial application of a strategy in the context of the problem is indicated.
 - Explanation¹ of and/or justification² for the mathematical process(es) used to solve a problem is partially developed, logically flawed, or missing.
 - Connections and/or extensions made within mathematics or outside of mathematics are partial or overly general, or flawed.
 - Supportive information and/or numbers may or may not be provided as appropriate.³
- 0 The response is completely incorrect, irrelevant to the problem, or missing.⁴**

Notes:

¹ **Explanation** refers to students' ability to communicate **how** they arrived at the solution for an item using the language of mathematics.

² **Justification** refers to students' ability to support the reasoning used to solve a problem, or to demonstrate **why** the solution is correct using mathematical concepts and principles.

³ Students need to complete rubric criteria for *explanation, justification, connections* and/or *extensions* as cued for in a given problem.

⁴ Merely an exact copy or paraphrase of the problem will receive a score of "0".