Concrete Level Instruction

Instructional Plan

Name of Math Skill/Concept: Identifying fractional parts and writing fractions.

Prerequisite Skills:

1.) Compare concrete objects- more, less, same.

2.) Differentiate part from whole.

Learning Objectives

1.) Identify fractions using concrete materials that represent the area model.

2.) Identify fractions using concrete materials that represent the measurement model.

3.) Identify fractions using concrete materials that represent the sets model.

Important Tips for Teaching This Concept:

1.) When teaching this concept, it is very important that you use several "fraction models." Using more than one fraction model to teach fraction concepts provides students a foundation for generalizing their understanding of fractions to other math concepts/skills. This teaching plan emphasizes two fraction models, the *Area Model* and the *Measurement Model.* Both the Area Model and the Measurement Model teaches fractions as parts of an established "whole" measurable area (e.g. a one-fourth fraction piece is actually one-fourth of the area of the whole circle; a three inch piece of a 12 inch rod represents one-fourth of the whole length of the rod). For most children, especially students with learning difficulties, the Area Model and Measurement models are easier models to grasp relative to the Sets Model which is a third Model for teaching and understanding fractions. Using multiple models to teach fractions is important because it assists students to generalize their understanding of fractions later on. In this teaching plan, the Area Model is taught first, followed by the Measurement Model. At the Concrete level of instruction only, a description of teaching the Sets Model is also included.

2.) If you are working with first or second graders, it is recommended that you carefully decide whether your students are ready to understand fractions using the Sets Model (e.g. a set of 12 unifix cubes can be put into groups of three and one group represents 'one-fourth.') before implementing the part of the teaching plan that teaches fractional parts through the Sets Model. Some math experts believe this model is best introduced during *third grade* when students have a better understanding of both number sense including whole numbers and fractional parts.

3.) Each fractional part should be taught separately initially. As students demonstrate understanding of one fractional part, then move to the next, then the next. In this teaching plan, "one-half" is taught first using the Area Model. You will see that descriptions of the various instructional strategies address "one-half" first. You should "stay with" one-half all the way through to scaffolding instruction, then move to "one-fourth," etc.

You will probably notice that students will "catch on" more quickly each time you move through a different fractional part. When you have modeled each fractional part and scaffolded your instruction for each within the Area Model, then move to student practice ("Acquisition to Mastery"). When you move to the Measurement Model, follow the same process. You may discover that your students will "catch on" more quickly with this model since you have built a solid foundation with the Area Model. However, do not rush this if your students are not ready. Use the same process for teaching understanding with the Sets Model. Remember, you are laying a very important foundation for later understanding of fractions and without this solid foundation, students will be negatively affected later in their school lives.

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

1. Teach Skill/Concept within Authentic Context

Description:

Contexts include puzzles, sharing parts of a candy bar with friends, as well as story situations that present real-life situations such as cutting a pizza into equal parts for two friends, cutting a long dog leash into to shorter pieces so two friends can both walk their dogs, and dealing a set of cookies into two or more equal sets so two of more children receive the same number of cookies. These authentic contexts are used throughout the teaching process and they are explicitly linked to the skill/concept being taught throughout the teaching plan.

2. Build Meaningful Student Connections

Purpose: to assist students to make meaningful connections between what they know about materials that can be broken into parts and the concept of fractional parts.

Learning Objectives 1 -3

Materials:

- puzzles made from interesting pictures that come in two equal pieces, four equal pieces, and eight equal pieces
- candy bar
- visual for identifying the skill to be learned

Description:

1.) **L** ink to student's prior knowledge & experiences about things relevant to their lives that can be broken into parts.

- relate how puzzles are made of pieces and that when they are put together, they make a whole picture. Bring in a several puzzles made from an interesting picture. Have a puzzle that comes in two equal pieces, four equal pieces and eight equal pieces.

2.) **I** dentify the skill students will learn: How to cut whole objects into equal parts and how the equal parts can be put back together to make the object whole again.

For Example:

Today we are going to learn how to break or cut whole objects into parts, just like the puzzles I just showed. We also are going to learn how the parts can be put together to make the object whole again.

- Provide some type of visual that represents the words you are saying (e.g. the puzzle, a short written phrase or two that reflects the learning objective, or a picture that represents the learning objective.)

3.) **P** rovide rationale/meaning for learning how to break objects into equal parts.

For Example:

Learning how to break things into equal parts is a really important thing to be able to do. For example, you may have something that you want to share with one or more friends. It is helpful to know how to break them into equal parts so each friend gets the same amount. Maybe you have a candy bar and you want to share it with a friend. Knowing how to break it into equal parts will allow you to share it with your friend. Both of you will feel good. You will feel good because you did something nice for your friend. Your friend will feel good because you gave him some of your candy bar. Your friend will also feel good because he knows you gave him the same amount as you took yourself.

- bring in a candy bar to demonstrate this
- have students brainstorm other objects they might want to break into equal parts and why (e.g. pizza, sets of cards, etc.)

3. Provide Explicit Teacher Modeling

*First teach fractional parts using the Area Model, then teach fractional parts using the Measurement Model, and finally teach fractional parts using the Sets Model. Students should be provided practice opportunities and demonstrate mastery using concrete materials that represent the Area Model (see Instructional Phase 2: Facilitate Acquisition to - Student Practice) before providing explicit teacher modeling for the Measurement Model. Students also should be provided practice opportunities and demonstrate mastery using concrete materials that represent the Measurement Model before providing explicit teacher modeling for the Sets Model.

Purpose: to provide students a teacher model who clearly demonstrates the concepts of “parts” and “whole” how to represent fractional parts with concrete materials.

Learning Objective 1: Identify fractions using concrete materials that represent the area model.

Materials:

Teacher -

- appropriate concrete materials that represent the Area Model, Measurement Model, and Sets Model
- a visible platform for demonstrating the concrete materials
- a visible platform for each story situation used to model the three different fraction models

Description:

A. Break down the skill of identifying fractions using concrete materials that represent the area model into learnable parts.

1. Introduce a story context that accurately represents the fractional part/provide a visual display.
2. Read story aloud yourself first/have students read with you second.
3. Explicitly teach how to pick out the important information.
4. Recreate the story context using appropriate concrete materials.
5. Prompt student thinking about the relationship of the parts and the whole represented in the story.
6. Model parts, whole, and their relationships using the story context.

   6a. Teach students the language and meaning of 'two equal parts' and 'whole'.

   1.) Model 'equal parts'

   2.) Model 'whole'

   3.) Model relationship of 'parts' to 'whole'
7. Teach Students Name of Fractional Part
8. Repeat steps 5-6 for same fractional part using at least two different types of materials appropriate for the fraction model being taught.

B. Explicitly describe and model how to identify fractions using concrete materials that represent the area model.

1. Introduce identifying fractions using a story that provides a context for learning about fractional parts and writing fractions. *Provide a similar story for each fractional part you introduce (e.g. for ½, ¼, etc.) Start with one-half, then move to one-fourth, etc. Highlight/color code key words that reflect important information about fractions. Present the story in a fashion that is visible to all students (e.g. chart paper, chalk board, overhead projector).

   For Example:

   Velma's mother bought a small cheese pizza for Velma and her friend Maria. Velma's mother cut the whole pizza into two equal pieces.

2. Read the story aloud first, and then have students read aloud with you a second time. Point to the words as you read the story. Place vocal emphasis on the key words as you read.

3. Explicitly teach how to pick out important information in the story.

- Introduce a strategy for finding the important information.

For Example:

There's some important information in this story that will help us learn about parts and wholes. Let's find the important information in our story. Hmm, I wonder what the important information is? One way I can find this out is to read each sentence and then ask myself, "Do any words 'talk about' a whole and parts of a whole?"

- Model finding the 'whole.'

For Example:

I'll do that now. I'll read the first sentence. (Read the first sentence aloud). Hmm, do any words talk about a whole or parts? I don't see the words 'whole' or 'parts' so I'm not really sure. I think I'll read the second sentence and see if the words 'whole' or 'parts' is in that sentence. (Read the second sentence aloud.) Do any words talk about a whole or parts? Well, I see the word 'whole' written in red. (Point to the word 'whole.') It reads 'whole pizza.' So the cheese pizza in the first sentence is a whole pizza. (Point back to the words 'cheese pizza' in the first sentence.)

- Model finding the 'parts'

For Example:

Hmm, what about 'parts.' Well, I see the words 'two equal pieces' written in blue. (Point to the words 'two equal pieces.) Two equal pieces of pizza is the same thing as saying two equal parts of pizza. So there is a whole pizza that is cut into two equal pieces (Point to the words 'whole' and 'two equal pieces' as you say this.)

4.) Recreate the story context in your class with appropriate materials (e.g. pizza made of construction paper). Demonstrate what was done in the story, relating what you do to words/phrases in the story.

- Introduce the concrete material

For Example:

Now, let's act out the story. I have a pizza made of construction paper. (Show the pizza.) Let's use it to see if we can do the same thing that was done in the story we just read.

- Model each step of the story using the concrete material

For Example:

Mmm, it says Velma's mother bought a small pizza. (Point to the appropriate phrase in the story). Is that right? (Elicit appropriate response from students). Now, what did Velma's mother do? (Elicit the response, "she cut the whole pizza into two equal pieces." *Prompt students to emphasize the words 'whole' and 'two equal pieces.') Yes, Velma's mother cut the *whole* pizza into *two equal pieces.* I'm going to

do that now. (As you demonstrate cutting the pizza, again emphasize that you are starting with a whole and cutting it into two equal parts.)

5. Prompt students' thinking about the relationship between the parts and the whole.
   - Ask questions regarding the relationships.

     What did I just do?

     Is that what Velma's mother did?

     How many pizza parts are there now?

     How many pizza parts were there before I cut the pizza?

     Are the parts the same size?

6. Model parts, whole, and their relationships.

   1.) Model "Equal Parts"

   - Identify and count the two 'parts' of pizza

   <u>For Example:</u>

   Now that we have talked about what I did and about the pizza parts we have, I'm going to review your ideas and review some very important ideas about our pizza. We have two parts now, don't we? (Elicit appropriate student response.). Let me count them: "one, two."

   - Model comparing the two parts of pizza

   <u>For Example:</u>

   When I compare the two parts, I can see that they are the same size. I can do that by placing one on top of the other. (Place one part on top of the other top.) See, the top pizza part fits perfectly on top of the bottom piece of pizza. (Point to the edges, referring to how they are smooth to emphasize this fact.) We now know for sure that the pizza parts are the same size.

   - Teach language 'equal parts'

   <u>For Example:</u>

   We have another way to say they are the same size. We can also say they are *equal parts*. They are equal parts because they are the same size. Everybody, what is another way to say the parts are the same size? (Elicit the response, 'they are equal parts.') Great! These two pieces of pizzas are equal parts.

   2.) Model "Whole"

   - Prompt student thinking about the relationship of the parts of pizza to the whole pizza (they are equal parts of the whole pizza)

   <u>For Example:</u>

Who can tell me what they are equal parts of? (Elicit the response, 'they are equal parts of the whole pizza you just cut.') Yes, they are equal parts of the pizza I cut. Was the pizza I cut a whole pizza or a part of a pizza? (Elicit the response, 'it was a whole pizza.') Excellent. Yes it was a whole pizza.

- Model putting the two equal parts together to make the pizza 'whole' again

For Example:

I can make the pizza whole again by putting the two equal parts together. Watch me. (Put the two pieces of pizza back together.)

- Teach language 'whole' by re-modeling putting the two pieces of pizza together and emphasizing the language 'whole'

For Example:

Now let's review what we can call the pizza parts a what we call the pizza when the parts are put back together. When I put the two equal pieces back together, it becomes a 'whole' pizza. (Model putting the two pieces together) The two '*equal parts*' make a *'whole'*. What do we call the pizza when we put the two equal pieces or 'parts' of the pizza together? (Elicit the response, we call it a 'whole' pizza.) Great!

3.) Model Relationships of 'Parts' to 'Whole' (teach students that fractions are 'parts of a total number of 'parts')

- Review relationship of 'two equal parts' of pizza and the 'whole' pizza and model 'one equal part'

For Example:

Now that we know that we can call the pizza parts *two equal parts* and we know that when we put the two equal pieces together, we have a *whole* pizza, there is one more relationship that is important to know about. Let me show you what I mean. How many equal parts do I have? (Elicit the response, 'two equal parts.') Yes. Remember that in the story, Velma's mother gave one piece of pizza to Velma and one piece to Maria? (Point to the phrase in the story that says this and read it aloud.) Let's do the same thing here. I am going to take one piece of pizza and give it to _____ (choose one child to give it to). How many parts of the two parts of pizza does _____ have? (Elicit the response, 'one equal part.') Great! _____ has one equal part.

- Model that one piece of pizza is 'one of two equal parts'

For Example:

How many equal parts of pieces did I have before I gave one away? (Elicit the response, 'two equal parts.') Yes, I had two parts of pizza. Another way to same how many parts of pizza

_____ has is to say he/she has *one of two equal parts* of pizza. Everybody say that with me:" _____ has *one of two parts* of pizza." How many parts does he/she have? (Elicit the response, 'one equal part.') Good. What is the total number of equal pizza parts? (Elicit the response, 'two.') Yes. Therefore, _____ has one out of two equal parts of pizza. How many does he/she have? (Elicit the response, 'one out of equal two parts.')

- Model that the second piece of pizza is also 'one of two equal parts'

For Example:

Now, I'm going to give one more piece of pizza away. (Give the remaining piece of pizza to a different child.) How may parts of pizza does _____ have? (Elicit the response, 'one part.') Good. Another way to say that is that _____ has one of two parts of pizza. Let's say that together….. One more time……. Great job guys.

7.) Teach Students Name of Fractional Part (That 'One of Two Equal Parts' is 'One-Half')

- Introduce the language 'one-half' (another way to say 'one of two equal parts')

For Example:

Now that we know Velma and Maria each have one of two equal parts of pizza, there is another way to say this. When we have 'one of two equal parts', we can also use its special name. The special name for situations where we have 'one of two equal parts' like we have here is "one-half."

- Provide a visual cue for the language 'one-half'

For Example:

(Show and post a card that has 'one-half' written on it or write 'one-half' on the chalkboard. *Having posted name cards will be helpful in the future because you can refer to them as you continue your instruction with fractions. Also color coding the words that name fractional parts by the color they take with the fraction circles or fraction bars you use can be a helpful cueing mechanism. Explicitly teach this color code to students if they have trouble naming fractional parts)

- Teach 'one-half' by referring to visual and explicitly relating the language to 'one of two equal parts' using the concrete materials

Let's all say the special name for when we have 'one of two equal parts'. (Point to the name card and say aloud 'one-half' with your students.) Great! When we have a situation where there is one of two equal parts, we can call one of those parts 'one-half.' Everybody say the special name for when we have one of two equal parts. (Elicit the response, 'one-half.') Wonderful job! Now you know the special name for situations where you have one of two parts. The name is 'one-half.'

8.) Repeat steps 3-4 with at least two more examples of one-half. Use a different type of material each time (e.g. fraction circles; cutting paper geometric figures into fractional parts.). Relate the particular

material to the original story by saying: "Now, we are going to do the same thing as we did with the pizza, but this time we are going to use a different type of material. Instead of cutting pizza, we are going to use……

9.) Repeat steps 1-8 for each new fraction (e.g. one-fourth, one-eighth).

Learning Objective 2: Identifying fractions using concrete materials that represent the measurement model.

Materials:

Teacher -

- appropriate concrete materials that represent the Area Model, Measurement Model, and Sets Model
- a visible platform for demonstrating the concrete materials
- a visible platform for each story situation used to model the three different fraction models

Description:

A. Break down the skill of identifying fractions using concrete materials that represent the measurement model into learnable parts.

1.) Introduce a story context that accurately represents the fractional part/provide a visual display.
2.) Read story aloud yourself first/have students read with you second.
3.) Explicitly teach how to pick out the important information.
4.) Recreate the story context using appropriate concrete materials.
5.) Prompt student thinking about the relationship of the parts and the whole represented in the story.
6.) Model parts, whole, and their relationships using the story context.
    6a. Teach students the language and meaning of 'two equal parts' and 'whole'.
        1.) Model 'equal parts'
        2.) Model 'whole'
        3.) Model relationship of 'parts' to 'whole'
7. Teach Students Name of Fractional Part
8. Repeat steps 5-6 for same fractional part using at least two different types of materials appropriate for the fraction model being taught.

B. Explicitly describe and model how to identify fractions using concrete materials that represent the measurement model.

1. Introduce identifying fractions using a story that provides a context for learning about fractional parts and writing fractions. *Provide a similar story for each fractional part you introduce (e.g. for ½, ¼, etc.) Start with one-half, then move to one-fourth, etc. Highlight/color code key words that reflect important

information about fractions. Present the story in a fashion that is visible to all students (e.g. chart paper, chalk board, overhead projector).

For Example:

Vince had one long leash for his dog Race. He had a friend named Steve who also had a dog. But his leash was lost. Vince and Steve couldn't walk their dogs together if Steve didn't have a leash. Vince had a neat idea to help Steve. He asked his mom if she would cut his leash into two equal parts. Now Vince and Steve could walk their dogs together.

2. Read the story aloud first, and then have students read aloud with you a second time. Point to the words as you read the story. Place vocal emphasis on the key words as you read.

3. Introduce a strategy for finding the important information.

- Introduce a strategy for finding the important information.

For Example:

Just like our pizza story, there's some important information in this story that will help us learn about parts and wholes. I need to have a strategy/plan for finding the important information. In the pizza story, what strategy did I use to find the important information? (Prompt as needed to elicit the response, "you read each sentence and asked yourself, 'Do any of the words talk about a whole and parts.'") That's right. I read each sentence and after each sentence, I asked myself the question, "So any words talk about a whole and parts." Why do I want to find words that talk about a 'whole' and 'parts'? (Elicit the response, "because we are learning about wholes and parts of wholes.") Good. I'll find the important information about a whole and the parts in our story by using the question strategy.

- Model finding the 'whole.'

For Example:

I'll do that now. I'll read the first sentence. (Read the first sentence aloud). Hmm, do any words talk about a whole or parts? I don't see the words 'whole' or 'parts', but the words 'one long dog leash' is written in red. (Point to the words 'one long dog leash'.) Could a long dog leash represent a whole? Hmm, well I think it is a whole object. So, I have found the information that tells me what the 'whole' is. The whole is the one long dog leash.

- Model finding the 'parts'

For Example:

Now that I have found the 'whole', I need to find the information that talks about how many parts I'll read the second sentence. (Read the second sentence aloud.) Hmm, do any words talk about 'parts'? No, no words talk about parts. (Continue this process for the next several sentences until you reach the sixth sentence. (Read the sixth sentence aloud.) Do any words talk about 'parts'? Well, I see the words

'two equal parts' written in blue. (Point to the words 'two equal parts.') The whole dog leash is cut into two equal parts to make two dog leashes.

4. Recreate the story context in your class with appropriate materials (e.g. a rope, a piece of string, a piece of yarn). Demonstrate what was done in the story, relating what you do to words/phrases in the story.

- Introduce the concrete material

For Example:

We can use this long piece of string/rope to represent the long dog leash. (Show students the long piece of string/rope).

- Model each step of the story using the concrete material

For Example:

Now, let's take our "dog leash" and see if we can do the same thing that was done in the story we just read. Mmm, it says Vince had one long leash. (Point to the appropriate phrase in the story). Is that right? (Elicit appropriate response from students). But Steve didn't have a leash, did he? (Elicit the response, "no.") So what did Vince and his mom do? (elicit the response, "his mom cut his leash into two parts." *Prompt students to emphasize that their was one (whole) leash and that it was cut into 'two equal pieces.') Yes, Vince's mother cut the *one* long leash into *two equal parts.* I'm going to do that now. (As you demonstrate cutting the rope/string/yarn, again emphasize that you are starting with a whole and cutting it into two equal parts.)

5. Prompt students' thinking about the relationship between the parts and the whole.

4a.) Ask questions regarding the relationships.

What did I just do?

Is that what Vince's mother did?

How many parts are there now?

How many parts were there before I cut the rope/string/yarn?

Are the parts the same size?

6. Model parts, whole, and their relationships.

1.) Model "Equal Parts'

- Identify and count the two 'equal parts' of the original leash

For Example:

Now that we have talked about what I did and about the parts of rope/string/yarn we have, I'm going to review your ideas and review some very important ideas about our "dog leash." We have two parts now, don't we? (Elicit appropriate student response.). Let me count them: "one, two."

- Model comparing the 'two equal parts'

When I compare the two parts, I can see that they are the same length. I can do that by placing one beside the other. (Place one piece of string beside the other.) See, the ends of the string are even (Point to the ends, referring to how they are even.) We now know for sure that the two parts of string are the same size.

- Teach/review language 'equal parts'

Like we did with pizzas and fraction circles, we have another way to say they are the same size. We can also say they are *equal parts*. They are equal parts because they are the same length. Everybody, what is another way to say the parts are the same size? (Elicit the response, 'they are equal parts.') Great! These two pieces of string are equal parts.

2.) Model 'Whole'

- Prompt student thinking about the relationship of the parts of the original ('whole') leash to the original ('whole') leash

For Example:

Who can tell me what they are equal parts of? (Elicit the response, 'they are equal parts of the whole string you just cut.') Yes, they are equal parts of the whole piece of string I cut. How many parts was the string before I cut it ? (Elicit the response, 'it was just one string/part.') Excellent. Yes it was one string.

- Model putting the two equal parts together to make the original dog leash 'whole' again

For Example:

I could make the "dog leash" whole again by putting the two equal parts together. Watch me. (Put the two pieces of string end to end.) Now the string is the same size as it was before I cut it.

- Teach/review 'whole' by re-modeling putting the two pieces of string together and emphasizing the language 'whole'

For Example:

Now let's review what we can call the two parts of string and what we call the string when the parts are put back together…..

3.) Model Relationships of 'Parts' to 'Whole' (teach students that fractions are 'parts of a total number of 'parts')

- Review relationship of 'two equal parts' (shorter dog leashes) and the 'whole" (original long dog leash)

For Example:

We know that we can call the parts of string *two equal parts* and we know that when we put the two equal pieces together, our "dog leash" is the same length as it was before I cut it. Like with our pizza and fraction circles, there is one more relationship that is important to know about. Let me show you what I mean. How many equal parts do I have? (Elicit the response, 'two equal parts.') Yes. Remember that in the story, Vince's mother cut the dog leash into two equal pieces? (Point to the phrase in the story that says this and read it aloud; elicit the appropriate response.) She did it so that Vince and Steve would have a leash to walk their dogs.

- Model that one of the two pieces of string (shorter dog leashes) is 'one of two equal parts' (lengths of string)

Let's pretend we are doing the same thing here. I am going to take one part of the string that represents our dog leash and give it to _____ (choose one child to give it to). How many parts of the original dog leash does _____ have? (Elicit the response, 'one part.') Great! _____ has one part. How many parts or dog leashes did I have before I gave one away? (Elicit the response, 'two parts/two dog leashes.') Yes, I had two shorter parts of my original long dog leash. Another way to say how many parts of the original dog leash _____ has is to say he/she has *one of two parts*. Everybody say that with me:" _____ has *one of two parts*." How many parts does he/she have? (Elicit the response, 'one.') Good. What is the total number of parts? (Elicit the response, 'two.') Yes. Therefore, _____ has one out of two parts of the original dog leash. How many does he/she have? (Elicit the response, 'one out of two parts.')

- Model that the second piece of string is also 'one of two equal parts'

Now, I'm going to give away the other piece of string that represents a dog leash. (Give the remaining piece of string to a different child.) How many parts of the original dog leash does _____ have? (Elicit the response, 'one part.') Good. Another way to say that is that _____ has one of two parts of pizza. Let's say that together….. One more time……. Great job guys.

7.) Teach Students Name of Fractional Part (That 'One of Two Equal Parts' is 'One-Half')

- Introduce the language 'one-half' (another way to say 'one of two equal parts')

For Example:

Now that we know Vince and Steve each have one of two equal parts of what was a long dog leash, there is another way to say they have 'one of two equal parts'. When we were working with pizzas and fraction circles, we learned that 'one of two equal parts' has a special name. Who remembers

that special name? We put a name card up in the room to remind us of that name. (Elicit the response, "one-half.") That's right! The special name for 'one of two equal parts is 'one-half.'

- Teach 'one-half' by referring to the visual ('one-half' name card/poster) and explicitly relating the language to 'one of two equal parts' using the concrete materials

Who can point to the name card that reminds us this special name. (Wait for as many students as can point to the posted 'one-half' sign. Point to the posted 'one-half' sign.) Let's all say the special name for when we have 'one of two equal parts'. (Point to the name card and say aloud 'one-half' with your students.) Great!

- Teach/review 'one-half' by referring to the visual and explicitly relating the language to 'one of two equal parts' using concrete materials and relating to other concrete materials students have had experiences with (e.g. pizza and fraction circles)

For Example:

When we have a situation where there is one of two equal parts, we can call one of those parts 'one-half.' Everybody say the special name for when we have one of two equal parts. (Elicit the response, 'one-half.') Wonderful job! Now you've seen 'one of two parts' with a different material, in this case string/rope, and you know the special name is the same as with pizzas or fraction circles. This is important to remember because the special name for times when you have one of two equal parts, 'one-half,' will stay the same no matter what kind of material you are working with. Will the special name 'one-half' always stay the same when you have one of two equal parts even though you have different materials? (Elicit the response, "yes.") That's correct. The special name 'one-half' will always be used when you have situations where you have one of two equal parts, no matter whether you have strings, dog leashes, pizzas, or fraction circles.

8.) Repeat steps 3-4 with at least two more examples of one-half. Use a different type of measurement material each time (e.g. cuisenaire rods, fraction strips, etc.). Relate the particular material to the original story by saying: "Now, we are going to do the same thing as we did with the string, but this time we are going to use a different type of material. Instead of cutting string, we are going to use……

9.) Repeat steps 1-8 for each new fraction (e.g. one-fourth, one-eighth).

Learning Objective 3: Identifying fractions using concrete materials representing the sets model.

Materials:

Teacher -

- appropriate concrete materials that represent the Area Model, Measurement Model, and Sets Model
- a visible platform for demonstrating the concrete materials

- a visible platform for each story situation used to model the three different fraction models

Description:

A. Break down the skill of identifying fractions using concrete materials that represent the sets model into learnable parts.

1.) Introduce a story context that accurately represents the fractional part/provide a visual display.
2.) Read story aloud yourself first/have students read with you second.
3.) Explicitly teach how to pick out the important information.
4.) Prompt student thinking about the relationship of the parts and the whole represented in the story.
5.) Model parts, whole, and their relationships using the story context.
    5a. Teach students the language and meaning of 'two equal parts' and 'whole'.
        1.) Model 'equal parts'
        2.) Model 'whole'
        3.) Model relationship of 'parts' to 'whole'
6.) Teach Students Name of Fractional Part
7.) Prompt students' thinking about the relationship between the parts and the whole (repeat step #4).
8.) Repeat steps 5-6 for same fractional part using at least two different types of materials appropriate for the fraction model being taught.

B. Explicitly describe and model how to identify fractions using concrete materials that represent the sets model.

1. Introduce identifying fractions using a story that provides a context for learning about fractional parts and writing fractions. *Provide a similar story for each fractional part you introduce (e.g. for ½, ¼, etc.) Start with one-half, then move to one-fourth, etc. Highlight/color code key words that reflect important information about fractions and underline phrases that represent what is being solved for. Present the story in a fashion that is visible to all students (e.g. chart paper, chalk board, overhead projector).

For Example:

Angela's mom baked a total of ten chocolate chip cookies. Angela's friend, Tommy was at Angela's and they were playing outside. Angela's mom wanted both Angela and Tommy to have an equal number of cookies. If she gave all ten cookies to Angela and Tommy how many would each child get? How many cookies out of how many total cookies did Angela and Tommy get? What part of the whole set of cookies does this number of cookies represent?

2. Read the story aloud first, and then have students read aloud with you a second time. Point to the words as you read the story. Place vocal emphasis on the key words as you read.

3. Explicitly teach how to pick out important information in the story (including what needs to be solved for) and model the story problem.

- Introduce/review strategy for finding the important information.

For Example:

Like we did with the other stories, we need to find the important information in order to learn more about parts and wholes. But, this story is different from the stories we read about cutting a pizza and cutting a dog leash into parts. This story has questions at the end of it. (Point to the questions at the end of the story problem.) I'm going to use a different strategy for finding the important information in this story. First, I'm going to find out what the questions ask. Then I'll read the rest of the story and decide what words in the story will help me answer the questions.

- Introduce finding what you are solving for by finding the questions and question marks.

For Example:

Let's find out what the questions ask. (Point to the first underlined phrase.). What do you see at the end of this sentence? (Elicit the response, "a question mark.") Yes, there is a question mark. A question mark is an important sign in story problems because it tells us that this is what we need to find out (Circle the question mark). Let's read what the question asks. I am going to read it first and then I want you to read it with me a second time (Read the question aloud and then encourage students to read it a second time with you.). What does the question ask? (Elicit the response, "how many cookies Angela and Tommy get.") Right, she wants to know how many cookies both Angela and Tommy should get. Remember the names Angela and Thomas, because that is information we want to find in a few minutes. Remember, main words in a question are important words and we will want to find them somewhere in the story. Is that the only question? (Elicit the response, "no, there are two other questions.") You are such a smart bunch! That's right, there are two more things we need to find out. I know this because there are two other questions at the end of the story (Point to the second and third questions and circle the question marks.) Remember that the question mark is a good signal that there is something I need to find out. Let's read what the second question asks. I am going to read it first and then I want you to read it with me a second time (Read the question aloud and then encourage students to read it a second time with you.). Ok, what is it that we need to find out? (Elicit the response, "how many cookies Angela and Tommy each got out of the total number of cookies.") Wow, you all sure are sharp! Yes, we need to find out how many cookies Angela got out of the total number of cookies and how many cookies Tommy got out of the total number of cookies. I see the word cookies in this question. That must be another important word in the story. I'll need to remember that. (Write the word 'cookies' under the names 'Angela' and 'Tommy' you previously wrote next to the story problem). Now, let's read what the third question asks. I am going to read it first and then I want you to read it with me a second time (Read the question aloud and then encourage students to read it a second time with you.). Ok, what is it that we need to find out? (Elicit the response, "we need to find out what part of the whole number of cookies is represented by the

number of cookies Angela and Tommy got.") Wow, you all sure are sharp! Yes, we need to find out what part of the whole set of cookies Angela and Tommy each got.

- Model finding the words that represent the 'whole' set

For Example:

Ok, let's take a look at the rest of the story. I'll read the first sentence. (Read the first sentence aloud.) How many total cookies did Angela's mom bake? (Elicit the response, "ten cookies.") That's right. Angela's mom baked a total of ten cookies (Point to the appropriate highlighted phrase and circle the word "ten."). I know the word 'total' means all of the cookies. Ten cookies must be the whole set.

- Model recognizing irrelevant information

For Example:

Now that I've found the 'whole' set, I'll read the next sentence to see if I can find the 'parts.' (Read the second sentence.) Does this sentence have any words that talk about parts? Hmm, it says that Angela and Tommy are playing outside. Is that important information? Well, it doesn't say anything about parts of the whole set of cookies, so I don't think it is important.

- Model finding the 'parts' of the 'whole' set

For Example:

Now let's read the next sentence. (Read the third sentence.) What did Angela's mom want to do? (Elicit the response, "she wanted to give the same number of cookies to Angela and Tommy.") Excellent thinking. Angela's mom wanted both Angela and Tommy to have an equal number of cookies (Point to the appropriate highlighted phrase and circle "Angela" and "Tommy.") How many children are there? (Elicit the response, "two.") That's right, there are two children. Let's count them. (Count aloud, "one, two" as you point to the names "Angela" and "Tommy.") Therefore, I know Angela's mom wants to separate her total set of ten cookies into two sets by giving the same number of cookies to Angela and to Tommy.

- Review what you need to solve for (prompt student thinking about each question).

For Example:

Now, what is it that we need to find out? Let's look back at our questions. Let's read what the first question asks. (Read the question aloud and then encourage students to read it a second time with you.). So, what is it that Angela's mom needs to know? (Elicit the response, "how many cookies Angela and Tommy get.") Right, she wants to know how many cookies both Angela and Tommy should get. There is also something important we need to remember to help Angela's mom do this. We need to make sure that both Angela and Tommy get an equal number of cookies. I know this because it says so in the story (Point to the phrase, "equal number of cookies."). Is that the only thing we need to find out in order to help Angela's mom? (Elicit the response, "no, there are two other questions.") Great! Let's read what the second question asks. (Read the question aloud and then encourage students to read it a second time with you.). Ok, what is it that we need to find out? (Elicit the response, "how many cookies Angela and Tommy

each got out of the total number of cookies.") Excellent! Yes, we need to find out how many cookies Angela got out of the total number of cookies and how many cookies Tommy got out of the total number of cookies. (Prompt student thinking about why Angela's mom wants to know this – i.e. that she wants each to get the same number of cookies and that she wants to give them all ten cookies that she baked.) Now, let's read what the third question asks. (Read the question aloud and then encourage students to read it a second time with you.). Ok, what is it that we need to find out? (Elicit the response, "we need to find out what fractional part of the whole number of cookies is represented by the number of cookies Angela and Tommy got.") Yes, we need to find out what part of the whole set of cookies Angela and Tommy each got. Excellent job thinking about what each question asks!

4. Prompt students' thinking about the relationship between the parts and the whole.

- Ask questions regarding the relationships.

  What questions did we answer to help Angela's mom?

  How did we answer the first question, second question, third question?

  What does the whole circle represent? How many cookies are in the whole circle?

  How many parts of the whole circle are there? How many cookies are in each part?

  Are the parts the same size? Are there the same number of cookies in each part?

  Re-model relationships of the parts to the whole.

5. Model parts, whole, and their relationships (model use of area model to develop understanding of sets model 'parts to whole relationships').

1.) Model 'Whole' Set

<u>For Example:</u>

Now that we know what it is we need to find out in order to help Angela's mom, we need to do some things. Mmm, I think I have an idea of how we can do this. We can use what we have learned about parts of circles to help us answer these questions. Let me show you what I mean. (Show students a circle that is large enough to fit ten objects that represent the cookies in the story.) What do I have here? (Elicit the response, "a circle.") That's right. Is this a whole circle or a part of a whole circle? (Elicit the response, "it is a whole circle.") That's right, it is a whole circle. I am going to use this circle to help us find out the information that will help Angela's mom. Now, since the circle represents a whole, I can place the whole number of cookies that Angela's mom baked on the circle. Let's do that now. How many total cookies did Angela's mom bake? (Elicit the response, "ten." Point to the word ten that is in the story.) Let's count out ten cookies onto the circle. (Count out ten cookies on the circle; have your students count out the cookies with you.) Alright, the ten cookies in the whole circle represent the total number of cookies that Angela's mom baked.

2.) Model 'Equal Parts'

For Example:

Ok, our first question asks us to do what? (Point to the first question in the story and elicit the response, "if she gave all of the cookies to Angela and Tommy, how many would each child get.") Yes. To represent the two children with the circle, I can draw a line that separates the whole circle into two equal parts (Draw a line that separates the circle into two equal parts.) Why do I need to make sure that the circle is separated into two *equal* parts? (Elicit the response, "because both Angela and Tommy are to get an equal number of cookies.") Great! I can represent Angela and Tommy by writing their names in one of the two parts of the circle. Now, in order to find out how many cookies each child gets, I can deal them out one-by-one to each student until I don't have any left. I'll do that now. (Deal out cookies one-by-one, alternating sides as you deal each cookie out.) Ok, now that we have given both Angela and Tommy their cookies, how many does each have? Let's count the cookies in each part of the circle to find out. (Count aloud with your students the number of cookies in each part of the circle.) Alright, how many cookies does Angela have? (Elicit the response, "five.") Good. How many cookies does Tommy have? (Elicit the response, "five.") Yes. Do Angela and Tommy have the same number of cookies? (Elicit the response, "yes.") Yes, they each have five cookies. Did we give out the total number of cookies that Angela's mom baked? (Elicit the response, "yes.") How many? (Elicit the response, "ten.") Have we helped Angela's mom by answering the first question? (Elicit the response, "yes.") What did we find out? (Elicit the response, "Angela and Tommy both got five cookies each.") Great! Both Angela and Tommy got five cookies each.

3.) Model Relationships of 'Parts' to 'Whole'

- Link understanding from Area & Measurement Model, that fractions are 'parts of a total number of 'parts', to Sets Model by teaching the relationship of number of objects in one part to number of objects in all parts

For Example:

Ok, we have answered the first question in our story (Point to the first question at the end of the story.) Now, we need to answer the second question. What does the second question ask? (Point to the second question and elicit the response, "How many cookies out of how many total cookies did Angela and Tommy get?) That's right. We really have all the information we need to answer that question. Let's take a look at our circle and the cookies on each part of the circle. The cookies in one part of the circle represent how many cookies Angela got and the cookies in the other part of the circle represent how many cookies Tommy got. Let's count the cookies again for Angela. (Count the cookies aloud with your children. Point to each cookie as you count it.) So, Angela has five cookies. We already knew that. But, how do you think we can find out the total number of cookies? (Elicit the response, "count all of the cookies in both parts of the circle.") That's right. I can count the cookies in both parts of the circle. I know this represents

the total or whole number of cookies that Angela's mom baked because when I put the two equal parts of the circle together, I have a whole. We learned this when we worked with circles and cut them into parts. When we put the parts together, we made a whole circle again. In this story, the whole circle represents the whole number of cookies that Angela's mom baked. Let's count the whole number (Count aloud with your students. Point to each cookie as you count it.) How many total cookies do we have? (Elicit the response, "ten.") Wonderful! Now, let's answer our second question. How many cookies does Angela have? (Elicit the response, "five." Recount aloud if students don't respond.) Yes, she has five cookies. What is the total number of cookies? (Elicit the response, "ten." Recount aloud if students don't respond.) Great! Now let's answer the question (Point to the second question in the story and read it aloud.) Let's answer the question for Angela first. Angela got five cookies out of a total of ten cookies. (Write this phrase so that it is visible to all students.) Let's answer the question again. (Point to the phrase and read it aloud with your students.) Does this tell us how many cookies Angela got out of the total number of cookies Angela's mom baked? (Elicit the response, "yes.") Good! Now let's answer the same question for Tommy. How many cookies does Tommy have? (Elicit the response, "five." Recount aloud if students don't respond.) Yes, he has five cookies. What is the total number of cookies? (Elicit the response, "ten." Recount aloud if students don't respond.) Great! Now let's answer the question (Point to the second question in the story and read it aloud.) Let's answer the question for Tommy. Tommy got five cookies out of a total of ten cookies. (Write this phrase so that it is visible to all students.) Let's answer the question again. (Point to the phrase and read it aloud with your students.) Does this tell us how many cookies Angela got out of the total number of cookies Angela's mom baked? (Elicit the response, "yes.") Good!

- *Model That the Number of Objects Each Child Has Represents 'One of Two Equal Parts'*

For Example:

Wow, you guys are really doing well! We've helped Angela's mom a lot. But, we have one more question to ask before we help her with everything. What question do we need to answer last? (Point to the third question and elicit the response, "what part of the whole set of cookies does this number of cookies represent?") Great! Guess what? We already have all the information we need to answer this question. And, we can use what we have learned about circles and parts of circles to answer this question. Let's look at the circle once again. How many equal parts of the circle did we "cut" it into? (Elicit the response, "two.") Yes. How do we know this? (Elicit the response, "because the line you drew cuts the circle into two equal parts. *Be sure that you continually emphasize that the parts are 'equal part.') That's great! I did cut the circle into two equal parts. Now that we know this, we can answer the question. Remember we used the circle to represent the total number of cookies. What is the total number of cookies? (Elicit the response, "ten.") That's right. Angela's mom baked ten cookies total. When we count all of the cookies in the whole circle, we get ten (Count the cookies in the whole circle.). Therefore, the

whole circle represents the total number of cookies. So, we started with a whole circle that had ten cookies. We then cut the circle into two parts (Point to the line that divides the circle and count the two circle parts aloud.) Let's count the parts together. (Count the parts aloud again with your students.) Ok, we have two parts of a whole circle and each part has five cookies each (Count the cookies in each part by saying, " in Angela's part we have one, two, three, four, five cookies." Repeat this for Tommy's part.) Let's answer our question now. The question asks, "What part of the whole set of cookies does this number of cookies represent? (Point to the question as you read it.) Let's answer the question for Angela first. How many cookies does she have? (Elicit the response, "five.") Good. Now how many parts of the total number of parts does this number of cookies represent (Point to the part that represents Angela moving your finger around the border of her part.)? (Elicit the response, "one of two parts.") That's right. Angela's five cookies represent one of two parts because there are five cookies on her part and her part is one of two parts of the circle (Point to each part, counting aloud, "one part, two parts."). Now, let's answer the question for Tommy. How many cookies does he have? (Elicit the response, "five.") Good, Tommy also has five cookies. Now how many parts of the total number of parts does this number of cookies represent (Point to the part that represents Tommy moving your finger around the border of her part.)? (Elicit the response, "one of two parts.") That's right. Tommy's five cookies represent one of two parts because there are five cookies on her part and her part is one of two parts of the circle. (Point to each part, counting aloud, "one part, two parts."). Now we have answered the third question, "what part of the whole set of cookies does this number of cookies represent?" The number of cookies Angela has, which is five cookies, represents one of two equal parts. The number of cookies Tommy has, which is also five cookies, represents one of two equal parts as well.

6. Teach Students Name of Fractional Part (That 'One of Two Equal Parts' is 'One-Half' – "'Five Cookies out of Ten Cookies' means 'One-Half'")

<u>For Example:</u>

Ok, we know Angela and Tommy each have one of two equal parts of the whole ten cookies that Angela's mom baked. We learned there is a special name for times when we have 'one of two equal parts.' We learned this special name when we were working with pizzas and fraction circles, and when we were working with strings and "dog leashes." Who remembers that special name? (Elicit the response, "one-half.") That's right! The special name for 'one of two equal parts is 'one-half.' Who can point to the name card that reminds us this special name. (Wait for as many students as can point to the posted 'one-half' sign. Point to the posted 'one-half' sign.) Let's all say the special name for when we have 'one of two equal parts'. (Point to the name card and say aloud 'one-half' with your students.) Great! When we have a situation where there is one of two equal parts, we can call one of those parts 'one-half.' Everybody say the special name for when we have one of two equal parts. (Elicit the response, 'one-half.') Wonderful job! We've seen that the

special name for times when we have 'one of two parts' stays the same even when we have different materials. We saw this with pizzas and fraction circles and with strings and "dog leashes." Now we see that this special name is also used when we put a whole set of objects into two equal groups, like we did with the cookies Angela's mom baked. This situation is a little different looking because with pizzas, fraction circles, strings, and "dog leashes' we were working with one object that we cut into parts. In this case, we started with a group of ten individual cookies and then put them into two equal groups (Angela got five cookies and Tommy got five cookies.) It is important to know that even though we are working with sets of objects, like cookies, we still use the same special name when those objects are in 'one of two equal groups'. Always remember that the special name, 'one-half' for times when you have one of two equal parts, will stay the same no matter what kind of material you are working with. Will the special name 'one-half' always stay the same when you have one of two equal parts even though you have different materials? (Elicit the response, "yes.") That's correct. The special name 'one-half' will always be used when you have situations where you have one of two equal parts, no matter whether you have pizzas, fraction circles, strings, "dog leashes," or sets/groups of cookies.

7. Prompt students' thinking about the relationship between the parts and the whole (repeat step #4).

**It is recommended that step #4 be repeated for students with learning problems because the story situation/problem for the Sets Model is more complex than for the Area and Measurement Models. Reviewing the relationships between the parts and whole of Sets by linking understanding back to the story situation/problem provides these students the opportunity to deepen their association between the concept, the process, and a meaningful context.*

- Ask questions regarding the relationships.
  What questions did we answer to help Angela's mom?
  How did we answer the first question, second question, third question?
  What does the whole circle represent? How many cookies are in the whole circle?
  How many parts of the whole circle are there? How many cookies are in each part?
  Are the parts the same size? Are there the same number of cookies in each part?
  Re-model relationships of the parts to the whole.

8. Repeat steps 3-4 with at least two more examples of one-half. Use a different type of discrete object to put into the circle each time (e.g. counting chips, unifix cubes, etc.). Relate the particular material to the original story by saying: "Now, we are going to do the same thing as we did with the cookies, but this time we are going to use a different type of material. Instead of using cookies, we are going to use……

9. Repeat steps 1-8 for each new fraction (e.g. one-fourth, one-eighth).

Scaffold Instruction

Purpose: to provide students a teacher supported transition from seeing and hearing the teacher demonstrate/model representing fractional parts with concrete materials to performing the skill independently. It also provides the teacher opportunities to check student understanding so she/he can provide more modeling cueing if needed *before* students practice independently.

Learning Objective 1: Identifying fractions using concrete materials that represent the area model.

Materials:

Teacher –

- Area concrete materials
- A visible platform for showing concrete materials
- The appropriate story situation made visible to students

Students –

- Appropriate Area Model concrete materials

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. (Choices are shown in red)

For Example:

- Restate the story situation used from Explicit Teacher Modeling – "Ok, everybody. I've showed you several examples of cutting a shape into equal parts and you've helped me see the relationships of the parts to the whole. Now we're going to do several more together, except this time I want you to help me out even more. The first time, I want you to help me with two questions. Then, you'll help me with more and more until you are asking the questions and I will answer them with you. Let's reread the story about Velma's mom and the pizza." (Read the story aloud with your students.)
- Re-introduce the area manipulative (should be one used during Explicit Teacher Modeling – e.g. fraction circle/pieces) – "Now, like we did before, I'll use this fraction circle and pieces to represent the pizza and its parts." (Show students the fraction circle and two "one-half" pieces.)
- Relate/prompt students to think that the circle represents the "whole" piece of pizza – "What does this circle represent? (Elicit the response, "the whole pizza.") That's right, this circle piece represents Velma's mother's whole pizza."

- Demonstrate/prompt students to think how "cutting" the circle into two equal parts is like cutting the pizza into two equal parts – "Now, what do I need to do in order to "cut" the circle in two equal parts like Velma's mom did with the pizza? (Elicit the response, "find two pieces that are equal in size and that when put together are the same size as the circle.") Excellent thinking. I'll do that now."
- Teacher asks questions/Teacher answers questions about the relationships of the parts to each other and to the whole.
    - How many parts are there now? – "(Find the two "one-half" pieces and place them on top of the circle or "whole." Relate that I know these are the correct pieces because the sides do not overlap, pointing to this feature.) Ok, now I need to ask myself, how many parts are there in all? Hmm, I can count them. (Count the parts aloud, pointing to them and picking them up to show they are separate parts.) I have two parts."
    - How many parts were there before I "cut" the circle? – "Now, let me think. How many parts were there before I cut the circle into two parts? I know there was only one part. It was the whole circle. (Remove the two "one-half" pieces to reveal the circle underneath. Pick the circle up and demonstrate that it is one whole.)."
    - Are the parts the same size? – "Now, I can look again at the parts. It's important to know if they are equal, because Velma's mom wanted each child to get the same amount of pizza. How can I figure this out. Oh, I know, I can put one part on top of the other part. (Put one of the "one-half" pieces on top of the other. Show how they are the same size by pointing to the edges and relating that there is no overlap.) Now I know the parts are two equal parts."
    - How many parts of the total number of parts is this one? – "I wonder how many parts each part represents out of the total number of parts. Well, I can answer this by counting the total number of parts. There are 'one, two' parts (Point to each part as you count it.) Now, if I take one part, it represents one of two parts. (Pick up one part and say "one." Put the part back down). Now, I can count the total number of parts. (Count the parts aloud.) I have two total parts. That means this part (point to one of the "one-half" pieces) is one of two total parts. (Repeat this for the other part as well.) Another name for this part is "one-half."

B. Maintain 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. (Choices are shown in red)

For Example:

- Prompt students to think how to relate the circle as being the "whole" piece of pizza – "Ok, everybody. You've helped me find the parts and the whole for one/several example(s). Now we're going to do several more together. Because you all are doing such a great job, I'm going to have you help me even more with this one. What can we use to represent the pizza and its parts? (Elicit the response, "a fraction circle and fraction pieces." Show students the fraction circle and two "one-half" pieces.) What does this circle represent? (Hold up the fraction circle and elicit the response, "the whole pizza.") That's right, this circle piece represents Velma's mother's whole pizza."
- Prompt students to think how to simulate cutting the pizza into two equal parts. – "Now, what do I need to do in order to "cut" the circle in two equal parts like Velma's mom did with the pizza? (Elicit the response, "find two pieces that are equal in size and that when put together are the same size as the circle.") Excellent thinking. I'll do that now." (Find the two "one-half" pieces and place them on top of the circle or "whole.") How can I check to see if these are the correct pieces?" (Elicit the response, "put one piece on top of the other and see if they are the same size/see if the sides are smooth.") (Demonstrate that the sides do not overlap.)
- Teacher asks questions/teacher or students answer questions about the relationships of the parts to each other and to the whole.
    - How many parts are there now? – "Ok, now I need to ask myself, how many parts are there in all? Hmm, how can I do that? (Elicit the response, "we can count them.") Yes, we can count them. Let's count them. I'll point to them and you count out loud. (Point to them as students count aloud.) How many parts are there? (Elicit the response, "there are two parts.") Yes, there are two parts."
    - How many parts were there before I "cut" the circle? – "Now, let me think. How many parts were there before I cut the circle into two parts? I know there was only one part. It was the whole circle. (Remove the two "one-half" pieces to reveal the circle underneath. Pick the circle up and demonstrate that it is one whole.)"
    - Are the parts the same size? – "Now, I can look again at the parts. It's important to know if they are equal, because Velma's mom wanted each child to get the same amount of pizza. How can I figure this out? (Elicit the response, "put one part on top of the other part.") Great thinking! (Put one of the "one-half" pieces on top of the other.) How can I tell that they are equal? (Elicit the response, "because the edges are smooth/don't overlap.") That's right, the edges match up exactly (Point to the edges.) So, are the parts equal parts? (Elicit the response, "yes.") Now I know the parts are two equal parts."
    - How many parts of the total number of parts is this one? – "I wonder how many parts each part represents out of the total number of parts. Well, I can answer this by counting the total number of parts. There are 'one, two' parts (Point to each part as

you count it.) Now, if I take one part, it represents one of two parts. (Pick up one part and say "one." Put the part back down). Now, I can count the total number of parts. (Count the parts aloud.) I have two total parts. That means this part (point to one of the "one-half" pieces) is one of two total parts. Another name for this part is "one-half." (Repeat this for the other part as well.)"

B. Maintain medium 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.

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

- When students demonstrate increased competence, do not model the process. Ask students questions and encourage them to provide all the responses. Distribute concrete materials so students can replicate the process at their desks.

  For Example:

  - Prompt students to think how to relate the circle as being the "whole" piece of pizza – "Ok, everybody. You've helped me find the parts and the whole for several more examples. Now, you are going to use the circles and circle pieces I just gave you to answer my questions. Now, like we did before, we'll use these fraction circles and pieces to represent the pizza and its parts. Everybody, show me the fraction circle that represents a 'whole.' (Encourage students to raise the appropriate piece – check student understanding and provide corrective feedback as needed.) Great job."
  - Prompt students to think how to simulate cutting the pizza into two equal parts. – "Now, everybody show me the pieces that represent two equal parts of the whole pizza/circle. (Encourage students to raise the appropriate piece – check student understanding and provide corrective feedback as needed.) Good thinking guys. Ok, what does the circle represent? (Elicit the response, "the whole pizza.") That's right, this circle piece represents Velma's mother's whole pizza. Now, you've already showed me the two pieces that represent the parts of the pizza that Velma's mother cut. How can you show that those two pieces when put together equal the whole pizza? (Elicit the response, we can put them on top of the 'whole' circle piece.) That's right. Everybody do that now. (Monitor student responses, providing specific corrective feedback as needed.) Now, how do we know these parts equal the whole? (Elicit the response, "because the edges are smooth/don't overlap.) Wonderful! We know because the edges are smooth." (Point this out with your pieces.)
  - Teacher asks questions/students answer questions and about the relationships of the parts to each other and to the whole and demonstrate their understanding with their manipulatives.
    - How many parts are there now? – "How do I find out how many parts there are? (Elicit the response, "we can count them.") Yes, we can count them. How many parts do we have? (Elicit the response, "there are two parts.") Yes, there are two parts."

- How many parts were there before I "cut" the circle? – "Now, let me think. How many parts were there before I cut the circle into two parts? I know there was only one part. It was the whole circle. (Remove the two "one-half" pieces to reveal the circle underneath. Pick the circle up and demonstrate that it is one whole.)"
- Are the parts the same size? – "How many parts were there before I cut the circle into two parts? (Elicit the response, "there was only one part, the whole circle.") Yes, the circle was the whole pizza before we cut it into parts. How can you show this? (Elicit the response, "by taking off the two pieces on top.") Good job! Let's all do that now. (Remove the two "one-half" pieces to reveal the circle underneath.) Ok, everyone, pick up the circle and show each other that it is one whole. Now, just to check again, let's be sure that the two parts are equal since Velma's mom wanted each child to get the same amount of pizza. How can I figure this out? (Elicit the response, "put one part on top of the other part.") Great thinking! Everybody do that now. (Monitor students' work, provide specific corrective feedback as needed.) How can I tell that they are equal? (Elicit the response, "because the edges are smooth/don't overlap.") That's right, the edges match up exactly (Point to the edges.) So, are the parts equal parts? (Elicit the response, "yes.") Now I know the parts are two equal parts.
- "How many parts of the total number of parts is this one? (Elicit the response, "how many parts does each one represent out of the total number of parts?) Yes, we need to decide how many parts each part is out of the total number of parts. How can we answer that question? (Elicit the response, "by counting the total number of parts.") Good. Let's count the total number of parts. Point to your parts and count aloud. Ready, count. How many parts are there? (Elicit the response, "two.") Great, there are two parts. Now, if I take one part, it represents how many of the two parts? (Elicit the response, "one of two parts.") Great, it represents one of two parts. Everybody hold up one part. (Check student responding, provide specific corrective feedback as needed) How many parts? (Elicit the response, "one part.") Yes. Now pick up the two parts. (Check student responding, provide specific corrective feedback as needed) Out of how many parts? (Elicit the response, "out of two parts.") (Pick up one part and say "one." Put the part back down). Good the first part you held up represents one of two parts. Everybody say that. (Elicit the response, "one of two parts.") What's another name for this part? (Elicit the response, "one-half.") (Repeat same process for the other part as well.)

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

Instructional Phase 2: Facilitate Acquisition to Mastery – Student Practice

*Practice should be provided for each of the fractional parts taught during Phase 1- "Initial Acquisition." A separate practice lesson should also be provided for each Fraction Model taught. This teaching plan provides a detailed description of two practice activities, one at the receptive or recognition level of understanding and one at the expressive level of understanding. The receptive/recognition level of understanding requires students to "recognize" the correct response from a given set of possible responses. This is an easier task than expressing what you know from memory recall. The expressive level of understanding requires students to actually perform the skill when given an appropriate prompt. This level of understanding is more difficult and demonstrates a more advanced level of understanding. For students with learning problems, it is important to remember that their learning occurs most efficiently in increments of understanding. Developing success and understanding at the receptive/recognition level provides them a sound foundation for success at the expressive level. The practice activities described in this teaching plan can be used for all three Fraction Models (Area, Measurement, & Sets).

I. Provide practice at the receptive/recognition level

A. Instructional Game (Whole Class)

Purpose: to provide students a motivating way to have many practice opportunities to recognize fractional parts at the concrete level of understanding.

Learning Objectives 1-3

Materials:

Teacher –

- appropriate concrete materials (use those you have used during Explicit Teacher Modeling. Include those for each Fraction Model you taught. *Remember that the Area Models and Measurement Models will be less difficult for students initially than the Sets Model, so you may want to provide several Area/Measurement Model prompts before Set Model prompts.)
- a visual format with numbers "1," "2," & "3' clearly visible with ample room for displaying a separate concrete example by each written numeral (e.g. poster paper or folded number cards that "stand up" for concrete examples you will model on a table; overhead transparency if using overhead manipulatives.)
- a prepared list of prompts; a team score sheet for recording team points.

Students –

- number cards, "1," "2," "3" for each student; an individual performance record sheet (has two headings, "C" for "correct" responses & "H" for responses where "I need help" – incorrect responses.) *This record

sheet could be pre-made or students can use their own notebook paper and put the two headings at the top.

Description:

Activity: Teacher divides class into teams (existing group tables; rows where students are seated; etc.). Each student on each team has a series of cards that have the numbers "1," 2," or "3" on them. The teacher uses appropriate concrete materials that represent fractional parts (choose one from those you have used to model fractional parts.) to represent a given fractional part. The teacher gives the prompt (e.g. says "one of two parts;" "one-half"; "whole.") and then shows three examples using concrete materials, only one of which is correct. Teacher shows the first example next to the number "1," then shows the second example next to the number "2," etc. Students decide which example accurately represents the prompt given. When signaled by the teacher, the students all hold up the card that corresponds to the correct numbered example. The teacher gives the correct response and asks those not holding up the correct numbered card to lower their hands. Teacher quickly counts number of correct responses for each team and records total on scoring sheet. Students record on notebook paper or on a record sheet that you provide whether they answered correctly by putting a tally under "C" for "correct" or under "H" for "need help." Teacher models/provides corrective feedback as needed.

Instructional Game Steps:

1.) Introduce game.

2.) Distribute materials.

3.) Provide directions for game, what you will do, what students will do, and reinforce any behavioral expectations for the game.

4.) Provide time for students to ask questions.

5.) Model giving the prompts and then model how to respond.

6.) Provide time for students to ask questions about how to respond.

7.) Model how students can keep track of their responses.

8.) Play one practice round so students can apply what you have modeled. Provide specific feedback/answer any additional questions as needed.

9.) Provide ample amounts of positive reinforcement as students play.

10.) Provide specific corrective feedback/ re-model skill as needed.

11.) Play game.

12.) Encourage students to review their individual response sheets, write the total number of "correct" responses under the "C" column and do the same for the "H" column.

13.) Review team score and pick up individual student performance record sheet.

2. Provide practice at the expressive level

Purpose: to provide students multiple opportunities to represent fractional parts concretely and to give and receive feedback to a peer.

Structured Peer Tutoring

Learning Objectives 1-3

Materials:

Teacher –

- a timer

Students –

- ***concrete materials that represent the appropriate fraction model:*** appropriate "parts" cut out of construction paper and which match the Fraction Models you want to have students practice. There should be enough for each student to respond to given prompts on the learning sheet (e.g. circles and circle pieces cut out construction paper or tag-board (Area Model); fraction strips (Measurement Model); small circles or "dots" punched out with a hole puncher/ evenly cut squares (make one grid of 1 inch by 1 inch squares, put this 'master' on top of a small stack of construction paper and use a paper cutter to cut out the squares (Sets Model)
- a learning sheet with prompts about fractional parts and a corresponding place for students to glue on their construction paper pieces for each prompt (e.g. a circle (representing a 'whole') with the same dimensions of the circle pieces cut out would be drawn/represented next to each prompt for students to glue circle pieces (Area Model); a rectangle (representing a 'whole' with the same dimensions of the fraction strips would be represented next to each prompt to glue fraction strips (Measurement Model); ample space provided for students to group and glue sets of construction paper "dots" or "squares" that represent fractional part prompts (Sets Model);
- ***a player performance sheet***: a piece of paper for each "coach" to tally points for their respective player;
- ***glue***.

Description:

Activity: Students will use cut out circles and circle pieces made from construction paper of tag-board to respond to prompts provided on pieces of paper. The learning sheet contains prompts such as: Show "one of two equal parts;" Show "one of four equal parts;" Show a "whole;" Show "one-half." A circle that is the same dimensions as represented by the circle and circle pieces appears after each prompt. The player will choose the appropriate circle piece to represent the prompt given. After the "coach" evaluates the "player's" response, the coach gives the player a "thumbs-up." The player then glues the fractional part onto the circle in appropriate fashion. The teacher circulates the room, monitoring student academic and social behaviors. The teacher provides positive reinforcement, specific corrective feedback, and answers questions as needed.

Structured Peer Tutoring Steps:

1.) Select pair groups and assign each pair a place to practice (try to match students of varying achievement levels if possible).

2.) Review directions for completing peer tutoring activity and relevant classroom rules. Practice specific peer tutoring procedures as needed (see step #4).

3.) Model how to perform the skill(s) within the context of the activity *before* students begin the activity.

4.)Divide the practice period into two equal segments of time. One student in each pair will be the "player" and will respond to the prompts. The other "player" will be the "coach" and will give the "player" the prompts and evaluate the player's response. The coach will also provide positive reinforcement, corrective feedback, and assign points based on the player's responses (e.g. two points for correct response the first time, one point for the correct response the second time.).

5.) Provide time for student questions.

6.) Signal students to begin.

7.) Signal students when it is time to switch roles.

8.) Monitor students as they work in pairs. Provide positive reinforcement for both "trying hard," responding appropriately, and for students using appropriate tutoring behaviors. Also provide corrective feedback and modeling as needed.

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

1. Continuous Monitoring & Charting Student Performance

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

Materials:

Teacher –

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

Student –

- appropriate response sheet/curriculum slice/probe
- concrete materials if appropriate
- 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.

2.) Choose an appropriate number of tasks to indicate proficiency (suggested: 3 to 5 tasks). This number range allows you to complete the evaluation period within 3 to 5 minutes. *It is important that this evaluation strategy is time-efficient because it should be done every day or every other day and if it is not time-efficient, you will probably not implement this important evaluation strategy.

3.) Provide 3-5 prompts on the curriculum slice/probe that reflect the range of skills you want to evaluate (e.g. one or more fractional parts and using one or more fraction models.) 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, "show me 'one-half' with your circle pieces," while holding up a card with "one-half" written on it.), or a combination of written curriculum slices/probes and oral prompts with visual cues (e.g. students have a curriculum slice/probe that is numbered "1, 2, 3…" where each number has several fractional parts written – "one-half," "one-eighth," "one-fourth," and students circle the correct response when demonstrated by the teacher with concrete materials.)

4.) Provide students the curriculum slice/probe/response sheet.

5.) Provide directions.

6.) Conduct evaluation.

7.) Count corrects and incorrects (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 the concrete level of understanding this should be %100 – 3 out of 3 corrects or 5 out of 5 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:

Concrete Level: demonstrates %100 accuracy (given 3 to 5 response tasks) over 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

Purpose: to evaluate student conceptual understanding and provide you information to plan additional instruction.

Flexible Math Interview

Description:

During small group time, the teacher will encourage students to identify fractions using concrete materials and to describe what they represent. The teacher notes particular misunderstanding/non-understanding for individual students and provides additional modeling based on individual student needs.

Instructional Phase 4 - Maintenance

Purpose: to provide students periodic opportunities to respond to previously mastered skill, thereby helping students to maintain their level of mastery.

Problem of the Day

Materials:

Teacher –

- chalkboard/overhead projector
- chalk/overhead pen

Student –

- appropriate concrete materials

Description:

Provide a problem of the day that focuses on one or more fractional parts. Orally give the problem while students read the question/prompt written on the chalkboard. Ask students to discuss the strategy they used to get the answer. The student(s) will demonstrate using appropriate manipulatives. Teacher models skill after this discussion, highlighting important ideas/features.