

Instructional Plan
Representational/Drawing Level

Name of Math Skill/Concept: Division Process and Division with Remainders

Prerequisite Skills Needed:

- 1.) Mastery of dividing concrete objects into equal groups.
- 2.) Mastery of dividing concrete objects into equal groups and identifying left over objects as the "remainder."
- 3.) Mastery of using concrete objects to solve division problems without remainders.
- 4.) Mastery of using concrete objects to solve division problems with remainders.

Learning Objectives:

- 1.) FASTDRAW Strategy (to solve division story problems by drawing pictures).
- 2.) Drawing solutions to division story problems using the FASTDRAW Strategy.

Important Ideas for Implementing This Teaching Plan:

- 1.) This plan describes how to teach students a strategy for solving division story problems – FASTDRAW (Mercer & Mercer, 1998). Students with learning problems benefit from systematic instruction of how to find the important information in a story problem and develop an equation to solve the problem. "FAST" in the FASTDRAW Strategy provides students explicit steps to do this. "DRAW" provides students explicit steps to solve the division equation.
- 2.) First, teach students the FASTDRAW Strategy. Then teach students to draw the solution to the story problem.
- 3.) DRAW can be taught to solve division equations without story problems.

Instructional Phase 1: Initial Acquisition of Skill/Concept – Teacher Directed Instruction

I. Teach Skill/Concept within Authentic Context

Description:

Drawing solutions to division problems should continue to be taught within the framework of story situations that resonate with students given their age and interests.

II. Build Meaningful Student Connections

Purpose: to assist students to build meaningful connections between what they know about solving division problems (with and without remainders) using concrete objects and drawing pictures to solve division problems (with and without remainders.)

Learning Objectives 2: Drawing solutions to division equations using the DRAW Strategy.

Materials:

Teacher –

- appropriate counting objects and containers.
- visual display of an appropriate division problem.
- a visual display that identifies the learning objective.

Description:

1.) **L**ink to students' prior knowledge of solving division problems with concrete materials

For Example:

The last few days, you have learned how to use concrete materials such as _____ to solve division problems. You've used _____ to represent the total, or dividend, in division problems (Hold up the corresponding concrete materials) and you have used _____ to group, or "divide" the total number of objects by the divisor (Hold up the corresponding containers used). These concrete materials have been very helpful for solving division problems. Let's solve another division problem together using these concrete materials. (Solve a division problem with your students using previously used concrete materials, highlighting the dividend, divisor, quotient, and remainder (if appropriate).

2.) **I**dentify the skill students will learn: Drawing pictures to solve division problems.

For Example:

Today we are going to learn how to draw pictures to solve division problems instead of using these concrete materials. I will teach you how to draw simple pictures that represent the concrete objects you have been using the past few days. The pictures we will draw to solve division equations will be very similar to those you learned to draw for multiplication problems.

3.) **P**rovide rationale/meaning for drawing pictures to solve division problems.

For Example:

Drawing pictures to solve problems is a lot like using our concrete materials. When we use concrete materials like _____ (counting objects) and _____ (containers), we can see what it is we are solving. Moving the concrete objects around, like when we group counting chips onto plates, also helps us problem solve because it helps us make the numbers and symbols of a division problem "come alive." Drawing pictures helps in the same way. We can see the pictures we draw and we also can group pictures much like we did

with our concrete materials. Drawing pictures is also faster than using concrete objects so it will help you become even more talented at solving division problems.

III. Provide Explicit Teacher Modeling

Purpose: to provide students a clear model of how to draw solutions to division problems with and without remainders.

Learning Objective 1: FASTDRAW Strategy (to solve division story problems by drawing pictures).

Materials:

Teacher –

- A visual display of the “FASTDRAW” Strategy (Color-code the “FAST” and the “DRAW” in “FASTDRAW.”)
*The FASTDRAW strategy comes from Mercer & Mercer (1998)
- a format for visually displaying division story problems (e.g. chalk-board, dry-erase board, chart & chart paper).
- story problems that depict division situations and that color-code phrases that represent the dividend and the divisor.
- a format to visually display division equations and drawings.
- appropriate writing utensil (e.g. chalk, markers).
- cue cards/visual displays for the language “dividend,” “divisor,” “quotient,” & “remainder.” (Color-code the “dend” in “dividend” and the “sor” in “divisor” to correspond with the color of the corresponding number phrases.)

Description:

A. Break down the skill of teaching the FASTDRAW Strategy.

- 1.) Introduce students to the concept of a Learning Strategy.
- 2.) Introduce students to the “FASTDRAW” Strategy.
- 3.) Describe the purpose of the “FASTDRAW” Strategy.
 - 3a. **F**ind what you are solving for.
 - 3b. **A**sk yourself, what is the important information (circle it).
 - 3c. **S**et up the equation.
 - 3d. **T**ie down the sign.
- 4.) Teach the purpose of “DRAW” and the steps “DRAW”.
 - 4a. **D**etermine the sign.
 - 4b. **R**ead the problem.

4c. Answer, or draw and check.

4d. Write the answer.

B. Explicitly describe and model how to use the FASTDRAW Strategy.

1.) Introduce students to the concept of a Learning Strategy.

- Display "strategy" language card
- Point to cues on card
- Prompt student thinking

For Example:

Today we are going to learn how to use something called a strategy to help us draw pictures that will enable us to solve division problems. (Display and point to a visual display of the word "strategy" that includes a picture of a tool such as a hammer and a picture of a map, such as a treasure map.) Everybody say this word with me. (Point to the word and encourage students to read it aloud with you.) What pictures do you see next to the word "strategy" (Elicit the response, "a hammer and a treasure map.") Yes, this is a hammer and this is a treasure map (Point to each picture). Both the hammer and the map are tools that can help us do something. A hammer helps us to do what? (Elicit the appropriate response.) Good. And what does a map help us to do? (Elicit the appropriate response.) Great! The reason that these two pictures are next to the word strategy is because a strategy (point to the word "strategy") is also a tool that can help us do something important. What is a strategy like? (Elicit the response, "a tool/map") Yes, strategies are like tools or maps. Strategies are kind of like tools or maps because they help us "find our way" when we are solving math problems. What can strategies help us to do? (Elicit the response, "they can help us find our way when we solve math problems.")

2.) Introduce students to the "FASTDRAW" Strategy.

- Display FASTDRAW Strategy
- Color-code "FAST" and "DRAW"
- Point to steps
- Prompt student thinking

For Example:

Now that you know what a strategy is and how it can help us in math, I'm going to teach you about a strategy that can help you do division problems. The name of this strategy is "FASTDRAW." (Point to the visual display of "FASTDRAW.") What is the name of the strategy? (Point to the visual display and say aloud with your students, "FASTDRAW.") Yes, we are going to learn about the strategy "FASTDRAW." (Point to the visual display of "FASTDRAW.") The "FASTDRAW" Strategy can help you solve division

problems. What kind of math problems can "FASTDRAW" help you to solve? (Elicit the response, "division problems.") That's right. The "FASTDRAW" Strategy will help you solve division problems.

3.) Teach the purpose for "FAST" and the steps "FAST".

- Teach the purpose for "FAST."
 - Cue with finger
 - Prompt student thinking

For Example:

The "FASTDRAW" Strategy can be separated or divided into two parts. The first part is "FAST." (Point to the "FAST" in "FASTDRAW.") The second part is "DRAW." (Point to the "DRAW" in "FASTDRAW.") Let's learn what "FAST" means first. (Point to the "FAST" in "FASTDRAW.") "FAST" can help us find the important information when we have a story problem. It also can help us set up an equation that can then help us solve the story problem. What can the "FAST" in "FASTDRAW" help us to do? (Point the "FAST" in "FASTDRAW" and elicit the response, "find the important information in a story problem and set up an equation to solve the problem.") Correct. The "FAST" in "FASTDRAW" can help you find the important information in a story problem and set up an equation to solve the problem (point to "FAST" as you say this).

- Teach the "F" step: "Find what you are solving for."
 - Think aloud
 - Cue with finger
 - Circle question mark
 - Underline question

For Example:

When we have a story problem, the first thing we need to do after we read it is to find what we are solving for (Point to the "F" step). One way to find what we are solving for is to look for a question. Let me show you what I mean. (Show students a division story problem and demonstrate first looking for a question mark and then reading the question. Relate to students that the question tells us what we are solving for. *Circle the question mark and underline the sentence as you "find" them.)

- Teach the "A" step: "Ask yourself, 'What is the important information.'
 - Think aloud

- Cue with finger
- Circle important information
- Cue extraneous information
- Prompt student thinking

For Example:

Now that we have found what we are solving for by finding the question mark and the question, the next thing we do is "Ask ourselves, 'What is the important information?'" (Point to "A" step as you say this.)

What does the "A" stand for? (Elicit the response, "Ask yourself, 'What is the important information?'"

Right, "A" stands for "Ask yourself, 'What is the important information?'"

We know that story problems have important information in them that help us solve them. You have all solved story problems that involve addition, subtraction, and multiplication. What important information did you look for first when solving those story problems? (Elicit the response, "number phrases/key words") Great thinking, guys. Yes, we can first look for important words or phrases, such as words or phrases that refer to numbers. A good way to do that is to read each sentence in the story problem and then ask ourselves, "Is there a number phrase in this sentence?" Let's do this together now. (Model reading each sentence and asking aloud "Is there a number phrase in this sentence?" Then circle all number phrases. *At this point, do not use story situations that contain extraneous information that includes number phrases. Teaching students how to determine whether extraneous information is important or not should come after students have had plenty of experiences solving story problems without such extraneous information first.)

- Teach the "S" step: "Set up the equation."
 - Think aloud
 - Cue step and highlighted information with finger
 - Cue words/phrases that relate to equation
 - Color-code numbers representing dividend and divisor
 - Prompt student thinking

For Example:

Ok, we have completed the "F" step and the "A" step (point to each step as you say them) by "finding what we are solving for" and "asking ourselves, "What is the important information?" Now, we can move to the "S" step (Point to the "S."). The "S" stands for "Set up the equation." (Point to the phrase as you say it.)

An equation represents the problem that is in this story. We use the things we learned from the "F" step and the "A" step to set up the equation. I'll show how to do that now. (First, remind students what they

are solving for by pointing to and saying aloud the underlined question. Highlight for students any key words that indicate the “operation” needed to solve the problem – e.g. in the division question, “How many CD’s does each person get?”, the key words would be “How many” and “each.” Discuss with students why this question and the key words indicate the division process. Second, model reading the important information you circled. Remind students of the language “dividend” and “divisor,” and how to determine which number phrase represents the dividend (e.g. it is the “total” and which number phrase represents the “divisor” (e.g. the number of groups.). Third, model where the dividend and the divisor should be written in a division equation. Relate the rationale for “why” they are placed in those positions by using the language of the story (e.g. “I have a total of _____ and I need to separate them equally into _____ groups. It makes sense that the total, or dividend should be written first since I start with the total. Then I separate them into the number of groups represented by the divisor. Therefore, it makes sense that I write the divisor second.” (Write the number and the context/phrase as you set up the equation.)

For Example:

14	2	=	?
“total CD’s”	“children”		“How many CD’s does each person get?”

- Teach the “T” step: “Tie down the sign.”
 - Think aloud
 - Cue important information with finger

For Example:

Great! Now that I have my equation set up, I just need to write the symbol or sign that means division. That is what the “T” step reminds me to do. (Point to the “T.”) The “T” stands for “Tie down the sign.” “Tie down the sign” means to write the symbol or sign that represents the operation I will use to solve the equation. In this case, I “tie” down the sign by writing the division symbol/sign next to the dividend and divisor. I will write beside the divisor. This is a good place to place the division symbol because it reminds me that I am “dividing” or “separating” the dividend into the number of groups represented by the divisor (Point to each number as you refer to it.)

For Example:

14	÷	2	=	?
“total CD’s”		“children”		“How many CD’s does each person get?”

- Review the steps of “FAST” and its purpose.
 - Point to steps

- Elicit student responses
- Prompt student thinking

For Example:

Alright, we now know what the “FAST- F, A, S, & T” in the “FASTDRAW Strategy” means. We also know what each step in “FAST” means. Let’s review. (Prompt students to respond to multiple questions regarding the purpose of “FAST” and the individual steps. *Provide visual and auditory cueing as needed. Also provide corrective feedback and positive reinforcement.)

4.) Teach the purpose of “DRAW” and the steps “DRAW”.

- Teach the purpose of “DRAW”
 - Cue with finger
 - Prompt student thinking

For Example:

We know that the “FAST” in the “FASTDRAW Strategy” helps us to decide what the important information in the story problem is and it helps us to set up an equation to solve the problem. Well, the “DRAW” in the “FASTDRAW Strategy” also will help us do something important. “DRAW” helps us to solve the equation we set up. (Point to “DRAW” in the word “FASTDRAW” and then to the steps of “DRAW.”) What does “DRAW” in the “FASTDRAW Strategy” help us to do? (Elicit the response, “it helps us to solve the equation.”) That’s right.

- Teach the “D’ step: “Discover the sign.”
 - Think aloud
 - Cue step with finger
 - Circle division sign

For Example:

Just like in “FAST,” each letter in “DRAW” reminds us of an important step to use. If we follow these steps, we will be able to solve the equation. The first step in “DRAW” is “D.” (Point to the “D.”) The “D” stands for “Discover the sign.” (Point to the phrase as you say it aloud.) What does the “D” stand for? (Elicit the response, “Discover the sign.”) Yes, the “D” stands for “Discover the sign.” To discover the sign, I look at my equation and find the symbol that tells me what operation I need to use to solve the equation. Hmm, where is the sign in the equation I have written? Oh, here it is. (Point to the sign.) This sign means to “divide.” I’ll circle it so I can remember what it is I need to do to solve the equation. (Circle the division sign.)

- Teach the “R” step: “Read the problem.”
 - Think aloud
 - Cue step with finger
 - Elicit student responses
 - Prompt student thinking

For Example:

Now that I have discovered the sign and I know what operation I need to use to solve the equation, its time to move to the “R” step. (Point to the “R.”) The “R” stands for “Read the problem.” (Point to the phrase as you say it aloud.) To read this equation, I start with the dividend (Point to the dividend). The dividend is _____. Next I say the operation. (Point to the division sign and say “divided by.”) Last, I say the “dividend” since that represents the number of groups I will equally divide or separate the dividend into. Let’s read the problem together. (Point to each number and symbol as you and your students read the problem.) Great job. Reading the problem aloud is a good strategy to use because it allows you to not only see the equation, it also lets you hear it as well. When we read the problem, what do we start with? (Elicit the response, “the dividend.”) Good. And what does the dividend represent? (Elicit the response, “the total.”) Yes, the dividend represents the total. What do we read next? (Elicit the response, “the sign.”) Good. We read the sign next because that tells us what we need to do with the dividend. The divide sign means we need to do what? (Elicit the response, “separate the dividend into equal groups.”) Yes, the divide sign tells us to separate our dividend into equal groups. What do we read last? (Elicit the response, the “divisor.”) Yes, we read the divisor last. What does the divisor represent? (Elicit the response, “the number of groups we will separate/divide the dividend into.”) Excellent thinking guys. The divisor tells us the number of groups we will separate or divide the dividend or total into.

- Teach the “A” step: “Answer, or draw and check.”
 - Think aloud
 - Cue step with finger
 - Elicit student responses
 - Prompt student thinking

For Example:

The first two steps of “DRAW,” “Discover the sign,” and “Read the problem” get us ready to solve the equation. The “A” reminds us it is time to answer or solve the equation. The “A” stands for “Answer, or draw and check.” What does the “A” stand for? (Elicit the response, “Answer, or draw and check.”) Yes. We answer the equation by solving it. For the last several days, you have learned how to solve division equations using concrete materials like _____. Today you will learn how to draw pictures that will help you solve division problems. That is what is meant by the phrase “draw and check.” (Point to this

phrase.) I will show you how to do this soon, but for now it is important to know that the “A” step reminds us to answer the problem, or draw and check.

- Teach the “W” step: “Write the answer.”
 - Think aloud
 - Cue step with finger
 - Elicit student responses
 - Prompt student thinking

For Example:

The last step in “DRAW” is “W.” (Point to “W.”) It stands for “Write the answer.” What does the “W” stand for? (Elicit the response, “write the answer.”) Great, the last thing we do when solving a division equation is to write the answer. If I were to solve the equation we have written, I would write the answer in this position. (Point to the appropriate space.) Where do I write my answer? (Elicit the appropriate response.)

- Review the steps of “DRAW” and its purpose.

Alright, we now know what the “DRAW- D, R, A, & W” in the “FASTDRAW Strategy” means. We also know what each step in “DRAW” means. Let’s review. (Prompt students to respond to multiple questions regarding the purpose of “DRAW” and the individual steps. *Provide visual and auditory cueing as needed. Also provide corrective feedback and positive reinforcement.)

- Review the steps and purpose of “FASTDRAW” collectively

*Follow the same procedure as above except review the “FAST” and the “DRAW” together as well as how the two parts work together to help solve division story problems.

Learning Objective 2: Draw solutions to division story problems using the “FASTDRAW Strategy.”

A. Break down the skill of drawing solutions to division story problems using the FASTDRAW Strategy.

- 1.) Introduce story problem.
- 2.) Read the story problem aloud and then have students read it with you.
- 3.) Teach finding the important information in the story problem and setting up an equation using the steps “FAST” from the “FASTDRAW” Strategy.
 - 3a. Find what you are solving for.
 - 3b. Ask yourself, what is the important information (circle it).
 - 3c. Set up the equation.

- 3d. **T**ie down the sign.
- 4.) Teach drawing solutions using the steps "DRAW" from the "FASTDRAW" strategy.
 - 4a. **D**etermine the sign.
 - 4b. **R**ead the problem.
 - 4c. **A**nswer, or draw and check.
 - 4d. **W**rite the answer.
- 5.) Model how to solve the story problem by relating the "answer" to the division equation back to the story problem context.
- 6.) Model how to draw solutions to division equations by repeating the steps in #4 and #5 at least two or three more times with different division equations.

B. Explicitly Describe and Model how to draw solutions to division story problems using the "FASTDRAW Strategy."

- 1.) Visually display a story problem/division situation. (Color-code the number phrases that represent the dividend and the divisor.)
 - color-code dividend and divisor
 - make visible to all students

For Example:

The local music store was giving away 14 free CD's of the musical group, the "Backstreet Boys" as a promotion. The CD's were given away in packs of three. How many packs were given out? How many single CD's were left over?

- 2.) Read the story problem aloud and then have students read it with you.
 - *Follow the same procedure described for Learning Objectives 2 &3 in the Concrete Level Instructional Plan.
- 3.) Teach finding the important information in the story problem and setting up an equation using the steps "FAST" from the "FASTDRAW" Strategy.
 - *Follow the same procedure as described above for teaching the "FAST" of the "FASTDRAW Strategy."
- 4.) Teach drawing solutions using the steps "DRAW" from the "FASTDRAW" strategy.
 - Follow the same procedure as described above for teaching the "DRAW" of the "FASTDRAW Strategy."
 - Explicitly describe and model how to draw solutions for the "A" step, "Answer, or draw and check."


- Model drawing pictures to represent the dividend and relating the pictures to a concrete representation of the dividend.
 - Think aloud
 - Point to objects and count them aloud
 - Prompt student thinking
 - Cue relationship of objects and pictures with finger or by drawing a line between them

For Example:

In order to *answer* the equation, we need to *solve it*. As I mentioned earlier, I will show you a way to solve division equations without using concrete materials. Instead of concrete materials, I'll show you how to draw pictures to solve a division equation instead. I'll show you how to do this with this equation.



When we used concrete materials, like _____, we represented the dividend by counting out the appropriate number of _____ that equaled the total, or dividend. I'll do that again. (Count out the appropriate number of counting objects to represent the dividend. Place them in one single row.)

For Example:

$$\begin{array}{r}
 14 \\
 + \quad \underline{3}
 \end{array}$$


How many objects do I have? (Elicit the response, "fourteen.") That's right. Why did I count out fourteen objects? (Elicit the response, "because that is how many the dividend/total is.") Good. Now, I'm going to draw some simple pictures that represent the same number as does these objects. (Model drawing tallies or dots, which represent the same number of concrete objects. *To show direct one-to-one correspondence, draw each picture directly under each concrete object so that the pictures are also arranged in on row.)

For Example:

$$\begin{array}{r}
 14 \\
 + \quad \underline{3}
 \end{array}$$



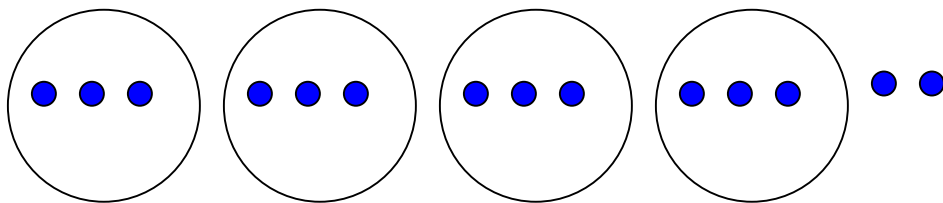
How many tallies/dots did I draw? (Count aloud with your students and elicit the appropriate response.) How many objects do I have? (Elicit the appropriate response.) Do I have the same number of objects as pictures? (Elicit the response, "yes." *If there is confusion, prompt students by recounting the objects and the pictures and by pointing out their one-to-one correspondence. Draw a line between each object and each picture if needed.) Great, I do have the same number of pictures as I do objects.

- Model separating/dividing the drawings into equal groups determined by the divisor and relate this process to grouping concrete objects.
 - Think aloud
 - Cue objects and drawings with finger
 - Count aloud
 - Prompt student thinking
 - Elicit student responses

For Example:

Now that we have our dividend represented with pictures, it's time to divide the pictures by our divisor, "three." (Point to the divisor.) We already know how to do this with our concrete objects, so let's do that now. How do I divide these objects? (Elicit the response, "separate them into groups of three.") Excellent thinking. We separate them into groups of three because three is our divisor. (Model separating the objects into groups of three. Use a container or string to represent the groups.)

For Example:



How many groups do I have? (Elicit the response, "four.") How many objects do I have left over? (Elicit the response, "two.") Good. Why are these two objects "left over." (Elicit the response, "because there aren't enough to put in each group.") Yes. They are "left over" because there are not enough to put one more in each group. What do we call objects that are "left over?" (Elicit the response, "remainder.") Yes, we call the left over objects the remainder.

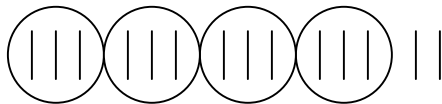
Now, I want to show you how to divide our pictures just like we did our concrete objects. I can divide my tallies/dots by counting three and then drawing a circle around them. I'll do that now. (Model counting aloud three tallies/dots and then drawing a circle around them.)

For Example:



The circle means these three tallies/dots are in one group. This is the same thing as grouping three objects on a plate/circling three objects with string. (Point to one group of three objects.) I can keep counting by three's and circle each group until there are no longer three tallies/dots left. I'll do that now. (Continue to count aloud three tallies/dots and circling them until you have only two tallies/dots left.) (Count aloud the two remaining tallies/dots.)

For Example:



Hmm, I don't have three tallies/dots so I know I cannot group them with a circle. They must be my remainder. I can't make any more groups of three so it's time to count my groups. How many groups of three tallies/dots do I have? (Elicit the response, "four.") Yes, I have four groups. How many groups of three objects did we have? (Elicit the response, "four.") Good. Now, how many tallies/dots are remaining/left over? (Elicit the response, "two.") Great, there are two tallies/dots remaining/left over. How many objects were left over? (Elicit the response, "two.") Good. What is our solution? (Elicit the response, "four groups with two left over.")

- Model checking your drawings.
 - Think aloud
 - Count pictures aloud
 - Prompt student thinking

For Example:

Now that I have finished drawing pictures, I need to check them and be sure I drew them correctly. I do this by counting my tallies to be sure they total the dividend. (Count aloud the tallies and compare the total to the dividend.) I know I have the correct number of tallies, so now I need to

check to see if I have my dividend drawn correctly. The dividend is represented by the tallies in each circle or group. I can check this by counting the number of tallies in each group and be sure they equal the divisor. (Count aloud the tallies in each group and compare the total in each group to the divisor.) Last, I check my remainder by being sure there are fewer tallies left over than there are in each group. (Count aloud the remaining tallies and compare the total to the divisor/the number of tallies in each group.)

5.) Model finding the solution to the story problem by relating the solution to the division equation to the story problem context.

- Think aloud
- Prompt student thinking
- Cue important information with finger

For Example:

Now that we have drawn our solution and checked our work, we have one more thing left to do. Who knows what we need to do now that we have solved the division equation, "fourteen divided by three?" (Elicit the response, "answer/solve the story problem.") That's right, we need to use our solution to answer the story problem. What is it we needed to solve for? (Elicit the response, "How many packs of three CD's were given out? and How many single CD's were left over?") Great thinking! So, how many packs of CD's were given out? (Point to the appropriate question in the story problem and elicit the response, "four.") And how do you know this? (Elicit the response, "because we circled four groups of tallies.") Yes, and what did each tally represent? (Elicit the response, "one CD.") That's right, each tally represented one CD. Each circle represented one pack of three CD's. (Point to one circle and count the three tallies aloud.) Because we have four circled groups of three tallies, we know four packs of CD's were given out. Were any single CD's left over? (Point to the appropriate question in the story problem and elicit the response, "two.") Yes, there are two single CD's left. I know this because I have two tallies left over. (Point to the two left over tallies.) Excellent job guys!

6.) Model how to draw solutions to division equations by repeating the steps in #4 at least two or three more times with different division equations. *It is recommended that you use concrete materials as a comparison to drawings for one more example and then fade the use of concrete objects for comparison.*

IV. Scaffold Instruction

*This teaching plan provides a description of how to scaffold instruction for using "DRAW" to solve division equations without and with remainders. The same basic process can be used for scaffolding instruction for other skills/concepts explicitly modeled during Explicit Teacher Modeling. First, break the skill/concept into learnable parts (e.g. use those "parts" taught during Explicit Teacher Modeling) and then fade your direction in three phases:

1.) High level of teacher support; 2.) Medium level of teacher support; 3.) Low level of teacher support.

Scaffolding Instruction should occur for each skill/concept taught during Explicit Teacher Modeling before providing student practice.

Purpose: to provide students the opportunity to build their understanding of how to draw solutions to division story problems and equations, with and without remainders, and to provide you the opportunity to evaluate your students' level of understanding after your initial modeling of these skills.

Learning Objective 2: Drawing solutions to division story problems using the FASTDRAW Strategy - Solving division equations using DRAW.

Materials:

Teacher -

- appropriate division equations represented visually on chalkboard, dry-erase board, chart/chart paper, overhead projector.
- chalk, markers for writing and drawing

Students -

- paper with appropriate division equations to practice drawing solutions to during 3rd phase of Scaffolding Instruction - Low Level of Scaffolding Instruction.
- pencils for drawing and writing answers.

Description:

1.) Scaffold Using a High Level of Teacher Direction/Support

a. Choose one or two places in the problem-solving sequence to invite student responses. Have these choices in mind before you begin scaffolding instruction. (Examples of choices are shown in red.) *Color-code the dividend and the divisor in each equation during this phase of instructional scaffolding.

- Review steps of "DRAW"
 - " I have an equation here. Hmm, I know there is a strategy that can help me draw pictures to solve this equation. What is the name of the strategy? Oh, yes, it is called the 'DRAW'. (Point to 'DRAW' in the FASTDRAW Strategy or display 'DRAW' and its steps separately.) **What is the name of the strategy that can help me draw pictures to solve this equation? (Elicit the response, "DRAW.")** I know each letter in 'DRAW' stands for a step in solving an equation. The 'D' stands for 'Discover the sign.' (Point to the appropriate phrase as you say it.) **What does the 'D' stand for? (Elicit the response, "Discover the sign.")** Yes, 'D' stands for 'Discover the sign.' (*Repeat this process for each step of 'DRAW'.) "

- Model the “D” step, “Discover the sign.”
 - “Now that I know I can use the ‘DRAW’ Strategy to help me solve this equation, I can begin by completing the first step, ‘D’. **What does ‘D’ stand for? (Point to the ‘D’ step and elicit the response, “Discover the sign.”)** Yes, I first need to discover the sign. I do this by finding the symbol that tells me what math operation to use. (Point to the division sign.) Hmm, this sign has a line in the middle and a dot on the top and a dot on the bottom. It also looks like a sideways face. I see a long nose with two eyes. (Point to the relevant features of the division sign.) **What can I do to help me remember what math operation I need to use? (Elicit the response, “circle it.”)** Yes, I can circle it to help me remember what math operation to use. (Circle the division sign.) “
- Model the “R” step, “Read the problem.”
 - “I’ve discovered the sign, and know I need to divide. The next step is ‘R.’ **What does ‘R’ stand for? (Point to the ‘R’ step and elicit the response, “Read the problem.”)** Yes, I need to read the problem. “ When I read a division problem, I know I need to read the dividend or total first. Usually, the dividend will be the number that has the higher value because it represents the total. In this equation, the dividend must be ___ because it has the higher value. (Point to the dividend and say it aloud.) I know that I have to divide because the sign I discovered is a division sign. (Point to the division sign.) Last, I find the divisor. This number must be my divisor because it is the remaining number. It also represents a lower value. The divisor usually is a number that has a lower value than the dividend. Now that I know all the parts of this equation, I’ll read it. (Read the equation aloud.) Now, read the problem with me. (Encourage students to read the problem aloud with you as you point to each part of the equation.)”
- Model the “A” step, “Answer, or draw and check.”
 - Draw pictures to represent the dividend. - “Now that I know what the problem is and what math operation I need to use, I need to complete “A” step. **What is the “A” step? (Elicit the response, “Answer, or draw and check.”)** Yes, I need to answer the equation. I know I can draw pictures to solve a division equation. Hmm, I remember using concrete materials to do this. When I did this, I first represented the dividend by counting out that number of objects. I can do the same thing by drawing pictures instead of using concrete objects. **What kind of pictures can I draw? (Elicit the response, “tallies or dots.”)** Yes, I can represent the dividend by drawing tallies or dots. I’m going to draw tallies. My dividend is ___ so I need to draw ___ tallies. (Draw the appropriate number of tallies.)”
 - Draw circles around pictures to represent dividing them into equal groups based on the divisor. - “Now I have to divide or separate these tallies into groups. I know the

divisor tells me how many tallies belong in each group. (Point to the divisor and say aloud how many tallies should be in each group.) I can put the tallies into groups by drawing circles around them. **How many tallies do are in each group? (Elicit the appropriate response.)** Yes, I need to circle ___ tallies at a time. I'll do that now. (Circle the tallies until you have tallies "left over.") I have ___ tallies left over. That is not enough to put in a group so I know this is my remainder. "

- o Model checking your drawings. - "Now that I have finished drawing pictures, I need to check them and be sure I drew them correctly. I do this by counting my tallies to be sure they total the dividend. (Count aloud the tallies and compare the total to the dividend.) I know I have the correct number of tallies, so now I need to check to see if I have my dividend drawn correctly. The dividend is represented by the tallies in each circle or group. I can check this by counting the number of tallies in each group and be sure they equal the divisor. (Count aloud the tallies in each group and compare the total in each group to the divisor.) Last, I check my remainder by being sure there are fewer tallies left over than there are in each group. (Count aloud the remaining tallies and compare the total to the divisor/the number of tallies in each group.)"
- o Model how to find the answer to the equation. - "Now, to answer the equation, I count the number of groups. (Count aloud the groups.) **How many groups do I have? (Elicit the appropriate response.)** Yes. **And how many tallies do I have left over? (Elicit the appropriate response.)**"
- Model the 'W' step, "Write the answer."
 - o " I have found my answer by drawing pictures and I have checked my drawings to be sure they are accurate. Now I can finish solving the problem by completing the 'W' step. **What is the 'W' step? (Elicit the response, "Write the answer.")** Great, after I have found my answer by drawing, I write the answer. I know the answer to a division equation should be written here. (Point to the appropriate space.) **What is my answer? (Elicit the appropriate response.)** Yes, my answer is _____. I know this because I have ___ groups (Point to each circled group of tallies and count them aloud.) and I have ___ tallies left over (Point to the remaining tallies and count them aloud.) I'll write the answer here. (Point to the appropriate space and write the answer.) "

b. Maintain a high level of teacher direction/support for another example if students demonstrate misunderstanding/non-understanding; move to a medium level of teacher direction/support if students respond appropriately to the selected questions/prompts.

2.) Scaffold Using a Medium Level of Teacher Direction/Support

a. Choose several more places in the problem-solving sequence to invite student responses. Have these choices in mind before you begin scaffolding instruction. (Examples of choices are shown in red.)

- Review steps of "DRAW"
 - " I have another equation. **What is the name of the strategy that can help me draw pictures to solve this equation? (Elicit the response, "DRAW.")** I know each letter in 'DRAW' stands for a step in solving an equation. The 'D' stands for 'Discover the sign.' (Point to the appropriate phrase as you say it.) **What does the 'D' stand for? (Elicit the response, "Discover the sign.")** Yes, 'D' stands for 'Discover the sign.' (*Repeat this process for each step of 'DRAW'.) "

- Model the "D" step, "Discover the sign."
 - "Now that I know I can use the 'DRAW' Strategy to help me solve this equation, I can begin by completing the first step, 'D'. **What does 'D' stand for? (Point to the 'D' step and elicit the response, "Discover the sign.")** Yes, I first need to discover the sign. **How do I do this? (Elicit the response, " by finding the symbol that tells what math operation to use.")** Good. (Point to the division sign.) **What is the sign? (Elicit the response, "division.")** Good. **How do you know it is a division sign? (Elicit the response, it has a line in the middle and a dot on the top and a dot on the bottom/it also looks like a sideways face. I see a long nose with two eyes.)** (Point to the relevant features of the division sign.) Excellent thinking! **What can I do to help me remember what math operation I need to use? (Elicit the response, "circle it.")** Yes, I can circle it to help me remember what math operation to use. (Circle the division sign.) "

- Model the "R" step, "Read the problem."
 - "I've discovered the sign, and know I need to divide. The next step is 'R.' **What does 'R' stand for? (Point to the 'R' step and elicit the response, "Read the problem.")** Yes, I need to read the problem. " When I read a division problem, I know I need to read the dividend or total first. Usually, the dividend will be the number that has the higher value because it represents the total. **What is the dividend in this problem? (Elicit the appropriate response.)** Yes. (Point to the dividend and say it aloud.) I know that I have to divide because the sign I discovered is a division sign. (Point to the division sign.) Last, I find the divisor. This number must be my divisor because it is the remaining number. It also represents a lower value. The divisor usually is a number that has a lower value than the dividend. Now that I know all the parts of this equation, I'll read it. (Read the equation aloud.) Now, read the problem with me. (Encourage students to read the problem aloud with you as you point to each part of the equation.)"

- Model the "A" step, "Answer, or draw and check."
 - Draw pictures to represent the dividend. - "Now that I know what the problem is and what math operation I need to use, I need to complete "A" step. **What is the "A"**

- step? (Elicit the response, "Answer, or draw and check.") Yes, I need to answer the equation. I know I can draw pictures to solve a division equation. **What kind of pictures can I draw? (Elicit the response, "tallies or dots.")** Yes, I can represent the dividend by drawing tallies or dots. I'm going to draw tallies. My dividend is ___ so I need to draw ___ tallies. (Draw the appropriate number of tallies.)"
- o Draw circles around pictures to represent dividing them into equal groups based on the divisor. - "Now I have to divide or separate these tallies into groups. **What number tells me how many tallies belong in each group. (Elicit the response, "the divisor.")** Good. (Point to the divisor and say aloud how many tallies should be in each group.) I can put the tallies into groups by drawing circles around them. **How many tallies do are in each group? (Elicit the appropriate response.)** Yes, I need to circle ___ tallies at a time. I'll do that now. (Circle the tallies until you have tallies "left over.") I have ___ tallies left over. **Can I circle these tallies? (Elicit the response, "no.") Why? (Elicit the response, "because there are not enough/they are fewer than the divisor.")** That's right, there are fewer tallies left than are represented by the divisor."
 - o Model checking your drawings. - "Now that I have finished drawing pictures, I need to check them and be sure I drew them correctly. How do I check the dividend? (Elicit the response, "count the total number of tallies to be sure they total the dividend.") Yes. (Count aloud the tallies and compare the total to the dividend.) I know I have the correct number of tallies, so now I need to check to see if I have my dividend drawn correctly. The dividend is represented by the tallies in each circle or group. I can check this by counting the number of tallies in each group and be sure they equal the divisor. (Count aloud the tallies in each group and compare the total in each group to the divisor.) Last, I check my remainder by being sure there are fewer tallies left over than there are in each group. (Count aloud the remaining tallies and compare the total to the divisor/the number of tallies in each group.)"
 - o Model how to find the answer to the equation. - "Now, to answer the equation, I count the number of groups. (Count aloud the groups.) **How many groups do I have? (Elicit the appropriate response.)** Yes. **And how many tallies do I have left over? (Elicit the appropriate response.)**" **What do we call the left over tallies? (Elicit the response, "remainder.")** Yes, they represent the remainder."
- Model the 'W' step, "Write the answer."
 - o " I have found my answer by drawing pictures and I have checked my drawings to be sure they are accurate. Now I can finish solving the problem by completing the 'W' step. **What is the 'W' step? (Elicit the response, "Write the answer.")** Great, after I have found my answer by drawing, I write the answer. **Where to I write the answer? (Elicit the appropriate response.)** Great thinking! I know the answer to a division

equation should be written here. (Point to the appropriate space.) **What is my answer?** (Elicit the appropriate response.) Yes, my answer is _____. I know this because I have ____ groups (Point to each circled group of tallies and count them aloud.) and I have ____ tallies left over (Point to the remaining tallies and count them aloud.) I'll write the answer here. (Point to the appropriate space and write the answer.) "

b. Maintain a medium level of teacher direction/support for another example if students demonstrate misunderstanding/non-understanding; move to a low level of teacher direction/support if students respond appropriately to the selected questions/prompts.

3.) Scaffold Using a Low Level of Teacher Direction/Support

a. When students demonstrate increased competence, do not model the process. Ask students questions and encourage them to provide all responses. (Examples of choices are shown in red.) Direct students to replicate the process at their desks as you work together.

- Review steps of "DRAW"
 - " I have another equation. **What is the name of the strategy that can help me draw pictures to solve this equation?** (Elicit the response, "DRAW.") What does each letter in 'DRAW' stand for? (Elicit the response, "the steps for solving an equation.") Yes. **What does the 'D' stand for?** (Elicit the response, "Discover the sign.") Yes, 'D' stands for 'Discover the sign.' (*Repeat this process for each step of 'DRAW'.) "
- Model the "D" step, "Discover the sign."
 - "Now that I know I can use the 'DRAW' Strategy to help me solve this equation, I can begin by completing the first step, 'D'. **What does 'D' stand for?** (Point to the 'D' step and elicit the response, "Discover the sign.") Yes, I first need to discover the sign. **How do I do this?** (Elicit the response, " by finding the symbol that tells what math operation to use.") Good. (Point to the division sign.) **What is the sign?** (Elicit the response, "division.") Good. **How do you know it is a division sign?** (Elicit the response, it has a line in the middle and a dot on the top and a dot on the bottom/it also looks like a sideways face. I see a long nose with two eyes." (Point to the relevant features of the division sign.) Excellent thinking! **What can I do to help me remember what math operation I need to use?** (Elicit the response, "circle it.") Yes, I can circle it to help me remember what math operation to use. (Circle the division sign.) "
- Model the "R" step, "Read the problem."
 - "I've discovered the sign, and know I need to divide. **What is the next step?** (Elicit the response, 'R'.) **What does 'R' stand for?** (Point to the 'R' step and elicit the

response, "Read the problem.") Yes, I need to read the problem. " When I read a division problem, what do I read first? (Elicit the response, "the dividend.") Yes, I know I need to read the dividend or total first. What does the dividend represent? (Elicit the response, "the total.") Good. The dividend represents the total. What is the dividend in this problem? (Elicit the appropriate response.) Yes. (Point to the dividend and say it aloud.) How do you know this is the dividend? (Elicit the response, "because it has the highest value/it is more.") What do I read next? (Elicit the response, "the division sign.") Yes, need to read the sign because it tells me what math operation to use to solve the problem. (Point to the division sign.) What do I read last? (Elicit the response, "the divisor.") Right, I read the divisor last. What is the divisor? (Elicit the appropriate response.) How do you know this is the divisor? (Elicit the response, "because it is less than the dividend.") Right, this number must be my divisor because it is less than the dividend and because it is the remaining number. Now that we know all the parts of this equation, we'll read it. (Encourage students to read the problem aloud with you as you point to each part of the equation.)"

- Model the "A" step, "Answer, or draw and check."
 - Draw pictures to represent the dividend. - "Now that we know what the problem is and what math operation I need to use. What is the next step? (Elicit the response, "the "A" step.) What is the "A" step? (Elicit the response, "Answer, or draw and check.") Yes, I need to answer the equation. I know I can draw pictures to solve a division equation. What kind of pictures can I draw? (Elicit the response, "tallies or dots.") What do we draw first? (Elicit the response, "___ tallies.") Why do we draw ___ tallies? (Elicit the response, "because that is the dividend/total.") Yes, we represent the dividend first by drawing tallies or dots. I'm going to draw ___ tallies and you draw them on your paper (Draw the appropriate number of tallies.)"
 - Draw circles around pictures to represent dividing them into equal groups based on the divisor. - "How do we divide or separate these tallies into groups? (Elicit the response, "circle them.") What number tells me how many tallies belong in each group. (Elicit the response, "the divisor.") Good. (Point to the divisor and say aloud how many tallies should be in each group.) We can put the tallies into groups by drawing circles around them. How many tallies do are in each group? (Elicit the appropriate response.) Yes, we need to circle ___ tallies at a time. Let's do that now. (I'll circle tallies here and you do the same on your paper.) Do we have any tallies left over? (Elicit the appropriate response.) Yes, we have ___ tallies left over. Can we circle these tallies? (Elicit the response, "no.") Why? (Elicit the response, "because there are not enough/they are fewer than the divisor.") That's right, there are fewer tallies left

- than are represented by the divisor. **What do we call the left over tallies? (Elicit the response, "remainder.")** Yes, they represent the remainder."
- o Model checking your drawings. – **"Now that I have finished drawing pictures, what do I need to do? (Elicit the response, "check the drawings.")** Yes, we need to check them and be sure we drew them correctly. **How do we check the dividend? (Elicit the response, "count the total number of tallies to be sure they total the dividend.")** Yes. Let's count them. **You count yours and I'll count mine. How many tallies should you have? (Elicit the appropriate response.)** We know we have the correct number of tallies. **What do we check next? (Elicit the response, "to see if we have the dividend drawn correctly.")** Yes. **How do we know if the dividend is drawn correctly? (Elicit the response, "make sure the number of tallies we circled is the same as the divisor.")** Excellent thinking! I can check this by counting the number of tallies in each group and be sure they equal the divisor. **What is the divisor? (Elicit the appropriate response.)** You count yours and I'll count mine. **What do we check last? (Elicit the response, "the remainder.")** Yes, we have to check the remainder. **How do we do this? (Elicit the response, "count them to see that they are less than the divisor/less than the number of tallies in each group.")** Right. **Count your remaining tallies and I'll count mine. Are there enough to make another group of ___? (Elicit the response, "no.")"**
 - o Model how to find the answer to the equation. – **"Now, to answer the equation, I count the number of groups. (Count aloud the groups.) How many groups do I have? (Elicit the appropriate response.)** Yes. **And how many tallies do I have left over? (Elicit the appropriate response.)"**
 - Model the 'W' step, "Write the answer."
 - o " I have found my answer by drawing pictures and I have checked my drawings to be sure they are accurate. **What do I do next? (Elicit the response, "the 'W' step.")** Yes. **What is the 'W' step? (Elicit the response, "Write the answer.")** Great, after I have found my answer by drawing, I write the answer. **Where to I write the answer? (Elicit the appropriate response.)** Great thinking! I know the answer to a division equation should be written here. (Point to the appropriate space.) **What is my answer? (Elicit the appropriate response.)** Yes, my answer is _____. **How do you know this? (Elicit the response, " because there are ___ groups and there are ___ tallies left over.")** Great. **I'll write the answer and you write yours on your paper."**

b. When you are confident students understand, ask individual students to direct the problem solving process or have the class direct you: Students ask questions and you and the students respond/perform the skill.

Instructional Phase 2: Facilitate Acquisition to Mastery – Student Practice

*The student practice strategies described below can be used for both drawing solutions from division story problem contexts and from division equations without story problem contexts. A detailed description for providing practice for drawing solutions to division equations at the receptive/recognition and expressive levels is provided.

1. Receptive/Recognition Level

Purpose: to provide students multiple opportunities to practice matching appropriate drawings to given division equations and written solutions.

Learning Objective 2: Drawing solutions to division story problems using the FASTDRAW Strategy – Solving division equations using DRAW.

Instructional Game/Structured Cooperative Learning Groups

Materials:

Teacher –

- overhead projector
- marker for writing
- large cards with a variety of appropriate division number sentences written on them in large enough writing to be seen from all areas of the classroom.
- a box or suitable container to place the cards in
- Cards with the individual roles written on them for describing each role. (i.e. group writer, group checker, group drawer, group reporter, group score-keeper)

Students -

- paper for drawing solutions
- paper for keeping score
- pencils and markers for keeping score and drawing solutions

Description:

Activity:

Class is divided into groups of approximately five students. Each group member is assigned one of the following roles: group writer, group checker, group drawer, group reporter, group score-keeper. The teacher leads game from overhead projector. A box is placed at the front of the classroom containing large cards with division number sentences written on them (e.g. $10 \div 4 = 2 \text{ r}2$). Groups are assigned a number that

reflects the order that a student from that group will come to the front of the classroom to pull a card from the box. Students in each group are assigned numbers that reflect the order they will pull a card from the box when it is their group's turn. The respective student holds the card up so all groups can see it and then reads the division number sentence. Each "group writer" copies the number sentence on a piece of paper. The "checker" for each group verifies the number sentence is written correctly. The student returns to his/her group and each group draws the solution to the division number sentence. The "group drawer" makes the final drawing for their group. An appropriate time frame is provided for groups to draw their solutions. Meanwhile the teacher draws three different examples of solutions, only one of which is accurate, on the overhead with the projector turned off. The teacher numbers each example, "1, 2, 3." At the appropriate time, the teacher signals groups to stop drawing and then reveals the three choices. Groups have a short period of time to make their choice for which of the three examples is correct. At the end of the time period, the teacher instructs the "group writer" to write the number of the choice their group has made. The "group reporter" then says the group's choice while holding up the number they wrote when asked for it by the teacher. After all groups have made their selections, the teacher reveals the correct drawing. Groups get 1 point for making the correct selection. After the teacher reveals the correct drawing, then she/he asks each group to hold up their drawing. If the group's drawing is correct, then that group gets an additional point. The "group recorder" keeps a record of their group's score on a sheet of paper by making a tally for each point their group earns. Teacher provides feedback including positive reinforcement and corrective feedback as appropriate. For each example, the teacher "talks aloud" why the drawing represents the number sentence, emphasizing the dividend, the divisor, and the quotient with remainder.

Instructional Game/Structured Cooperative Learning Groups Steps:

- 1.) Provide explicit directions for the instructional game/cooperative group activity including what you will do, what students will do, and reinforce any behavioral expectations for the game.
- 2.) Arrange students in cooperative groups. Groups should include students of varying skill levels.
- 3.) Assign roles to individual group members and explain them (e.g. group writer, group checker, group drawer, etc.).
- 4.) Distribute materials.
- 5.) Have students number themselves for the order in which they will pull a card from the box.
- 6.) Number groups for the order in which a representative of their group will pull a card from the box.
- 7.) Review/model appropriate cooperative group behaviors and expectations.
- 8.) Model one example of skill(s) (i.e. drawing solutions and making an appropriate choice from three examples of drawings) within the context of the game.
- 9.) Provide opportunity for students to ask questions.
- 10.) Play one practice round so students can apply what you have modeled. Provide specific feedback/answer any additional questions as needed.
- 11.) Teacher monitors and provides specific corrective feedback & positive.
- 12.) Play game.

- 13.) Encourage group score-keeper to review their individual score sheets and write the total number of points at the top of their score sheets.
- 14.) Review team scores, providing positive reinforcement to each group for their work.

2. Expressive Level

Purpose: to provide students multiple opportunities to draw solutions to division equations and receive immediate feedback about their responses.

Learning Objective 2: Drawing solutions to division story problems using the FASTDRAW Strategy - Solving division equations using DRAW.

Self-Correcting Materials - Folder Practice

Materials:

Teacher -

- manila folders with division equations written on right column of inside flap and appropriate drawings/solutions written on the left column of the same inside flap. The front cover is cut in half to reveal only the division equations.

Students -

- manila folder self-correcting materials with appropriate division equations represented.
- paper for writing solutions
- pencil

Description:

Activity:

A variety of appropriate division equations are written in a column on the right side of the inside flap of a manila folder. On the left side of the inside flap are written the drawings and solutions to each equation. The front flap of the manila folder is cut in half so that only the division equations are revealed. The solutions are covered by the front flap. Students solve each division equation by drawing and after they have completed all equations, they turn the front flap over and check their answers. Students cross out incorrect responses, and draw/write the correct response on their response sheet. The teacher reviews student response sheets to evaluate student understanding/progress. *An example of a drawing and written solution to one division equation can be written on the back of the manila folder as a cueing mechanism for students.

Self-Correcting Materials Steps:

- 1.) Introduce self-correcting material.
- 2.) Distribute materials.
- 3.) Provide directions for self-correcting material, what you will do, what students will do, and reinforce any behavioral expectations for the activity.
- 4.) Provide time for students to ask questions.
- 5.) Model responding/performing skill within context of the self-correcting material.
- 6.) Model how students can keep track of their responses.
- 7.) Have students practice one time so they can apply what you have modeled. Provide specific feedback/answer any additional questions as needed.
- 8.) Instruct students to write the number that is in the front left hand corner of the manila folder on the front left hand corner of their response sheet. *This will let you know which set of division equations they responded to.
- 9.) Monitor students as they work
- 10.) Provide ample amounts of positive reinforcement as students practice.
- 11.) Provide specific corrective feedback/ re-model skill as needed.
- 12.) Review individual student response sheets.

Instructional Phase 3: Evaluation of Student Learning/Performance (Initial Acquisition through Mastery/Maintenance)

1. Continuously Monitor & Chart Student Performance

Purpose: to provide you with continuous data for evaluating student learning and whether your instruction is effective. It also provides students a visual way to "see" their learning.

Materials:

Teacher -

- appropriate prompts if they will be oral prompts
- appropriate visual cues when prompting orally

Student -

- appropriate response sheet/curriculum slice/probe
- graph/chart

Description:

Steps for Conducting Continuous Monitoring and Charting of Student Performance:

- 1.) Choose whether students should be evaluated at the receptive/recognition level or the expressive level for drawing solutions to division equations.

- 2.) Choose an appropriate criteria to indicate mastery (8 out of 8 up to 10 out of 10 correct is appropriate for drawing solutions. Provide an appropriate amount of time for students to complete problems. However, this time frame should be no more than 5 minutes since this evaluation technique should not require a lot of class time.
- 3.) Provide appropriate number of prompts in an appropriate format (receptive/recognition or expressive) so students can respond.
 - Based on the skill, your students' learning characteristics, and your preference, the curriculum slice or probe could be written in nature (e.g. a sheet with appropriate prompts; index cards with appropriate prompts), or oral in nature with visual cues (e.g. say aloud a division equation while showing it visually), or a combination of written curriculum slices/probes and oral prompts with visual cues.
- 4.) Distribute to students the curriculum slice/probe/response sheet/concrete materials.
- 5.) Give directions.
- 6.) Conduct evaluation.
- 7.) Count corrects and incorrects/mistakes (you and/or students can do this depending on the type of curriculum slice/probe used – see step #3).
- 8.) You and/or students plot their scores on a suitable graph/chart. A goal line that represents the proficiency (for representational level skills, this should be %100 – e.g. 8 out of 8 corrects) should be visible on each students' graph/chart).
- 9.) Discuss with children their progress as it relates to the goal line and their previous performance. Prompt them to self-evaluate.
- 10.) Evaluate whether student(s) is ready to move to the next level of understanding or has mastered the skill at the abstract level using the following guide:

Representational Level: demonstrates %100 accuracy of (given 8-10 response tasks) over two to three consecutive days.

- 11.) Determine whether you need to alter or modify your instruction based on student performance.

2. Additional Assessment Activity Appropriate For This Math Skill/Concept

Flexible Math Interview

Purpose: to evaluate specific conceptual or procedural misunderstandings selected students who are demonstrating difficulty have as a means to re-teach the concept/skill.

Materials:

Teacher -

- selected examples of division story problems or division equations

Students -

- paper for responding to selected division story problems or division equations
- pencil for writing/drawing
- appropriate concrete materials to help describe their understanding as needed

Description:

As students are working independently or in pairs, ask them to describe their solutions and how they arrived at them. Encourage students to use concrete materials to do this as well as to “talk about” what they are doing with their concrete materials if needed. *Providing students to describe their drawings with concrete materials can sometimes help you and the student better understand their misconceptions.

Instructional Phase 4: Maintenance – Periodic Practice to Maintain Student Mastery of Skills

Purpose: to provide students with opportunities to maintain their level of mastery of solving division story problems and division equations by drawing.

1. Problem of the Day

Materials:

Teacher –

- a written prompt on the chalkboard, dry-erase board, or overhead projector (e.g. a division problem or division story problem) or a drawing representing a solution to a division equation (e.g. solution to a division problem that includes a remainder).

Students -

- paper and pencil to record their responses

Description:

Teacher presents a “problem of the day” that focuses on a particular skill or conceptual understanding of drawing solutions to division story problems and/or division equations. The problem can be written in nature where students draw their solutions, or a drawing could be presented and students write the appropriate division equation it represents. The “problem of the day” is displayed as students enter the room or as the period begins. Students are asked to “solve” the problem and provided necessary directions. After an appropriate amount of time, the teacher and the students “talk through” the problem and its solution. Students can individually describe how they

approached the problem. Specific positive verbal reinforcement is provided by the teacher as well as specific feedback regarding misunderstandings students may have. Teacher notes students who seem to be having difficulty for the purpose of reviewing/re-modeling appropriate skills and concepts.