

Instructional Plan

Representational Level

Name of Math Skill/Concept: Identifying and representing equivalent fractions using drawings

Prerequisite Skills Needed:

- Identifying and write fractions.
- Comparing fractions.
- Greater than, less than,
- Experience using a number line,
- Concept of equivalency
- Identifying and representing equivalent fractions using concrete objects

Learning Objectives:

1. Use paper folding and drawing to identify equivalent fractions.
2. Use drawings to represent equivalent fractions.

Important Ideas for Implementing This Teaching Plan:

1. Use area model, then measurement model and then move to a set model. If students have difficulty with a sets model, reintroduce the area and then measurement model before moving forward.
2. Color code or cross hatch drawings.
3. Emphasize estimation.
4. Provide examples and nonexamples to help students discriminate the concept.

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

Teach Skill/Concept within Authentic Context

Description: In this lesson, a paper folding game that children play is emphasized.

Build Meaningful Student Connections

Purpose: to help students make meaningful connections between what they have experienced with working with concrete objects and using paper folding and drawings to identify and make equivalent fractions.

* The following is a description of how you implement this instructional strategy for Learning Objective 1.

Learning Objective 1: Use drawings and other representations to identify equivalent fractions.

Materials:

Teacher –

- Paper cube, folded and unfolded,

Description:

1.) Link to students' prior knowledge of identifying and representing fractions.

For Example:

How many of you love to make those folded paper blocks that ask questions like "What's your favorite number? What is your favorite color? Who do you love?" Well, today we are going to fold paper and work on equivalent fractions.

2.) Identify the skill students will learn

For Example:

We have been using objects like fractions bars and circles to work on equivalent fractions. Today we are going to find out how we can use paper and pencil to show equivalent (point to word on board) fractions. Remember that equivalent fractions look different but show the same amount of a whole.

3.) Provide rationale/meaning for identifying and representing equivalent fractions.

For Example:

If we can learn to draw our answers, it will help us when we start adding and subtracting fractions.

Provide Explicit Teacher Modeling

Purpose: to provide students with a clear model of how to identify and make equivalent fractions using drawings and other representations.

Learning Objective 1: Use paper folding and drawing to identify equivalent fractions.

* This skill should first be taught using an area model, then a measurement model, and then a sets model. After completing all phases of the instructional plan with an area model, and measuring student mastery, the concept should then be taught using a measurement model. After completing all phases of the instructional plan with a measurement model, and measuring student mastery, the concept would then be taught using a sets model.

Materials:

Teacher -

- Paper
- Markers, colored pencils, crayons
- White or chalkboard

Description:

A. Break down the skill of identifying equivalent fractions using paper folding/drawing.

1. Identify the first fraction.
2. Compare the second fraction to the first.

B. Explicitly describe and model how to identify equivalent fractions using paper folding/drawing with an **area** model.

1.) Identify the fraction represented by each object.

- ❖ Identify the whole.
- ❖ Cue students to identify the total number of parts that the whole is divided into.
- ❖ Cue students to identify the number of parts that are shown/shaded.

For Example:

I have a sheet of paper up here (show paper). I am going to fold this paper into 2 parts (Take piece of paper and fold it horizontally in half). How many parts do you think I will have? Right, 2 (count parts with students). I am going to color in 1 of those two parts. What fractional part of the whole piece of paper have I colored in? Right $\frac{1}{2}$ (label $\frac{1}{2}$). Now I am going to take my sheet of paper and fold it again. I have folded it across and now I am going to fold it lengthwise. How many parts did I fold this paper into? Right four parts. (Illustrate with paper, counting parts). What fraction is represented by one of these four parts? (Point to one of the four parts). Right, this is a $\frac{1}{4}$ because it is one of four parts. I am going to label each of the four parts. (Label each square $\frac{1}{4}$).

2.) Compare the second fraction to the first fraction.

- Identify them as equivalent if they represent the same amount of the whole (for area model, take up the same amount of space; for measurement model, if they are the same length; for sets model, if they contain the same part of the total whole).
- Cue students to comparisons by color coding or cross hatching of shadings.

For Example:

Let's look at this paper. I want to color in how many fourths are in $\frac{1}{2}$. I am going to color my fourths a different color than I used for the half. How many fourths are in the $\frac{1}{2}$ of the paper that I shaded? Right! one, two - two fourths, so I am going to color in these two fourths. Two fourths and one half take up the same amount of space (show on paper). You can tell because this area is marked with both the color for the $\frac{1}{2}$ (point to $\frac{1}{2}$) and the color for the fourths (point to the two fourths). $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent fractions. I am going to show this by writing $\frac{1}{2} = \frac{2}{4}$ on the board. I know from looking at this paper that $\frac{1}{2}$ and $\frac{2}{4}$ take up the same amount of space. How many fourths did I color in? Right 2 fourths. So, $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent (point to word on board).

3. If appropriate, repeat the sequence, adding an additional comparison (e.g. eighths).

4. Repeat the activity several more times showing equivalent (e.g. thirds and sixths) as well as non-equivalent fractions (e.g. thirds and fourths).

Learning Objective 2: Use drawings to represent equivalent fractions.

* This skill should first be taught using an area model, then a measurement model, and then a sets model. After completing all phases of the instructional plan with an area model, and measuring student mastery, the concept should then be taught using a

measurement model. After completing all phases of the instructional plan with a measurement model, and measuring student mastery, the concept would then be taught using a sets model.

Materials:

Teacher –

- **Chocolate bar**
- Markers, colored pencils, crayons
- White or chalkboard

Description:

A. Break down the skill of representing equivalent fractions using drawings.

1. Identify the first fraction.
2. Draw an equivalent fraction.
3. Compare the second fraction to the first.

B. Explicitly describe and model how to represent equivalent fractions using drawings.

1.) Identify the fraction represented by the given drawing.

- ❖ Identify the whole.
- ❖ Cue students to identify the total number of parts that the whole is divided into.
- ❖ Cue students to identify the number of parts that are shown/shaded.

For Example:

We have been working on identifying equivalent fractions by folding paper and drawing. Today I want to look at how we can make equivalent fractions. (Point to word on board). Remember – equivalent means that the fractions represent the same amount of the whole. I have a candy bar that I want to share. Let me draw that up on the board. What have I drawn? Right, a whole candy bar. If I am going to share it with my friend, how many parts do I need to break it into? Right – 2. How many of those two parts am I going to share with my friend? Right, I am going to share one of the two parts with my friend. What is the fraction that shows that I am going to share one of these two parts? Right one half. I am going to label each half (write $\frac{1}{2}$ in each part). I am also going to color in the part of the candy bar that I am going to give away.

2.) Draw an equivalent fraction.

- Draw an equivalent whole
- Identify the number of parts that the whole is divided into.

For Example:

My sister also has a candy bar. I am going to draw her candy bar right here. She is going to share her candy bar with some friends too. BUT she has 3 friends plus herself, so how many parts will she need to divide her candy bar into? Right 4, because there are 3 friends plus herself. I am going to draw lines and divide this candy bar into four parts. There, 1,2,3,4. What is the fraction for this fractional part (point to one of the four parts)? Right one fourth. I am going to label each part $\frac{1}{4}$.

3.) Compare the second fraction to the first fraction.

- Prompt students to identify the number of parts that cover the same area as the part shown by the model (first) drawing.
- I identify them as equivalent if they represent the same amount of the whole (for area model, take up the same amount of space; for measurement model, if they are the same length; for sets model, if they contain the same part of the total whole).
- Cue students to comparisons by color coding or cross hatching of shadings.

For Example:

Now I am going to give one half of my candy bar away and I get to keep the other half. My sister wants to know how many of her pieces she would need to give away to give away as much as I am giving away. Here is the half I am going to give away. I am going to draw a line from this half over to my sister's candy bar. Then I am going to shade in everything below this line. The shading shows how much of this candy bar is equal to the one half of my candy bar. Now that I've shaded it in, how many fourths are under the line in the shaded area? Right! There are two fourths 1,2. A fourth is smaller than a half (point to fourth on sister's candy bar and a half on model), so it takes two of them to cover the same space as a half. My sister will need to give two fourths away to equal the one half I am giving away. Both this one half (point to shaded one half) and these two fourths (point to each labeled fourth) take up the same amount of space. That means that $\frac{1}{2}$ is equivalent to $\frac{2}{4}$ (write $\frac{1}{2} = \frac{2}{4}$ on board).

3.) If appropriate, repeat the sequence, adding an additional comparison (e.g. eighths).

4.) Repeat the activity several more times showing equivalent (e.g. thirds and sixths) as well as non-equivalent fractions (e.g. thirds and fourths).

Scaffold Instruction

Purpose: to provide students an opportunity to build their initial understanding of how to identify and represent equivalent fractions using drawings.

Materials:

* Dependent on the skill (See materials listed for the specific skill under Explicit Teacher Modeling).

Description:

Scaffolding at the representational/drawing level of instruction should occur using the same process as scaffolding instruction at the concrete level of instruction (See the description of Scaffolding Instruction for "identifying and representing equivalent fractions **using concrete objects with an** area model. A similar process could be used for the other learning objectives in this plan.). The steps used during Explicit Teacher Modeling should be used as structure for scaffolding your instruction.

HIGH

MEDIUM

LOW

1. Scaffold instruction using a high level of teacher direction/support (*Dependent on the needs of your students, you may want to continue to associate concrete materials with drawings at this level as described under Explicit Teacher Modeling.) *Move to the next phase of scaffolding only when students demonstrate understanding and ability to respond accurately to your prompts.
2. Scaffold instruction using a medium level of teacher direction/support (*If you associated concrete materials with drawings while scaffolding using a high level of teacher direction/support, then do not include concrete materials during this phase of scaffolding). *Move to the next phase of scaffolding only when students demonstrate understanding and ability to respond accurately to your prompts.
3. Scaffold instruction using a low level of teacher direction/support (*Students should actually draw as you prompt during this phase of Scaffolding Instruction.). *Move students to independent practice of the skill only after they demonstrate the ability to perform the skill with limited prompting from you.

Instructional Phase 2: Facilitate Acquisition to Mastery – Student Practice

Receptive/Recognition Level

Purpose: To provide students with multiple practice opportunities identify and represent equivalent fractions using drawings. A similar process could be used for the other learning objectives in this plan.

Learning Objective 1 I identify equivalent fractions **using paper** folding and/or drawing.

Structured Cooperative Learning/Instructional Games

Materials:

Teacher –

- Overhead with transparencies of problem sheets
- Bell

Students –

- **Set of problem sheets. Each shows a labeled drawing of a fraction and three drawings of possible equivalent fractions.**

Description:

Activity:

Children will work in groups of 4 or 5 students. Each group will have a set of problem sheets numbered 1-10. The teacher will choose a problem 1-10. Each team is to look at the correspondingly numbered problem sheet and decide which of the three choices shows an equivalent fraction. After the teacher rings the bell, one member of a team will report their answer. Teams can earn points for each correct decision.

Cooperative Learning Groups Steps:

- 1.) Provide explicit directions for the 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:
 - a. Materials manager (gets the materials)
 - b. Time keeper (makes sure that group stays on task)
 - c. Reporter (reports group's answer)
 - d. Encourager(s) (encourages each person)
- 4.) Distribute materials.
- 5.) Model one example of skill(s).
 - a. Look at problem.
 - b. Look at answer choices
 - c. Decide which is correct answer,
 - d. Make sure that the team agrees with the decision before time is called.
- 6.) Review/model appropriate cooperative group behaviors and expectations.
 - a. Agree or disagree with a teammate's decision.
 - b. Listen while teams are sharing decisions.
 - c. Attend to classmates showing examples on board.
- 7.) Provide opportunity for students to ask questions.
- 8.) Teacher monitors and provides specific corrective feedback & positive reinforcement.
 - a. Circulate around the tables and check on children's responses.
 - b. Make sure that each child receives feedback on his/her decision.
 - c. Ask each child in the class to share his/her decisions at least once either with the entire class or individually with the teacher.

Expressive Level

Purpose: to provide students multiple opportunities to represent equivalent fractions using drawings.

Learning Objective 2: Represent equivalent fractions using drawings.

Planned Discovery Activity

Materials:

Teacher -

- Sample drawing and response

Students -

- A set of problem sheets. Each sheet will show a fraction and a drawing for that fraction. Some drawings will show an area model, some will show a fraction strip – measurement model, and some drawings will show a sets model. Each drawing will be numbered.
- A set of numbered learning sheets
- Pencil for drawing/writing

Description:

Activity:

Students will work in pairs. Each pair will have a set of problem sheets. Students will choose a numbered drawing and draw and label as many equivalent fractions as they can on the corresponding numbered learning sheet.

Planned Discovery Activity Steps:

1. Develop Planned Discovery Activity Learning Sheet as described under *Materials*.
2. Distribute the Planned Discovery Activity Learning Sheet and provide clear directions for completing the activity, including appropriate behavioral rules.
3. Model how to complete one example for each of the three types of fractional models included on the Planned Discovery Learning Sheet (and model appropriate behaviors as needed).
4. Provide students with appropriate materials.
5. Monitor students as they practice, providing appropriate corrective feedback, prompting student thinking, providing positive reinforcement, and modeling or cueing as needed.
6. At the conclusion of the activity, provide students with solutions to the Planned Discovery Activity Learning Sheet. Elicit student examples, providing students with appropriate feedback and model several examples provided by students. Emphasize *why* the examples represent the fractions.
7. Review student response sheets and note special difficulties individual students may be having and/or progress they are making.

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

Continuous Monitoring & Charting of Student Performance

Purpose: to provide the teacher 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

Students:

- 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, the expressive level, or both.
- 2.) Choose appropriate criteria to indicate mastery.
- 3.) Provide appropriate prompts in an appropriate format (receptive/recognition or expressive) so students can respond:
 - * Based on the skill, your students' learning characteristics, and your preferences, the curriculum slice or probe could be written in nature (e.g. a sheet with appropriate prompts; index cards with prompts), or oral in nature with visual cues (e.g. teacher shows several drawings/choices on overhead then prompts students to say which drawing shows the correct solution for the problem), or a combination of both (e.g. teacher shows problem and then prompts students to circle which of several drawings shows the correction solution).
- 4.) Provide students with the materials to complete each task.
- 5.) Provide directions on how to complete each task.
- 6.) Conduct evaluation.
- 7.) Count corrects and incorrects (you and/or students can do this dependent on type of curriculum slice/probe used).
- 8.) You and/or the students will plot their responses on a suitable chart. A goal line that represents proficiency should be visible on each student's chart. For representational level of understanding this should be 100%. for 8 -10 trials.
- 9.) Talk with children about 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 by demonstrating 100% accuracy for 8-10 trials over 2-3 days.
- 11.) Determine whether you need to alter or modify your instruction based on student performance.

Additional Assessment Activity Appropriate For This Math Skill/Concept

Flexible Math Interview

Purpose: to provide the teacher with additional diagnostic information in order to check student understanding, and plan and/or modify instruction accordingly.

Materials:

Teacher -

- 5 pictures for student to color in equivalent fractions

Students -

- Paper, pencils

Description:

With individual students or in small groups, the teacher will have students draw solutions to given problems. The teacher will ask students to explain how their drawings show the solution to the problem. The teacher should note errors or misconceptions while the student is "teaching", but the teacher should not stop the student for correction purposes. By having the student complete the entire explanation, the teacher will gain a better understanding of the student's thinking. The teacher confers with students regarding specific errors or misconceptions afterwards.

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

Purpose: to provide periodic student practice activities and teacher directed review of this skill after students have mastered it.

1. Partner Drills

Materials

- Flash Cards showing two drawings of fractions, answers (equivalent/non-equivalent on back of card)

Description:

Students can do this individually or in pairs. The student will look at a flashcard and identify the two pictures as showing equivalent or non-equivalent fractions. Students can check themselves by turning the card over.

2. Math Center

Materials:

- Sets of numbered, laminated cards showing drawings of fractions using various models (set, area, measurement). Each card is vertically divided and has the drawing on one side and a space for student drawing on the other
- Marker for drawing
- Answers drawn on answer sheet in envelope

Description:

Students will choose a card and draw one or more equivalent fractions. Answers can be checked using an answer sheet.