The edTPA and the Power of Arts Integration

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Senior Honors Project:
The edTPA and the Power of Arts Integration
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Honors Program
Abstract

The edTPA (teacher performance assessment) is a nationally administered performance-based, subject-specific assessment used to emphasize, measure and support the skills and knowledge that all teachers need in the classroom (http://edtpa.aacte.org/faq). During my student teaching experience, I taught three lessons about fractions and accomplished three interconnected assessment tasks: (1) planning, (2) instruction, and (3) assessment. My third grade class learned about fractions on a number line, equivalent fractions, and comparing fractions. In addition to the elementary mathematics edTPA, I explored how arts integration enhances the learning opportunities of students.

Arts integration is an approach to teaching in which students demonstrate their understanding of a subject through art. Arts integration allows students to engage in a creative process that connects the arts with another core subject. Arts integration is important because it supports student learning. It deepens critical thinking, collaboration, and communication skills. Furthermore, incorporating the arts into school subjects promotes higher-level thinking skills and drives creative inquiry. Through creative inquiry, students can answer questions, solve problems, and take on new challenges. Incorporating the arts into the curriculum is essential because it engages students in the learning process. Arts integration offers a powerful way for students to gain meaning of a particular subject. My senior project aimed to incorporate the arts into the subjects of mathematics, literacy, and social studies. By teaching through the arts, I was able to empower the students to use their creativity and imagination to understand curricular concepts.

Keywords: edTPA, assessment, fractions, arts integration, subjects, creative, critical thinking, higher-level thinking
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Planning Task 1:
Planning for Instruction and Assessment
Part A: Context for Learning
TASK 1: CONTEXT FOR LEARNING INFORMATION

Respond to the prompts below (no more than 4 single-spaced pages, including prompts) by typing your responses within the brackets following each prompt. Do not delete or alter the prompts. Pages exceeding the maximum will not be scored.

About the School Where You Are Teaching

1. In what type of school do you teach? (Type an "X" next to the appropriate description.)
   - Urban: _____
   - Suburban: _____
   - Rural: __X____

2. What grade levels are at your school site (e.g., K–6)?
   - The grade levels at my school site are K-6.

3. List any special features of your school or classroom setting (e.g., charter, co-teaching, themed magnet, classroom aide, bilingual, team taught with a special education teacher) that will affect your teaching in this learning segment.
   - A special feature of my school is departmentalizing. The third grade teachers departmentalize, and the students switch classrooms during mathematics and reading. One instructor teaches math, while the other instructor teaches reading. A special feature of my classroom setting is classroom aide, as paraprofessionals come in and assist students with disabilities.

4. Describe any district, school, or cooperating teacher requirements or expectations that might affect your planning or delivery of instruction, such as required curricula, pacing plan, use of specific instructional strategies, or standardized tests.
   - Laramie County School District 1 is required to use the Everyday Mathematics curriculum. As a result, I am expected to teach lesson 8-4 on fractions on a number line, lesson 8-5 on equivalent fractions, and lesson 8-6 on comparing fractions.

About the Class Featured in this Learning Segment

1. How much time is devoted each day to mathematics instruction in your classroom?
   - Each day, two hours and thirty minutes is devoted to mathematics instruction in my classroom. (One hour and fifteen minutes is provided for each ability group.)

2. Is there any ability grouping or tracking in mathematics? If so, please describe how it affects your class.
   - There is ability grouping in mathematics. The third grade classes departmentalize, and the students are divided into two groups based on their ability level. There is a group consisting of low ability students, and a group consisting of high ability students. This ability grouping affects my class because the higher level students have the opportunity to learn with other higher level students, while the lower level students work with other lower level students. When the lower level group is instructed, they are given more support and guidance throughout the lessons. The higher level group is given less direction, and is encouraged to solve the majority of the problems independently.

3. Identify any textbook or instructional program you primarily use for mathematics instruction. If a textbook, please provide the title, publisher, and date of publication.
The school district requires the school to use the Everyday Mathematics curriculum. The title of the textbook that is primarily used for mathematics instruction is *Everyday Mathematics: Student Math Journal*. The publisher is McGraw-Hill Publishing. The date of publication is 2011.

4. List other resources (e.g., electronic whiteboard, manipulatives, online resources) you use for mathematics instruction in this class.

Other resources that are used for mathematics instruction in this class are an electronic whiteboard (SMART Board), a whiteboard, manipulatives, and online resources (Renaissance Learning and math game programs.)

About the Students in the Class Featured in this Learning Segment

1. Grade-level(s):

The class featured in this learning segment is third grade.

2. Number of students in the class:

- students in the class: __20___
- males: __8___ females: __12___

3. Complete the charts below to summarize required or needed supports, accommodations, or modifications for your students that will affect your instruction in this learning segment. As needed, consult with your cooperating teacher to complete the charts. Some rows have been completed in italics as examples. Use as many rows as you need.

---

**Students with IEPs/504 Plans**

<table>
<thead>
<tr>
<th>IEPs/504 Plans: Classifications/Needs</th>
<th>Number of Students</th>
<th>Supports, Accommodations, Modifications, Pertinent IEP Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Visual processing</td>
<td>2</td>
<td>Close monitoring, graph paper for 3 digit numbers</td>
</tr>
<tr>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
</tr>
</tbody>
</table>

---

**Students with Specific Language Needs**

---

1 California candidates—If you do not have any English language learners, select a student who is challenged by academic English.
### Language Needs

<table>
<thead>
<tr>
<th>Language Needs</th>
<th>Number of Students</th>
<th>Supports, Accommodations, Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: English language learners with only a few words of English</td>
<td>2</td>
<td>Pre-teach key words and phrases through examples and graphic organizers (e.g., word cluster, manipulatives, visuals)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Have students use pre-taught key words and graphic organizers to complete sentence starters</td>
</tr>
<tr>
<td>Example: Students who speak a variety of English other than that used in textbooks</td>
<td>5</td>
<td>Make connections between the language students bring and the language used in the textbook</td>
</tr>
<tr>
<td>Students who speak a variety of English other than that used in textbooks</td>
<td>1</td>
<td>Make lessons meaningful by connecting the cultural backgrounds of students with the language used in the <em>Everyday Mathematics</em> textbook</td>
</tr>
</tbody>
</table>

### Students with Other Learning Needs

<table>
<thead>
<tr>
<th>Other Learning Needs</th>
<th>Number of Students</th>
<th>Supports, Accommodations, Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Struggling readers</td>
<td>5</td>
<td>Provide oral explanations for directions and simplified text for word problems</td>
</tr>
<tr>
<td>Students needing greater challenge</td>
<td>5</td>
<td>Provide greater challenges by promoting higher order thinking skills among students</td>
</tr>
<tr>
<td>Students with gaps in academic knowledge</td>
<td>6</td>
<td>Offer extra academic support; provide more guidance and work one-on-one with students</td>
</tr>
</tbody>
</table>
Part B:
Lesson Plans for Learning Segment
Lesson 1

Title: Fractions on a Number Line

Overview: In this lesson, students will make a number-line poster for fractions. They will use the poster to review and extend fraction concepts.

1. Interactive SMART Board activity. (Duration: 10 minutes)
2. Cutting of fraction strips. (Duration: 5 minutes)
3. Gluing or taping of fractions strips over corresponding strips on journal page 191. (Duration: 25 minutes)
4. Completion of journal pages 192-193 and “Fractions in Number Line” worksheet. (30 minutes)
5. Conclusion of lesson with discussion of number-line model. (Duration: 5 minutes)

Materials:
- SMART Board for interactive activity (See Part D)
- Everyday Mathematics: Student Math Journal, pp. 191-193
- Everyday Mathematics: Math Masters, pp. 247 and 249-250 (See Part C)
- Scissors
- Tape or glue
- “Fractions in Number Line” worksheet (See Part D)

Big Ideas/Essential Questions: Students will understand the number line as a model for fractions. The lesson revolves around these questions:
1. How can fractions be represented on a number line?
2. How can a number line be partitioned into $b$ equal parts?
3. How can one explain where to place a fraction on a number line?

Content Objectives: By the end of the lesson,
1. Students will be able to view the number line as a model for fractions.
2. Students will be able to identify fractions on a number line.
3. Students will be able to determine how to place fractions on a number line.

Academic Language Objectives: Throughout the lesson, students will see/use the following terms:

<table>
<thead>
<tr>
<th>Content Specific Vocabulary</th>
<th>Language of Instruction</th>
<th>Language Format Demands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraction</td>
<td>Represent</td>
<td>Speaking</td>
</tr>
<tr>
<td>Number line</td>
<td>Identify</td>
<td>Listening</td>
</tr>
<tr>
<td>Fraction strip</td>
<td>Locate</td>
<td>Reading</td>
</tr>
<tr>
<td>Model</td>
<td>Discuss</td>
<td>Writing</td>
</tr>
</tbody>
</table>

Standards:
1. CCSS.MATH.CONTENT.3.NF.A.2: Understand a fraction as a number on the number line; represent fractions on a number line diagram.
   a. CCSS.MATH.CONTENT.3.NF.A.2.A: Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into $b$ equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 located the number $1/b$ on the number line.
   b. CCSS.MATH.CONTENT.3.NF.A.2.B: Represent a fraction $a/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into $b$ equal parts. Recognize that each part has size $a/b$ and that the endpoint of the part based at 0 located the number $a/b$ on the number line.
line diagram by marking off a length \( \frac{1}{b} \) from 0. Recognize that the resulting interval has size \( \frac{a}{b} \) and that its endpoint locates the number \( \frac{a}{b} \) on the number line.

2. **CCSS.MATH.CONTENT.3.G.A.2:** Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as \( \frac{1}{4} \) of the area of the shape.

**Introduction:**

1. **Gain students’ attention and stimulate their interest for the lesson**
   a. The educator will introduce the lesson by showing students the following interactive SMART Board activity: [http://exchange.smarttech.com/details?id=a32a3b23-f397-4acb-8857-f1081d410f5e](http://exchange.smarttech.com/details?id=a32a3b23-f397-4acb-8857-f1081d410f5e).

2. **Establish procedures (tell the students what you expect)**
   a. The educator will say, “I expect you to be safe, respectable, and responsible throughout this activity. Follow the classroom safety rules: obey your teacher’s rules, keep your hands and feet to yourself, no running, and handle the materials with care. Be open to ideas and support your classmates’ thoughts. Remember, we are working in a quiet learning environment. Therefore, you need to use your inside voices.” The educator will continue to say, “My goal for this lesson is that you understand the number line as a model for fractions.”

3. **Inform students of the learning outcomes/objectives**
   a. The educator will tell the students, “By the end of this lesson, you will have the ability to understand fractions as a point on the number line. You will also be able to locate specific fractions on a number line diagram.”

**Procedure:**

1. Distribute a set of seven fraction strips to each student (page 247 of *Math Masters*).
2. Instruct students to cut out the fraction strips.
3. Direct students to turn to page 191 in their *Everyday Mathematics: Student Math Journal*. Inform students that they will be using the strips they cut out to make the Fraction Number-Line Poster. Each strip includes a number line.
4. The fraction strip that shows a number line from 0 to 1 represents the whole, or one. Instruct students to glue or tape this fraction strip over the “1 Whole” strip on journal page 191.
5. Instruct students to fold the Halves fraction strip in half. Check that they fold it into two equal parts. Demonstrate how to make a mark where the crease meets the number line, and how to label the number line. Direct students to glue or tape the labeled number line strip exactly over the strip on the journal page for halves.
6. Allow students to continue gluing and labeling number-line strips for fourths, eights, thirds, and sixths. Inform students that to fold a strip into sixths, they need to first fold it into thirds and then in half.
7. The students may fold the last strip into twelfths, sixteenths, ninths, or fifths.
8. Have students look at their Fraction Number-Line Poster and ask,
   a. “What are the fraction words for five equal parts and ten equal parts?” *Fifths and tenths*
   b. “Between which fractions is \( \frac{5}{8} \)?” *4/8 and 6/8*
9. Instruct students to complete page 192 in their math journals. They may use their Fraction Number Line Poster on journal page 191 to help solve problems 1 and 2.
10. Instruct students to work on journal page 193 to further their understanding of fractions.

11. When students have completed journal pages 192 and 193, allow them to complete the “Fractions in Number Line” worksheet.

**Accommodations/Differentiation:**
- ESL/ELL students are to be paired with strong English language students. (There are no ESL/ELL students in the selected class.)
- ELLs may use bilingual students for assistance.
  - If necessary, the educator will provide one-on-one help for the students. (There are no ESL/ELL students in the selected class.)
- Students with disabilities are to be assisted by the instructor.
  - These students will be given extra time to work on their Fraction Number-Line Posters. If necessary, the students may work with a paraprofessional. (There are no disabled students in the selected class.)
- Students with documented accommodations for reading and writing may choose to complete their work according to their accommodations within the resource room. (There are no students with documented accommodations for reading and writing in the selected class.)
- Advanced students may be given more challenging problems in which they must use a number line to determine where to place specific fractions. For instance, if the students are given fractions with the same denominator, they may be directed to locate those fractions on a number line. Based on what they know about the denominator, they will be asked to partition the number line into \( b \) equal parts.
- Absent student(s) will need to make a Number-Line Poster for Fractions. In order to earn points for the lesson, they will be asked to complete the poster, journal pages 192-193, and the “Fractions in Number Line” worksheet.

**Extension/Enrichment:**
1. Students can compare the markings on a ruler or measuring cup to the fractions on a number line. They will use pages 249 and 250 of *Math Masters*.
   a. To understand how fractions on a ruler and fractions on a number line relate, the students can compare the two and label the fraction marks on a ruler. Allow students to describe the ways rulers and number lines are similar and different.

**Clean-up:** The educator will facilitate student cleanup of the lesson activity by instructing students to clean up their materials. Their pencil can stay on their desk, as they will need it for the next activity.

**Assessment/Evaluation:** The educator will gather and evaluate information related to the students’ learning based on the learning outcomes. In this lesson, assessment is ongoing throughout the learning process. The students will be evaluated on their participation during the SMART Board activity. They will be assessed on their completion of the Fraction Number-Line Posters, as well as the “Fractions in Number Line” worksheet.

**Closure:** The educator will bring the class back together to discuss the concept of fractions on a number line. He/she will say, “Do you understand the number line as a model for fractions?” Students will be given time to respond. The educator will continue to say, “Now, you know how to identify fractions on a number line.” A connection to the next lesson will be made when the educator says, “Tomorrow, we will be using our Fraction Number-Line Posters to learn about equivalent fractions.”
Lesson 2

Title: Equivalent Fractions

Overview: In this lesson, students will create fraction strips out of construction paper. They will discuss the features of the Fraction Cards and use them to find equivalent fractions. They will identify equivalent fractions on the Fraction Number-Line Poster from lesson 1.

1. Creation of fraction strips. *(Duration: 30 minutes)*
2. Cutting of Fraction Cards. *(Duration: 10 minutes)*
3. Completion of journal page 194 and “Equivalent Fractions” worksheet. *(Duration: 30 minutes)*
4. Conclusion of lesson with discussion of equivalent fractions. *(Duration: 5 minutes)*

Materials:
- Construction paper
- Scissors
- *Everyday Mathematics: Student Math Journal*, pp. 191, 194, and Activity Sheets 5-8
- *Student Reference Book*, pp. 283 and 284
- Math portfolio (notebook)
- Fraction Strips handout (See Part C)
- “Equivalent Fractions” worksheet (See Part D)

Big Ideas/Essential Questions: Students will find equivalent fractions. The lesson revolves around these questions:
1. Where are equivalent fractions?
2. How can equivalent fractions be identified?
3. How can equivalent fractions be represented?
4. How can equivalent fractions be generated?

Content Objectives: By the end of the lesson,
1. Students will be able to represent equivalent fractions.
2. Students will be able to identify equivalent fractions.
3. Students will be able to generate equivalent fractions.

Academic Language Objectives: Throughout the lesson, students will see/use the following terms:

<table>
<thead>
<tr>
<th>Content Specific Vocabulary:</th>
<th>Language of Instruction:</th>
<th>Language Format Demands:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraction</td>
<td>Represent</td>
<td>Speaking</td>
</tr>
<tr>
<td>Unit fraction</td>
<td>Identify</td>
<td>Listening</td>
</tr>
<tr>
<td>Equivalent</td>
<td>Generate</td>
<td>Reading</td>
</tr>
<tr>
<td>Fraction strip</td>
<td>Discuss</td>
<td>Writing</td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standards:
1. **CCSS.MATH.CONTENT.3.NF.A.3**: Explain equivalence of fractions in special cases, and compare fraction by reasoning about their size.
   a. **CCSS.MATH.CONTENT.3.NF.A.3.A**: Understand two fractions as equivalent (equal) if they are the same size, or the same point on the
Introduction:

1. Gain students’ attention and stimulate their interest for the lesson
   a. The educator will introduce the lesson by informing the students that they will be creating their own fraction strips to learn about equivalent fractions. He/she will tell the learners that they can use these fraction strips for future math lessons.

2. Establish procedures (tell the students what you expect)
   a. The educator will say, “I expect you to be safe, respectable, and responsible throughout this activity. Follow the classroom safety rules: obey your teacher’s rules, keep your hands and feet to yourself, no running, and handle the materials with care. Be open to ideas and support your classmates’ thoughts. Remember, we are working in a quiet learning environment. Therefore, you need to use your inside voices.” The educator will continue to say, “My goal for this lesson is that you understand how to find equivalent fractions.”

3. Inform students of the learning outcomes/objectives
   a. The educator will tell the students, “By the end of this lesson, you will have the ability to represent equivalent fractions. Furthermore, you will understand how to generate equivalent fractions with fractions strips and a number line model.”

Procedure:

1. Prior to teaching the lesson, select ten different colors of construction paper and cut twenty strips of each color (blue, brown, black, yellow, green, orange, red, purple, pink, and white). These strips of paper are for the students’ fraction strips.
   a. Consider folding the black, green, orange, purple, and pink strips into thirds, fifths, sixths, tenths, and twelfths, respectively. These fraction strips will more than likely being challenging for the students to fold accurately. It is important for the fractional pieces to be precise.

2. On the day of the lesson, instruct students to turn to the next blank page in their math portfolio and title it, “Equivalent Fractions.” Ask students to identify the meaning of the term. Tell students that equivalent fractions name the same fractional part of the whole. Direct students to write the following sentence in their notebook: “Equivalent fractions are different fractions that have the same value.”

3. Lay the previously cut strips of paper on a table. Instruct students to take a strip of each color.

4. Direct students to label the blue strip as “1 Whole.”

5. Students must fold the brown strip in half and cut along the crease. They are to label each half with “1/2.”
   If you did not already fold the black strips into thirds, instruct students to fold the black strip into thirds, cut along the creases, and label each sections with “1/3.”

b. CCSS.MATH.CONTENT.3.NF.A.3.B: Recognize and generate equivalent fractions, e.g., $1.2 = 2/4$, $4/6 = 2/3$. Explain why the fractions are equivalent, e.g., by using a visual fraction model.

2. CCSS.MATH.CONTENT.3.G.A.2: Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as $1/4$ of the area of the shape.
6. Students must fold the yellow strip into fourths, cut along the creases, and label each section with “1/4.”

7. If you did not already fold the green strips into fifths, direct students to fold the green strip into fifths, cut along the creases, and label each section with “1/5.”

8. If you did not already fold the orange strips into sixths, instruct students to fold the green strip into sixths, cut along the creases, and label each section with “1/6.”

9. Students must fold the red strip into eighths, cut along the creases, and label each section with “1/8.”

10. If you did not already fold the purple strips into tenths, direct students to fold the purple strip into tenths, cut along the creases, and label each section with “1/10.”

11. If you did not already fold the pink strips into twelfths, instruct students to fold the pink strip into twelfths, cut along the creases, and label each section with “1/12.”

12. Students must fold the white strip into sixteenths, cut along the creases, and label each section with “1/16.”

13. Distribute a Fraction Strips handout to each student.

14. Instruct students to cut out all 32 Fraction Cards on Activity Sheets 5-8 in their Everyday Mathematics: Student Math Journal.

15. Ask students to turn their cards to the picture side and observe. They should notice:
   a. Each card represents a whole.
   b. The fraction shown on the back of the card represents the shaded fractional part of the whole.
   c. Some fractions have the same numerator and different denominators. That means the whole is divided into different numbers of equal parts.
   d. The larger the denominator, the more parts the whole is divided into, and the smaller each part.

16. Inform students that any fraction with 1 in the numerator is called a unit fraction. (1/2 is a unit fraction.)

17. Have students find the 1/2 card. They are to find as many other cards in the deck as they can that have exactly the same amount shaded.

18. Students must record the fractions equivalent to 1/2 in the Table of Equivalent Fractions on journal page 194. Remind students that these are called equivalent fractions.

19. Instruct students to find cards equivalent to the 1/3 card and record them in the table. They are to repeat the process for the following fractions: 0/2, 2/2, 2/3, 1/4, 3/4, 1/5, 4/5, 1/6, and 5/6.

20. Discuss how to use the Fraction Number-Line Poster to identify equivalent fractions.
   a. Ask, “What part of the fourths strip is the same size as 1/2 of the whole strip?” (2/4) “Is 2/4 another name for 1/2?” (Yes) “What are some other names on the Fraction Number-Line Poster for 1/2?” (3/6, 4/8)

21. Demonstrate how to place a straightedge vertically on the page next to the fraction 1/2 to find fractions equivalent to 1/2. Allow students to use a straightedge to find other names for 1/4, for 3/4, for 1/3, and for 2/3.

22. When students have completed identifying equivalent fractions with the Fraction Number-Line Poster, provide each student with an “Equivalent Fractions” worksheet.

23. If time permits, allow students to play the Equivalent Fractions Game on pages 283 and 284 in their Student Reference Book. Have them read the rules on page 283 and demonstrate how to play the game.
Accommodations/Differentiation:

- ESL/ELL students are to be paired with strong English language students. (There are no ESL/ELL students in the selected class.)
- To support ELLs, write unit fraction on the board along with a list of examples. (There are no ESL/ELL students in the selected class.)
- To provide language support for fractions, have ELLs write the term equivalent fraction in their math portfolio. Instruct them to draw a picture representing the term. (There are no ESL/ELL students in the selected class.)
- ELLs may use bilingual students for assistance.
  - If necessary, the educator will provide one-on-one help for the students. (There are no ESL/ELL students in the selected class.)
- Students with disabilities are to be assisted by the instructor.
  - These students will be given extra time to work on their posters. If necessary, the students may work with a paraprofessional. (There are no disabled students in the selected class.)
- Students with documented accommodations for reading and writing may choose to complete their work according to their accommodations within the resource room. (There are no students with documented accommodations for reading and writing in the selected class.)
- Advanced students may be given more challenging problems in which they must identify and represent equivalent fractions. For instance, they may be asked to draw a model that represents a fraction equivalent to fraction a/b.
- Absent student(s) will need to make fraction strips with construction paper. In order to earn points for the lesson, they will be asked to complete journal page 194 and the “Equivalent Fractions” worksheet.

Extension/Enrichment:

1. Students can complete an “Equivalent Fractions” worksheet to further their understanding of equivalent fractions.
2. Students can play the Equivalent Fractions Game on pages 283 and 284 in their Student Reference Book.

Clean-up: The educator will facilitate student cleanup of the lesson activity by instructing students to clean up their materials. Their pencil can stay on their desk, as they will need it for the next activity.

Assessment/Evaluation: The educator will gather and evaluate information related to the students’ learning based on the learning outcomes. In this lesson, assessment is ongoing throughout the learning process. The students will be evaluated on their participation as they create their fraction strips and as they complete page 194 in their math journals. They will be assessed on their completion of the “Equivalent Fractions” worksheet.

Closure: The educator will bring the class back together to discuss the concept of equivalent fractions. He/she will say, “Do you understand what equivalent fractions are?” Students will be given time to respond. The educator will continue to say, “Now, you know how to represent them with fractions strips and a number-line model.” A connection to the next lesson will be made when the educator says, “Tomorrow, we will be using our Fraction Number-Line Posters and fraction strips to learn about comparing fractions.”
Lesson 3

Title: Comparing Fractions

Overview: In this lesson, students will use Fraction Cards to identify fractions that are greater than ½, less than 1/2, close to 0, and close to 1.

1. Introduction with “Fraction Pizzas” template. (Duration: 10 minutes)
2. Comparison of fractions to 1/2, 0, and 1. (Duration: 25 minutes)
3. Fraction Top-It game. (Duration: 25 minutes)
4. Completion of “Comparing and Ordering Fractions: worksheet (Duration: 10 minutes)
5. Conclusion of lesson with discussion of comparing fractions. (Duration: 5 minutes)

Materials:
- SMART Board for interactive activity (See Part D)
- “Fraction Pizzas” template (See Part C)
- “Comparing Fractions” handout (pizzas) (See Part C)
- ELMO document camera
- Fraction Cards from previous lesson
- Construction paper fraction strips from previous lesson
- Student Reference Book, pp. 287 and 288
- “Comparing and Ordering Fractions” worksheet (See Part D)
- “Comparing Fractions” activity card, recording sheet, and spinners (See Part C)

Big Ideas/Essential Questions: Students will compare fractions using region models. The lesson revolves around these questions:

1. How can fractions be compared?
2. How can fractions be ordered from least to greatest?
3. What is the relationship between numerators and denominators of fractions?

Content Objectives: By the end of the lesson,

1. Students will be able to read fractions.
2. Students will be able to compare fractions to 1/2.
3. Students will be able to use an area model to compare fractions.
4. Students will be able to identify patterns and relationships between numerators and denominators of fractions.

Academic Language Objectives: Throughout the lesson, students will see/use the following terms:

**Content Specific Vocabulary:**
- Fraction
- Compare
- Greater than
- Less than
- Model

**Language of Instruction:**
- Represent
- Identify
- Compare
- Order
- Discuss

**Language Format Demands:**
- Speaking
- Listening
- Reading
- Writing
Standards:

1. **CCSS.MATH.CONTENT.3.NF.A.3**: Explain equivalence of fractions in special cases, and compare fraction by reasoning about their size.
   a. **CCSS.MATH.CONTENT.3.NF.A.3.D**: Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

2. **CCSS.MATH.CONTENT.3.G.A.2**: Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.

Introduction:

1. **Gain students’ attention and stimulate their interest for the lesson**
   a. The educator will introduce the lesson by showing students the following interactive SMART Board activity: [http://exchange.smarttech.com/search.html?q=%20comparing%20fractions](http://exchange.smarttech.com/search.html?q=%20comparing%20fractions).
   b. The educator will introduce the lesson by explaining to students that they are going to compare and order fractions. He/she will use the ELMO document camera to display the first two pizzas on the “Fraction Pizzas” template. The educator will point out that the two pizzas are the same size, but the first pizza is divided into four slices and the second pizza is divided into eight slices. The students will be asked to identify which pizza has larger slices. The educator will say, “If you were offered one slice of pizza, would you rather have one slice of the pizza cut into fourths, or would you rather have one slice of the pizza cut into eighths?” The students will see that one slice from the pizza cut into fourths is bigger than one slice from the pizza cut into eighths. The students will be guided to conclude that 1/4 is larger than 1/8. The educator will write 1/8 < 1/4 on the whiteboard. He/she will reinforce the concept by explaining that when two fractions have the same numerator, the fraction with the smaller denominator is greater.
   c. The educator will write “5/12” and “7/12” on the whiteboard. He/she will say, “What about these two fractions? Their denominators are the same. How do we know which fraction is greater?” The educator will display the other two pizzas on the “Fraction Pizzas” template. He/she will say, “These pizzas are cut into twelve slices. Would you rather have five of the twelve slices (5/12 will be shaded in) or seven of the twelve slices (7/12 will be shaded in)? The educator will reinforce the idea that when the denominator is the same, the fraction with the larger numerator is greater. He/she will write 7/12 > 5/12 on the whiteboard.

2. **Establish procedures (tell the students what you expect)**
   a. The educator will say, “I expect you to be safe, respectable, and responsible throughout this activity. Follow the classroom safety rules: obey your teacher’s rules, keep your hands and feet to yourself, no running, and handle the materials with care. Be open to ideas and support your classmates’ thoughts. Remember, we are working in a quiet learning environment. Therefore, you need to use your inside voices.” The educator will continue to say, “My goal for this lesson is that you understand how to compare fractions using region models.”
3. **Inform students of the learning outcomes/objectives**
   
   **a.** The educator will tell the students, “By the end of this lesson, you will have the ability to identify fractions that are greater than 1/2, less than 1/2, equal to 1/2, close to 0, and close to 1. You will also understand patterns and relationships between the numerators and denominators of fractions.”

**Procedure:**

1. Remind students that the larger the denominator, the smaller the shaded part of a model – and therefore, the smaller the fraction.
2. Distribute a copy of the “Comparing Fractions” handout (with pizzas) to each student.
3. Instruct students to shade in the parts of the pizzas that correspond to the fractions beneath them. The students must then compare the pizzas to determine which fractions are greater than, less than, or equal to the others.
4. Ask students to take out the following Fraction Cards: 1/2, 1/4, 2/10, 10/12, 4/8, 4/5, 3/9, 0/4, 2/2, and 2/3. Guide them in the following activities:
   
   **a.** Use the 1/2 card to help you find all the cards that are less than half-shaded. 1/4, 2/10, 3/9, and 0/4 Compare the numerators and denominators of these fractions. What do you observe? *The numerator is less than half the denominator.* Ask students to name a fraction that is less than half and has a denominator of 8. 3/8, 2/8, 1/8, 0/8, etc.
   
   **b.** Find all the cards that are more than half-shaded. 4/5, 2/2, 10/12, and 2/3 Compare the numerators and denominators of these fractions. What do you observe? *The numerator is more than half of the denominator.* Ask students to name a fraction that more than half and has a denominator of 8. 5/8, 6/8, 7/8, 8/8, 9/8, and so on.
   
   **c.** Find all the cards that are exactly half-shaded. 1/2 and 4/8 Compare the numerators and denominators of these fractions. What do you observe? *The numerator is exactly half of the denominator.* Ask students to name a fraction that is equal to half and has a denominator of 12. 6/12

   **d.** Put all the cards back in the deck and take out the following cards: 1/4, 3/4, 1/5, 4/5, 1/6, 5/6, 2/10, 8/10, 2/12, and 10/12. Find all the cards that show more than 3/4 of the card shaded. 5/6, 10/12, 4/5, and 8/10. Ask students which card they used to guide their comparisons. 3/4 What do you observe about the numerators and denominators of these fractions? *When most of a card is shaded, the numerator of the fraction is close to the denominator. The difference between the numerator and denominators is small.*

   **e.** Find all the cards that show less than 1/4 of the card shaded. 1/5, 2/10, 1/6, and 2/12. Ask students which card they used to guide their comparisons. 1/4 What do you observe about the numerators and denominators of these fractions? *When a very small part of a card is shaded, the numerator of the fraction is very small compared to the denominator. The difference between the numerator and denominator is large.*

5. Students can play the *Fraction Top-It* game on pages 287 and 288 in their *Student Reference Book*.
   
   **a.** Have students read the rules for *Fraction Top-It.* Demonstrate a few founds and then have partners play the game.

6. When students have had time to play *Fractions Top-It*, distribute a “Comparing and Ordering Fractions” worksheet to each student.
7. When students have completed the “Comparing and Ordering Fractions” worksheet and if time permits, students can further their understanding of comparing fractions by doing the “Comparing Fractions” activity.

**Accommodations/Differentiation:**
- ESL/ELL students are to be paired with strong English language students. (There are no ESL/ELL students in the selected class.)
- ELLs may use bilingual students for assistance.
  - If necessary, the educator will provide one-on-one help for the students. (There are no ESL/ELL students in the selected class.)
- Students with disabilities are to be assisted by the instructor.
  - These students will be given extra time to work on their posters. If necessary, the students may work with a paraprofessional. (There are no disabled students in the selected class.)
- Students with documented accommodations for reading and writing may choose to complete their work according to their accommodations within the resource room. (There are no students with documented accommodations for reading and writing in the selected class.)
- Advanced students may be given more challenging problems in which they must compare and order fractions. For instance, they may be instructed to compare four or more fractions.
- Absent student(s) will need to review the SMART Board interactive lesson. They will also need to complete the “Comparing Fractions” handout. In order to earn points for the lesson, they will be asked to complete the “Comparing and Ordering Fractions” worksheet.

**Extension/Enrichment:**
1. Students can play the “Comparing Fractions” activity.
   a. Pair students with a partner and give each student a copy of the “Comparing Fractions” activity card, recording sheet, and spinners. (Each group should have a set of two spinners.) Have students insert a pencil through a paper clip and hold the pencil upright as an arrow for the spinners. Instruct students to use counters as game markers and follow the “Comparing Fractions” directions of the recording sheet.

**Clean-up:** The educator will facilitate student cleanup of the lesson activity by instructing students to clean up their materials. Their pencil can stay on their desk, as they will need it for the next activity.

**Assessment/Evaluation:** The educator will gather and evaluate information related to the students’ learning based on the learning outcomes. In this lesson, assessment is ongoing throughout the learning process. The students will be informally assessed as they use their Fraction Cards to compare fractions to 1/2, 0, and 1. They will also be evaluated on their participation during the Fraction Top-It game. Furthermore, they will be assessed on their completion of the “Comparing and Ordering Fractions” worksheet.

**Closure:** The educator will bring the class back together to discuss the concept of equivalent fractions. He/she will say, “Do you understand how to compare fractions?” Students will be given time to respond. The educator will continue to say, “Now, you know the patterns and relationships between the numerators and denominators of fractions.” A connection to the next lesson will be made when the educator says, “Tomorrow, you will be learning about fractions greater than one.”
Part C:
Instructional Materials
**STUDENT MATH SURVEY**

Please check a box for each statement to show if you agree or disagree with it. If you have any questions, ask your student teacher for help. Thank you!

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
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<tbody>
<tr>
<td><strong>Demonstrates Positive Attitude Towards Mathematics</strong></td>
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<td>I like learning math.</td>
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<td>In the past, I have not enjoyed math class.</td>
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<td>Math interests me.</td>
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<td><strong>Perceives Mathematics As “Sensible, Useful, and Worthwhile”</strong></td>
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<td>I use math every day (outside of school).</td>
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<td>Math is important throughout life.</td>
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<td>Math is a helpful subject to learn.</td>
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<td><strong>Persists in Applying Mathematics to Solve Problems</strong></td>
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<td>I like to come up with new ways to solve math problems.</td>
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<td>I give up when I have trouble solving a math problem.</td>
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<td>I enjoy the challenge of a hard math problem.</td>
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<td>I believe that there is usually one right way to solve math problems.</td>
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<td><strong>Believes in Own Ability to Learn Mathematics</strong></td>
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<td>I feel confident in my abilities to solve math problems.</td>
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<td>When I see a math problem, I get nervous.</td>
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<td>I have the skills to do the math I am learning.</td>
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Lesson 1 Instructional Materials:
Fractions on a Number Line
Cut on the dashed lines.

1 Whole

0 - 1

Halves

0 - \frac{1}{2} - \frac{2}{2}

Fourths

0 - \frac{1}{4} - \frac{2}{4} - \frac{3}{4} - \frac{4}{4}

Eighths

0 - \frac{1}{8} - \frac{2}{8} - \frac{3}{8} - \frac{4}{8} - \frac{5}{8} - \frac{6}{8} - \frac{7}{8} - \frac{8}{8}

Thirds

0 - \frac{1}{3} - \frac{2}{3} - \frac{3}{3}

Sixths

0 - \frac{1}{6} - \frac{2}{6} - \frac{3}{6} - \frac{4}{6} - \frac{5}{6} - \frac{6}{6}
1. Look at your ruler and the Class Number Line. **Sample answers:**
   How is a ruler like a number line?
   A ruler has equally spaced marks like a number line, and the numbers are in order.

2. Look at the small lines between 0 and 1 on the inch ruler. What do these small lines mean?
   They show parts of an inch.

3. Give examples of numbers that come between 0 and 1.
   \( \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, \) and so on

4. Look at the magnified inches on *Math Masters*, page 250.
   Fill in the blanks under each ruler with the correct fractions.
   How did you know which fractions to write?
   For the denominator, I counted the total number of equal spaces on each ruler. For each numerator, I counted the number of spaces up to the small lines that marked each equal part of the ruler.
Comparing Rulers & Number Lines cont.

0  \( \frac{1}{4} \)  \( \frac{2}{4} \)  \( \frac{3}{4} \)  or  \( \frac{1}{2} \)  1

0  \( \frac{1}{8} \)  \( \frac{2}{8} \)  \( \frac{3}{8} \)  \( \frac{4}{8} \)  \( \frac{5}{8} \)  \( \frac{6}{8} \)  \( \frac{7}{8} \)  or  \( \frac{1}{4} \)  \( \frac{1}{2} \)  1
Lesson 2 Instructional Materials:
Equivalent Fractions
Fraction Strips

One Whole

\[
\frac{1}{2} \quad \frac{1}{2}
\]

\[
\frac{1}{3} \quad \frac{1}{3} \quad \frac{1}{3}
\]

\[
\frac{1}{4} \quad \frac{1}{4} \quad \frac{1}{4} \quad \frac{1}{4}
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\[
\frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5} \quad \frac{1}{5}
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\frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6} \quad \frac{1}{6}
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\frac{1}{8} \quad \frac{1}{8} \quad \frac{1}{8} \quad \frac{1}{8} \quad \frac{1}{8} \quad \frac{1}{8} \quad \frac{1}{8} \quad \frac{1}{8}
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Lesson 3 Instructional Materials:
Comparing Fractions
Comparing Fractions

Directions: Shade in the fractions on each pizza and compare. Then write the correct sign.
Name: ____________________

**Comparing Fractions Recording Sheet**

**How to Play**
1. Place your marker in the center of your mat. Spin once, and write that fraction in the "First Spin" column below. Spin again, and write that fraction in the "Second Spin" column.
2. Compare the two fractions. In the circle, write >, <, or = to make the number sentence true.
3. If the symbol points left (<), move your marker one space to the left. If the symbol points right (>), move your marker one space to the right. If you used an equal sign (=), you can move your marker one space in either direction.
4. Keep playing until you move your marker to either end of the mat or you run out of room below. Check your work using the answer card.

*If you need more space to show your work, use the back of this page.*

<table>
<thead>
<tr>
<th>First Spin</th>
<th>Second Spin</th>
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<th>Second Spin</th>
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Part D:
Assessments
Pre-Assessment
1. The number that is above the fraction bar is known as the ________.
   - O A.) Denominator
   - O B.) Fractionator
   - O C.) Numerator
   - O D.) None of the above

2. What fraction is shown below?
   - O A.) \( \frac{1}{3} \)
   - O B.) \( \frac{1}{4} \)
   - O C.) \( \frac{3}{4} \)
   - O D.) \( \frac{1}{2} \)

3. Which fraction below is equal to \( \frac{1}{2} \)?
   - O A.)
   - O B.)
   - O C.)
   - O D.)

4. Jesse's mom ordered a pizza that was sliced into 8 pieces. Jesse ate 3 slices of pizza. What fraction of the pizza was left?
   - O A.) \( \frac{1}{3} \)
   - O B.) \( \frac{3}{8} \)
   - O C.) \( \frac{5}{8} \)
   - O D.) \( \frac{1}{8} \)

5. What fractional number is shown on the number line?
   - O A.) \( \frac{0}{1} \)
   - O B.) \( \frac{1}{2} \)
   - O C.) \( \frac{1}{3} \)
   - O D.) \( \frac{2}{5} \)

6. Identify the fraction that is shown below.
   - O A.) \( \frac{3}{5} \)
   - O B.) \( \frac{5}{8} \)
   - O C.) \( \frac{5}{8} \)
   - O D.) \( \frac{5}{3} \)
7. How many rhombuses can be used to fill the hexagon?
   - O A.) 1
   - O B.) 2
   - O C.) 3
   - O D.) 4

8. What part of the fraction strip is missing?
   - O A.) \( \frac{1}{3} \)
   - O B.) \( \frac{1}{4} \)
   - O C.) \( \frac{1}{5} \)
   - O D.) \( \frac{1}{2} \)

9. Which fraction is the arrow pointing to on the number line below?
   - O A.) \( \frac{1}{4} \)
   - O B.) \( \frac{1}{2} \)
   - O C.) \( \frac{1}{3} \)
   - O D.) \( \frac{2}{4} \)

10. Brooke baked a cherry pie for her aunt. She divided the pie into 6 equal parts. Brooke's aunt ate 2 pieces of the pie. What fraction of the pie did her aunt eat?
   - O A.) \( \frac{2}{4} \)
   - O B.) \( \frac{2}{8} \)
   - O C.) \( \frac{2}{6} \)
   - O D.) \( \frac{4}{6} \)

11. Use the chart to answer questions 11 and 12.

<table>
<thead>
<tr>
<th>Favorite College Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

   Christopher's friends voted on their favorite college sports teams. There are 12 friends in all. What fraction of Christopher's friends voted for Clemson?
   - O A.) \( \frac{1}{6} \)
   - O B.) \( \frac{2}{3} \)
   - O C.) \( \frac{3}{12} \)
   - O D.) \( \frac{6}{12} \)

12. What fraction of Christopher's friends voted for Georgia?
   - O A.) \( \frac{10}{12} \)
   - O B.) \( \frac{7}{12} \)
   - O C.) \( \frac{3}{12} \)
   - O D.) \( \frac{2}{12} \)

Page 2
13. What is the measurement of the pencil?

- O A.) \( \frac{3}{5} \) inches
- O B.) \( \frac{3}{6} \) inches
- O C.) \( \frac{2}{5} \) inches
- O D.) \( \frac{2}{6} \) inches

14. What fraction is shown below?

- O A.) \( \frac{3}{5} \)
- O B.) \( \frac{2}{3} \)
- O C.) \( \frac{3}{2} \)
- O D.) \( \frac{1}{2} \)

15. Compare the following fractions.

- O A.) <
- O B.) =
- O C.) >
- O D.) ≠

16. Shawn’s scored 4 points at the basketball game. Paul scored 3 points. Their team scored a total of 12 points. What fraction of points did Shawn and Paul score together?

- O A.) \( \frac{3}{4} \)
- O B.) \( \frac{7}{12} \)
- O C.) \( \frac{4}{12} \)
- O D.) \( \frac{3}{12} \)

17. Identify the fraction shown below.

- O A.) \( \frac{1}{3} \)
- O B.) \( \frac{2}{3} \)
- O C.) \( \frac{3}{3} \)
- O D.) \( \frac{4}{3} \)

18. Identify the fraction shown below.

- O A.) \( \frac{3}{10} \)
- O B.) \( \frac{3}{7} \)
- O C.) \( \frac{5}{10} \)
- O D.) \( \frac{7}{10} \)
19. Write a fraction in each box below.

20. Casey’s teacher asked him to divide the number line into sixths and label each fractional part. Help Casey complete this task.

21. Shade in \( \frac{4}{5} \) of the figure below.

22. Shade in \( \frac{5}{8} \) of the figure below.

23. Shade in \( \frac{6}{6} \) of the figure below.

24. Compare the following fractions.

\[ \frac{2}{4}, \frac{1}{2} \]

- O A.) =
- O B.) ≠
- O C.) >
- O D.) <

25. Name the shaded part of the figure below.

26. Name the unshaded part of the figure above.

27. Are the fractions above equivalent? Explain why or why not.

________________________________________

________________________________________

________________________________________

Page 4
Lesson 1 Assessment:
Fractions on a Number Line
Lesson objectives

- Students will...
  ...determine how to place fractions on a number line.
  ...place fractions in an appropriate place on a number line.
  ...generate their own number line and fractions.

There are numbers between 0 and 1.

Can you think of numbers that are larger than zero, but smaller than one? Write them in the space below.

How can we tell which fractions are on the number line below?

Count the jumps with your teacher.

Four jumps means we’ll use fractions that are fourths!

Where do these go?

Place these fractions on the number line above. Then click on the rectangle to check your answers:

\[
\begin{array}{c}
\text{3} & \text{1} & \text{2} \\
\text{4} & \text{4} & \text{4}
\end{array}
\]

How can we determine which fractions are on this number line?

Count the jumps with your teacher.

Six jumps means we’ll use fractions that are
Fractions in Number Line

Complete the number line with appropriate fractions: (Do not simplify fractions)

1)

\[ \begin{array}{c}
0 & & 1 \\
\end{array} \]

2)

\[ \begin{array}{c}
0 & & 1 \\
\end{array} \]

3)

\[ \begin{array}{c}
0 & & 1 \\
\end{array} \]

4)

\[ \begin{array}{c}
0 & & 1 \\
\end{array} \]

5)

\[ \begin{array}{c}
0 & & 1 \\
\end{array} \]
Answers

1)  

\[ \begin{array}{cccccc}
0 & \frac{1}{5} & \frac{2}{5} & \frac{3}{5} & \frac{4}{5} & 1 \\
\end{array} \]

2)  

\[ \begin{array}{cccccccc}
0 & \frac{1}{7} & \frac{2}{7} & \frac{3}{7} & \frac{4}{7} & \frac{5}{7} & \frac{6}{7} & 1 \\
\end{array} \]

3)  

\[ \begin{array}{cccccc}
0 & \frac{1}{4} & \frac{2}{4} & \frac{3}{4} & 1 \\
\end{array} \]

4)  

\[ \begin{array}{ccccccc}
0 & \frac{1}{6} & \frac{2}{6} & \frac{3}{6} & \frac{4}{6} & \frac{5}{6} & 1 \\
\end{array} \]

5)  

\[ \begin{array}{ccccc}
0 & \frac{1}{3} & \frac{2}{3} & 1 \\
\end{array} \]
Lesson 2 Assessment:
Equivalent Fractions
Equivalent Fractions

Equivalent fractions have the same value, even though they use different numbers.

Directions: Fill in the equivalent fractions below.

\[
\frac{2}{2} = \frac{4}{4} \quad \frac{4}{8} = \frac{2}{2} \quad \frac{3}{4} = \frac{2}{8} \quad \frac{2}{3} = \frac{1}{9} \\
\frac{4}{12} = \frac{1}{6} \quad \frac{1}{5} = \frac{1}{10}
\]
Lesson 3 Assessment: Comparing Fractions
Comparing Fractions!

Lesson objectives:
1) Students will review identifying fractions
2) Students will compare fractions

**REVIEW**

What is a fraction?
A fraction is a way of representing part of a whole or part of a group.

**REVIEW**

What does a fraction look like?

- Numerator
- Denominator

**Let's Review!**

What fraction is represented by the picture below?

Click on the gray dot to find out.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>![Picture 1]</td>
</tr>
<tr>
<td></td>
<td>![Picture 2]</td>
</tr>
<tr>
<td></td>
<td>![Picture 3]</td>
</tr>
<tr>
<td></td>
<td>![Picture 4]</td>
</tr>
</tbody>
</table>

**What fractions are represented by the following?**

- Two thirds
- Four sixths
- One fourth

Click green box to reveal answer!
What fraction of apples are there in the group of fruit?

What fraction of stars are yellow?

Identify the fraction of the shaded portion of the object.

Think-Pair-Share

If we compare 2 fractions, how do we know which one is BIGGER and which one is smaller?

How to compare fractions:

The larger the numerator, the larger the fraction.

Let's visualize that rule...

If you're stuck, use a number line and compare the fraction to 1/2.
A different way to look at these problems...

Using a number line

Is the fraction above or below 1/2?

Let’s compare!

Potential Answers:
< > =

Let’s compare!

Potential Answers:
< > =

Click to reveal. Which fraction is larger?

1/2 < 2/2
3/4 > 1/4
4/8 < 5/8
4/6 > 2/6

Put these fractions in order from least to greatest

1 5 1 2
6 6 6 6
How to compare fractions.

Fractions can be compared by size. The larger the denominator, the smaller the fraction. Which piece of pie would you rather have? 1/4 or 1/8? Why?

Click to reveal. Which fraction is greater?

1/2   1/8
1/3   1/2
1/12  1/6
1/9   1/12

Let's put the fractions in order from greatest to least!
Let's put the fractions in order from least to greatest! Pull the fractions to the box.

\[
\begin{array}{cccc}
\frac{1}{5} & \frac{1}{9} & \frac{1}{1} & \frac{1}{15}
\end{array}
\]

Which math sentence is true?
Press the balloons to pop them.

True! False False True!

True! False False True!

Which choice completes the comparison question:
\[\frac{4}{10} \ ? \ \frac{6}{15}\]

A. <
B. >
C. =
D. I'm not sure

Which choice completes the comparison question:
\[\frac{1}{3} \ ? \ \frac{1}{3}\]

A. <
B. >
C. =
D. I'm not sure

Which choice completes the comparison question:
\[\frac{1}{6} \ ? \ \frac{3}{6}\]

A. <
B. >
C. =
D. I'm not sure
Comparing and Ordering Fractions

Use your fraction strips to compare the following fractions. Line up each fraction strip to see which fraction has the greatest length. Use >, <, or = to compare each pair of fractions. For example, when comparing 1/2 and 2/4, the fractions should be modeled and lined up as follows:

```
  1/2
  1/4  1/4
```

1. \( \frac{3}{4} \) \( \frac{2}{3} \)

2. \( \frac{6}{8} \) \( \frac{5}{6} \)

3. \( \frac{2}{3} \) \( \frac{3}{6} \)

4. \( \frac{4}{8} \) \( \frac{1}{2} \)

5. \( \frac{7}{8} \) \( \frac{5}{6} \)

6. \( \frac{1}{4} \) \( \frac{2}{6} \)

7. \( \frac{4}{6} \) \( \frac{2}{3} \)

8. \( \frac{3}{8} \) \( \frac{4}{6} \)
Use your fraction strips to order the following fractions from least to greatest.

9. \[ \frac{4}{6}, \frac{3}{8}, \frac{1}{2} \]

10. \[ \frac{4}{8}, \frac{2}{3}, \frac{3}{4} \]

11. \[ \frac{7}{8}, \frac{5}{6}, \frac{2}{3} \]

12. \[ \frac{3}{4}, \frac{5}{8}, \frac{4}{6} \]

13. \[ \frac{6}{8}, \frac{3}{4}, \frac{1}{2} \]

14. \[ \frac{3}{8}, \frac{2}{4}, \frac{2}{3} \]

15. \[ \frac{4}{8}, \frac{3}{4}, \frac{4}{6} \]
Summative Assessment
Fraction Assessment

1. The number that is above the fraction bar is known as the ____________.
   A. Denominator
   B. Fractionator
   C. Numerator
   D. None of the above

2. The number that is below the fraction bar is known as the ____________.
   A. Fractionator
   B. Numerator
   C. Denominator
   D. None of the above

3. What fraction of the figure is shaded? _______  Unshaded? _______

   [Diagram of shaded and unshaded sections]

4. Identify the fractions that are represented by the shaded figures.

   [Diagram of shaded figures]  _______  _______  _______
5. Complete the number line.

\[ 
\begin{array}{ccccc}
& & & & \\
0 & & & & 1 \\
\end{array}
\]

6. Which fraction is the arrow pointing to on the number line? \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ __________

\[ 
\begin{array}{ccccc}
& & & & \\
0 & & & & 1 \\
\end{array}
\]

7. Represent the following fractions on the number line diagram below:

\[ \frac{9}{10} \ \frac{1}{2} \ \frac{3}{10} \ \frac{6}{10} \ \frac{1}{10} \]

\[ 
\begin{array}{ccccc}
& & & & \\
0 & & & & 1 \\
\end{array}
\]

8. Claire’s teacher asked her to represent fourths on a number line diagram.
Help Claire complete the task and label each fractional part.

\[ 
\begin{array}{ccccc}
& & & & \\
0 & & & & 1 \\
\end{array}
\]

9. What is the measurement of the pencil?
   A. \( \frac{3}{5} \) inches
   B. \( \frac{3}{6} \) inches
   C. \( \frac{2}{5} \) inches
   D. \( \frac{2}{6} \) inches
10. Explain what an equivalent fraction is.

11. Draw a model that represents a fraction equivalent to $\frac{3}{6}$.

12. Do the fraction circles below represent equivalent fractions? Explain why or why not.

```
[Diagram of fraction circles]
```

13. Which model below represents a fraction equivalent to $\frac{4}{5}$?
   A. [Diagram of stars]
   B. [Diagram of bars]
   C. [Diagram of hearts]
   D. [Diagram of circles]

14. Use your fraction strips to determine equivalent fractions for $\frac{1}{4}$. List the equivalent fractions discovered.
Use your fraction strips to compare the following fractions.

15. Circle the larger fraction.
   \[
   \frac{7}{8} \quad \frac{7}{12}
   \]

16. Use >, <, or = to compare the pair of fractions.
   \[
   \frac{1}{4} \quad \frac{3}{10}
   \]

17. Use <, >, or = to compare the pair of fractions.
   \[
   \frac{3}{4} \quad \frac{6}{8}
   \]

Use your fractions strips to order the following fractions from least to greatest.

18. \[
   \frac{2}{3} \quad \frac{1}{2} \quad \frac{4}{5}
   \]

19. \[
   \frac{3}{10} \quad \frac{2}{12} \quad \frac{1}{4}
   \]

Solve the following word problem.

20. Jordan’s pizza was divided into 8 equal slices. He ate 5 of them.

   Melissa’s pizza was the same size, but hers was divided into 6 equal slices.

   She ate 4 of them. Who ate more pizza? Explain.
Part E: Planning Commentary
1. Central Focus
   
   a. Describe the central focus and purpose of the content you will teach in the learning segment.

   [The central focus of the content I will teach in the learning segment is for the students to develop an understanding of fractions as numbers (Common Core). The fractions unit is the eighth unit of the third grade curriculum. I will be teaching three of the eight Everyday Mathematics fractions lessons. The three lessons I will focus on are: (1) fractions on a number line, (2) equivalent fractions, and (3) comparing fractions. These lessons are from the teacher handbook of Everyday Mathematics, lessons 8-4, 8-5, and 8-6. The purpose of the learning segment is for the students to learn how to identify fractions on a number line, how to find and represent equivalent fractions, and how to compare fractions using area models. All three lessons connect to the following Common Core State Standard:
   CCSS.MATH.CONTENT.3.G.A.2, “Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.”

   The objective of lesson 1, “Fractions on a Number Line,” is to introduce the number line as a model for fractions. In this lesson, the students will identify fractions on a number line. The purpose of the lesson is aligned to the third grade Common Core State Standards for fractions. This lesson addresses CCSS.MATH.CONTENT.3.NF.A.2, “Understand a fraction as a number on the number line; represent fractions on a number line diagram,” CCSS.MATH.CONTENT.3.NF.A.2.A, “Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line,” and CCSS.MATH.CONTENT.3.NF.A.2.B, “Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.” For this lesson, the students will make a number-line poster for fractions.

   The objective of lesson 2, “Equivalent Fractions,” is to guide children as they find equivalent fractions. In this lesson, the students will read and write fractions. Furthermore, they will represent, identify, and generate equivalent fractions with the use of manipulatives and drawings. The purpose of the lesson is aligned to the third grade Common Core State Standards for fractions. This lesson addresses CCSS.MATH.CONTENT.3.NF.A.3, “Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size,” CCSS.MATH.CONTENT.3.NF.A.3.A, “Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line,” and CCSS.MATH.CONTENT.3.NF.A.3.B, “Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.” For this lesson, the students will create fractions strips. The strips and Fraction Cards will be used to find equivalent fractions.

   The objective of lesson 3, “Comparing Fractions,” is to guide children as they compare fractions using region models. In this lesson, the students will read fractions, compare fractions to 1/2, and use an area model to compare fractions. They will also compare fractions using a number-line model. Moreover, they will identify patterns and relationships between numerators and denominators of fractions. The purpose of the lesson is aligned to the third grade Common Core State Standards for fractions. This lesson addresses CCSS.MATH.CONTENT.3.NF.A.3.D, “Compare two fractions with the same numerator or the same denominator by reasoning about...
their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.” For this lesson, the students will compare fractions to $\frac{1}{2}$, 0, and 1.]

b. Given the central focus, describe how the standards and learning objectives within your learning segment address

- conceptual understanding
- procedural fluency AND
- mathematical reasoning or problem-solving skills

[ Given the central focus, the standards and learning objectives within my learning segment address conceptual understanding because the students will develop an understanding of fractions as numbers. They will also understand a fraction as a point on the number line. In addition, the students will demonstrate a quantitative understanding of fraction equivalence. Lastly, the learners will exhibit an understanding of comparing fractions through reasoning.

The standards and learning objectives within my learning segment address procedural fluency because the students will demonstrate their ability to accurately represent a fraction on a number line diagram by partitioning the number line into $b$ equal parts. The students will be able to identify equivalent fractions through the use of pictures, manipulatives, and other visual models. Furthermore, the students will be able to appropriately compare fractions through the use of area models.

The standards and learning objectives within my learning segment address mathematical reasoning and problem-solving skills because throughout the lessons, the students will be equipped with the necessary skills to understand fractions as numbers. They will be able to identify numbers on a number line, find equivalent names for fractions, and compare two fractions. With the use of words, representations, and models, the students will use mathematical reasoning and problem-solving skills to solve the given problems.]

c. Explain how your plans build on each other to help students make connections between

- concepts
- computations/procedures AND
- mathematical reasoning or problem-solving strategies

to build understanding of mathematics.

[ The plans in my learning segment build on each other to help students make connections between concepts, computations/procedures, and mathematical reasoning and problem-solving skills. In lesson 1, “Fractions on a Number Line,” the students will use fraction strips from a handout that will be distributed to them. They will make the Fraction Number-Line Poster on journal page 191. They will complete this poster by gluing or taping each fraction strip to each corresponding strip on the page. When the students finish this procedure, they will be asked to discuss how the number-line model is different from the region and set models. They will also be asked to think of places in the everyday world where fraction number lines are found (e.g., rulers and measuring cups). As the students are studying their Fraction Number-Line Poster, fraction concepts will be reviewed. They will be reminded that words such as third, fourth, sixth, and eighth suggest the number of equal parts. They will be asked what the fraction words are for five equal parts and ten equal parts. Next, they will use mathematical reasoning to identify which fractions 5/8 is in between. Next, the learners will use their Fraction Number-Line Poster to help solve problems 1 and 2 on journal page 192. The students will then complete the math boxes on journal page 193 to further their understanding of fractions.]
In lesson 2, “Equivalent Fractions,” the students will create their own fraction strips with construction paper. These fraction strips will build their understanding of equivalent fractions. They will also use the Fraction Cards on Activity Sheet 5 in their math journal. They will use the Fraction Cards to extend fraction concepts. The students will select a Fraction Card from the deck. Their task will be to find as many other cards in the deck as they can that have exactly the same amount shaded. As they find equivalent fractions for 0/2, 1/2, 2/2, 1/3, 2/3, 1/4, 3/4, 1/5, 4/5, 1/6, and 5/6, they will record them in the Table of Equivalent Fractions on journal page 194. They will be reminded that the fractions they wrote are equivalent fractions. After this procedure, the students will build on what they learned from lesson 1, for they will use a number-line model to identify equivalent fractions. The learners will be asked to use mathematical reasoning to identify what part of the fourths strip is the same size as 1/2 of the “One” strip. They will discover that 2/4 is another name for 1/2. They will be directed to find other names on the Fraction Number-Line Poster for 1/2. Lastly, the students will play the Equivalent Fractions Game from pages 283 and 284 in their Student Reference Book.

In lesson 3, “Comparing Fractions,” the students will use Fraction Cards to compare fractions to 1/2, 0, and 1. This lesson will introduce the students to the concept that the larger the denominator, the smaller the fraction. They will also learn that when two fractions have the same denominator, the fraction with the larger numerator is bigger. By using mathematical reasoning and problem-solving strategies, the students will be able to identify fractions that are greater than 1/2, less than 1/2, equal to 1/2, close to 0, and close to 1. With the use of the Fraction Cards, the students will observe the relationship between the numerator and denominator of particular fractions. The students will be directed to compare fractions using a number-line model and the fraction strips they created in lesson 2. Following this procedure, the learners will play Fraction Top-It from pages 287 and 288 in their Student Reference Book. Each of my lesson plans build on each other to help learners develop an understanding of fractions as numbers. With lesson 1 being about representing fractions on a number line, the students will learn how to recognize the appropriate placement for a fraction on a number line. Lesson 2 builds off of lesson 1 because the students will understand how to use a number line diagram to find equivalent fractions. Finally, lesson 3 builds off of lessons 1 and 2 because the students will use a number-line model and fraction strips to compare two given fractions.

Throughout the learning segment, the students will use similar mathematical reasoning and problem-solving strategies.

2. Knowledge of Students to Inform Teaching

For each of the prompts below (2a–c), describe what you know about your students with respect to the central focus of the learning segment.

Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs or 504 plans, English language learners, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students).

a. Prior academic learning and prerequisite skills related to the central focus—Cite evidence of what students know, what they can do, and what they are learning to do.

[ In order for me to discover what the students know about fractions, I provided them with a fractions pre-assessment. The questions on this assessment were aligned to the third grade Common Core State Standards the fraction unit will address. The pre-assessment asked questions in regards to numerators and denominators, naming the shaded/unshaded regions of a figure, equivalent fractions, fractions in number stories, fractions on a number line, fraction strips, and comparing fractions. Based on the pre-assessment results, I can conclude that the... ]
students have a basic understanding of fractions. Currently, they understand how to identify fractions by analyzing the shaded/unshaded parts of a figure. They have a solid understanding of shading in certain parts of a figure to represent a specific fraction. It is evident that they need to be taught the difference between the numerator and denominator. They also need to develop a better understanding of fractions in number stories. Another area the students need to work on are identifying fractions on a number line. The number line questions on the pre-assessment proved to be quite difficult for the students. Furthermore, the students need to be taught how to identify equivalent fractions. On the pre-assessment, the students did not exhibit an understanding of how to find the equivalent fraction for 1/2. However, when looking at a circle that was divided into eighths and a circle that was divided into fourths, the students were able to see that both of the circles had one half shaded. Thus, they realized that 4/8 is equal to 2/4, which is equal to 1/2. Lastly, the students need to acquire knowledge regarding the comparison of fractions. When examining two fractions on the pre-assessment, the students did not know whether to put the greater than (>), equal to (=), or less than (<) symbol. After learning lesson 8-1 from *Everyday Mathematics*, the students know the basic fraction concepts and notations. This lesson taught the students how to name fractional parts of regions. The key concepts and skills of the lesson were to use manipulatives to solve problems involving fractional parts of collections, to identify equivalent halves and fourths of a shaded region, to use shaded regions to compare fractions, and to use equal sharing to solve fractional part-of-a-collection problems. Lesson 8-3 from *Everyday Mathematics* taught the students how to solve problems involving fractional parts of a collection. The students are learning to identify the fractional part one shape is of another.]

b. Personal, cultural, and community assets related to the central focus—What do you know about your students’ everyday experiences, cultural and language backgrounds and practices, and interests?

[To learn more about my students’ everyday experiences and interests, I gave them a “Student Interest Survey” from Scholastic.com. After reviewing the survey, I found that all of them have two adults living in their household (their mother and father). Out of the nineteen students that took the survey, two of them do not have any siblings. When the students are at home, a lot of the students like to play board games, play outside, read, do arts and crafts, play math games, listen to music, play video games, and spend time with family. Some of the students’ favorite hobbies include bird watching, sewing, creating art, dancing, singing, playing sports, and gardening. The students’ favorite books are *Harry Potter*, *The Hunger Games*, *The Outsiders*, *The Boxcar Children* series, *Diary of a Wimpy Kid*, *The Baby-Sitters Club* series, and *The Magic Tree House* series. The students’ favorite magazines include *Seventeen* magazine, *Sport’s Illustrated*, gardening magazines, and *Ever After High Magazine*.

For the statement, “If I had one wish, it would be…,” some of the students’ responses included, “to help the poor”, “to be a teacher”, “to be an NFL football player”, “to have a baby sister”, and “to have world peace.” Students said school would be better if “there weren’t as many bullies”, if “there were longer/more recesses”, and if “there was more reading time.” Many students believe school could not be better; it is fine the way it is. If the students had a million dollars, they would “give homes to the homeless”, “save it for college”, “share it with family and friends.” The students feel they are skillful at sports, reading, singing, dancing, math, and coloring. The students do their best thinking when they are not under pressure, when the room is quiet, when they are being timed, when music is playing, and when the lighting is dim. When asked about what their teacher did last year that they liked the most, they responded with, reading, math, painting, and going on field trips. When asked about what their teacher did last year that they liked the least, the students’ answers included, math and speech. Many students said they liked everything about last year. In the class, there is one student who comes from a Mexican cultural and language background. While the student speaks a variety of English,
Spanish is the only language spoken in the household. The student’s family has Mexican traditions that they celebrate. These practices reflect their values and beliefs. The remaining students in the class speak English.

c. Mathematical dispositions related to the central focus—What do you know about the extent to which your students

- perceive mathematics as “sensible, useful, and worthwhile”
- persist in applying mathematics to solve problems
- believe in their own ability to learn mathematics

[ In order for me to study the extent to which my students perceive mathematics as “sensible, useful, and worthwhile,” “persist in applying mathematics to solve problems,” and “believe in their own ability to learn mathematics,” I had my students complete a math survey that informed me of their mathematical dispositions. The students had to answer each of the thirteen statements by checking “Agree ☑️,” “Undecided ☐️,” or “Disagree ☐️.” By viewing the students’ answers to the survey questions, I was able to determine the mathematical dispositions related to the central focus of the learning segment.

Based on the collected data from the survey, I can infer that the students demonstrate a positive attitude toward mathematics. Out of the seventeen students who took the survey, sixteen agreed with the statement, “I like learning math.” One student was undecided. For the statement, “In the past, I have not enjoyed math class,” four students agreed, ten students disagreed, and two were undecided. Thirteen students agreed that math interests them; four students were unsure. It is evident that the students like learning math, have enjoyed math class in the past, and are interested in the subject.

The survey results prove that the students perceive mathematics as “sensible, useful, and worthwhile.” For the statement, “I use math every day (outside of school),” eleven students agreed, two students disagreed, and four students were undecided. All seventeen students agreed that math is important throughout life. Furthermore, all of the students agreed that math is a helpful subject to learn. As a result, the students are aware of the importance of mathematics. Additionally, the students persist in applying mathematics to solve problems. For the statement, “I like to come up with new ways to solve math problems,” thirteen students agreed, one student disagreed, and three students were undecided. Thirteen students disagreed with the statement, “I give up when I have trouble solving a math problem.” One student tends to give up when solving challenging problems, and three students were undecided. Thirteen students enjoy the challenge of a hard math problem. No students do not like the challenge, and four students were undecided. For the statement, “I believe that there is usually one right way to solve math problems,” five students agreed, eight students disagreed, and four students were undecided. Based on these outcomes, I can conclude that the students persevere in solving math problems.

Lastly, the students believe in their own ability to learn mathematics. Thirteen students agreed with the statement, “I feel confident in my abilities to solve math problems.” No students disagreed and four students were not sure if they felt confident in their abilities. For the statement, “When I see a math problem, I get nervous,” three students agreed, nine students disagreed, and five students were undecided. Fifteen students believe they have the skills to do the math they are learning. Two students were unsure if they have the essential math skills. These statistics demonstrate that the students feel they have obtained the necessary knowledge and skills to be successful in math.

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1 From the Common Core State Standards for Mathematics
3. Supporting Students’ Mathematics Learning

Respond to prompts below (3a–c). To support your justifications, refer to the instructional materials and lesson plans you have included as part of Planning Task 1. In addition, use principles from research and/or theory to support your justifications.

a. Justify how your understanding of your students’ prior academic learning; personal, cultural, and community assets; and mathematical dispositions (from prompts 2a–c above) guided your choice or adaptation of learning tasks and materials. Be explicit about the connections between the learning tasks and students’ prior academic learning, their assets, their mathematical dispositions, and research/theory.

My understanding of my students’ prior academic learning; personal, cultural, and community assets; and mathematical dispositions guided my choice or adaptation of learning tasks and materials. An article titled **Approach to Fractions Seen as Key Shift in Common Standards** by Llana Heitin states that due to the Common Core Standards for mathematics, more teachers are now being asked to emphasize fractions as points on a number line, rather than just parts of a whole. The results of the fractions pre-assessment proved that the students need to learn how to identify fractions on a number line. In lesson 1, “Fractions on a Number Line,” the students will be able to view the number line as a model for fractions. The article states that the Common Core State Standards repeatedly ask students to “apply and extend previous understandings” when working with fractions – that is, if students are able to show addition on a number line, they should also be able to show addition with fractions there.” According to the article, research says putting fractions on a number line early can also help solidify students’ understanding that fractions can and should be compared to whole numbers. The article also declares that the number line helps ensure students use consistent units. Heitin states, “All the work with the number line in third grade is meant to lead to a more thorough understanding of what it means to add, subtract, multiply, and divide with fractions. Fractions have a distinct place on the number line, and students need to learn how to represent fractions on a number line diagram. In the lesson, I will draw a number line that goes from 0 to 1. A dot will be placed on the number line, and the students will be challenged to think about if the dot is closer to 1 or closer to 0. They will also need to identify if the dot is greater than a half, if it is less than a half, if it is closer to one whole than a half, etc. The mathematical dispositions survey informed me that the majority of the students in the class realize that math is used every day outside of school. In the lesson, the students will be asked to think of places in the everyday world where fraction number lines are found. Responses should include rulers, tape measures, measuring cups, scales on a map, etc. This lesson will help students to understand fractions as a number.

In lesson 2, “Equivalent Fractions,” the students will be able to understand fractions as an area. In this lesson, students will begin to understand that different fractions represent the same number. To introduce the lesson, I will write, “10 dimes are equivalent to $1.00,” “2 + 4 is equivalent to 4 + 2,” and “1/2 is equivalent to 50%” on the whiteboard. The students are already familiar with money and addition/subtraction facts due to their prior academic learning. By introducing the lesson with these statements, the students will begin to understand the concept of “equivalence,” a concept they do not understand, as demonstrated by the fractions pre-assessment. An article titled **Teaching Fractions According to the Common Core Standards** by Hung-Hsu Wu states that students can experiment on the number line and discover that many fractions are equal. For instance, the fraction 1/2 is equivalent to 2/4 and 3/6. Due to the “Student Interest Survey,” I know the students enjoy doing crafts. Thus, the students will create their own fraction strips with construction paper. These fraction strips will help them to develop an understanding of equivalent fractions. In lesson 3, “Comparing Fractions,” the students will compare two different fractions. According to the article by Wu, “Given two fractions – thus two points on the number line – the one to the left of the other is said to be smaller than the other
and the one on the right is said to be bigger than the other. The students are aware of this because of their prior academic knowledge of numbers and number lines. The article identifies two simple comparisons that are accessible to third graders. Based on the fractions pre-assessment, it is evident that the students have not yet learned these comparisons. One fact is that if two fractions have the same denominator, the fraction with the larger numerator is the larger fraction. Wu states that this comes from the way fractions with the same denominator are placed on the number line. A second fact is that, for unit fractions, the greater the denominator, the smaller the fraction. Wu declares that in some cases, students may be able to compare fractions by reasoning about how the fractions are related to benchmarks such as 0, 1/2, and 1. The “Student Interest Survey” informed me that the students like to play math games when they are at home. As a result, the students will be doing a comparing fractions activity that will help them compare two given fractions with the symbols >, =, and <.]

b. Describe and justify why your instructional strategies and planned supports are appropriate for the whole class, individuals, and/or groups of students with specific learning needs.

Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs or 504 plans, English language learners, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students).

[ My instructional strategies and planned supports are appropriate for the whole class, individuals, and/or groups of students with specific learning needs. As stated in the Context for Learning section, there is ability grouping in mathematics. The third grade classes are divided into two different groups based on their ability level. The class I will be teaching consists of the higher level students. This group will be working independently the majority of the time, for they are capable of solving problems without a substantial amount of support and guidance. I will be the facilitator during the mathematics instruction, for I will guide the learning process. In lesson 1, “Fractions on a Number Line,” the students will engage in a SMART Board interactive lesson in which they will place a given fraction on the number-line model. Next, the students will create their own number-line poster. During this activity, I will float around the room to ensure the students are understanding the assignment. In lesson 2, “Equivalent Fractions,” the students will do a whole-class activity in which they create fraction strips out of construction paper. We will do this as a class because the students need to make their fraction strips very precise in order to identify equivalent fractions. When the fraction strips are created, I will give them directions such as, “Show me how many fourths equal one half,” or “Show me how many eighths equal one whole.” In lesson 3, the students will work independently to complete an engaging activity that reinforces their acquired knowledge of how to compare fractions.]

c. Describe common mathematical preconceptions, errors, or misunderstandings within your central focus and how you will address them.

[ A common mathematical misunderstanding within my central focus is the confusion of the terms numerator and denominator. To address this, I will teach the students what the numerator and denominator represents. The denominator represents the whole, while the numerator represents a part of the whole. A mathematical misconception is that some students believe that fractions must be less than one. I will correct this by explaining that fractions can represent any position on a number line, even a position greater than one. A mathematical error is that some learners count the tick marks on a number line rather than the larger intervals. This can be prevented by drawing circles around each interval. I can also have the students begin with their finger on the 0 and count each fractional part as they reach one of the tick marks, until they count to 1. This way, they are counting the number of intervals, not the number of tick marks.
Another misunderstanding is that some students think fractions are equivalent only when they appear identical or contain the same number of parts. I can address this by teaching students that when two different fractions share the same position on a number line, they are equivalent fractions. In addition, some students believe that the fraction with the larger denominator is greater, and the fraction with the smaller denominator is lesser. I can prevent this misconception by explaining that when the denominator is larger, there are smaller fractional parts. When the denominator is smaller, there are bigger fractional parts. I will also use models and real world examples to prove that the larger the denominator, the smaller the fraction.

4. Supporting Mathematics Development Through Language

As you respond to prompts 4a–d, consider the range of students’ language assets and needs—what do students already know, what are they struggling with, and/or what is new to them?

a. **Language Function.** Using information about your students’ language assets and needs, identify one language function essential for students to develop conceptual understanding, procedural fluency, mathematical reasoning, or problem-solving skills within your central focus. Listed below are some sample language functions. You may choose one of these or another language function more appropriate for your learning segment:

<table>
<thead>
<tr>
<th>Categorize</th>
<th>Compare/contrast</th>
<th>Describe</th>
<th>Interpret</th>
<th>Justify</th>
</tr>
</thead>
</table>

Please see additional examples and non-examples of language functions in the glossary.

[One language function that is essential for my students to develop conceptual understanding, procedural fluency, mathematical reasoning, or problem-solving skills within my central focus is: “representing” mathematical information. Throughout the learning segment, the students will represent fractions using area models and other pictorial representations.]

b. Identify a key learning task from your plans that provides students with opportunities to practice using the language function identified above. Identify the lesson in which the learning task occurs. (Give lesson day/number.)

[A key learning task from my plans that provides students with opportunities to practice using the language function identified above is lesson 2, “Equivalent Fractions.”]

c. **Additional Language Demands.** Given the language function and learning task identified above, describe the following associated language demands (written or oral) students need to understand and/or use:

- Vocabulary and/or symbols
- **Plus** at least one of the following:
  - Syntax
  - Discourse

[Given the language function and learning task identified above, the students need to understand and use the term *equivalent*. They will learn that the vocabulary word means equal in value. The symbol associated with this term is “=”. The students will use this vocabulary word in discourse. Because the language function is “represent,” the oral language forms could include statements such as, “Represent a fraction model that is equivalent to 1/2.” Appropriate written language forms could include area models or sentences such as “1/2 = 2/4.”]
d. **Language Supports.** Refer to your lesson plans and instructional materials as needed in your response to the prompt.

- Identify and describe the planned instructional supports (during and/or prior to the learning task) to help students understand, develop, and use the identified language demands (vocabulary and/or symbols, function, discourse, syntax).

[ The planned instructional support that will help the students to understand, develop, and use the term *equivalent* is lesson 2, “Equivalent Fractions.” In this lesson, the students will regularly use the vocabulary word and the “=” symbol. The students will be using the vocabulary word and symbol in discourse. For instance, the students can explain fraction equivalency by stating, “The fraction 3/4 is equivalent to the fraction 6/8,” or by writing “3/4 = 6/8.”]

5. **Monitoring Student Learning**

In response to the prompts below, refer to the assessments you will submit as part of the materials for Planning Task 1.

a. Describe how your planned formal and informal assessments will provide direct evidence of students’ conceptual understanding, computational/procedural fluency, AND mathematical reasoning or problem-solving skills throughout the learning segment.

[ My planned formal and informal assessments will provide direct evidence of students’ conceptual understanding, computational/procedural fluency, and mathematical reasoning or problem-solving skills throughout the learning segment because each assessment allows the students to demonstrate their understanding of the fraction concepts taught. In lesson 1, I will informally assess the students by checking for comprehension during the SMART Board interactive lesson. They will also be evaluated on their ability to correctly label fractions on their number-line poster. The formal assessment is a quiz that asks the students to complete the given number lines with the appropriate fractions. In lesson 2, the students will be informally evaluated when asked to show fractions equivalent to 1/2 with their fraction strips. The formal assessment will be a quiz regarding equivalent fractions. In lesson 3, I will informally assess the students by asking them higher order thinking questions throughout the interactive SMART Board activity. I will then informally measure comprehension by instructing them to compare fractions using area models. The formal assessment is a quiz in which the students must compare and order fractions using their fraction strips or other manipulatives. At the end of the learning segment, the students will take a summative assessment that addresses fractions on a number line, equivalent fractions, and comparing fractions. Each of these formal and informal assessments are aligned to the third grade Common Core State Standards for fractions.]

b. Explain how the design or adaptation of your planned assessments allows students with specific needs to demonstrate their learning.

Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs or 504 plans, English language learners, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students).

[ The design or adaptation of my planned assessments allows students with higher level learning needs to demonstrate their learning because the assessments encourage them to think critically and creatively. The learners will explore the various ways fractions can be represented. For lesson 3, the students will not only compare two fractions with the same numerator or same denominator, but also two fractions with *different* numerators and *different* denominators, such as 3/4 and 2/3. This challenges the students to use various models to represent two different fractions. It also introduces them to what they will be learning in fourth grade.]
Instruction Task 2: Instructing and Engaging Students in Learning
Part A:
Video Clips (Not Shown)
Part B: Instruction Commentary
TASK 2: INSTRUCTION COMMENTARY

Respond to the prompts below (no more than 6 single-spaced pages, including prompts) by typing your responses within the brackets following each prompt. Do not delete or alter the prompts. Commentary pages exceeding the maximum will not be scored. You may insert no more than 2 additional pages of supporting documentation at the end of this file. These pages may include graphics, texts, or images that are not clearly visible in the video or a transcript for occasionally inaudible portions. These pages do not count toward your page total.

1. Which lesson or lessons are shown in the video clip(s)? Identify the lesson(s) by lesson plan number.

[ The lessons shown in the video clips are lessons 1 and 3. Lesson 1, Fractions on a Number Line (8-4), is shown in the first video clip from 0:00 to 02:58. Lesson 3, Comparing Fractions (8-6), is shown in the second video clip from 02:59 to 15:00.]

2. Promoting a Positive Learning Environment

Refer to scenes in the video clip(s) where you provided a positive learning environment.

a. How did you demonstrate mutual respect for, rapport with, and responsiveness to students with varied needs and backgrounds, and challenge students to engage in learning?

[ In my lessons, I promoted a positive learning environment for all the students. In each of my lessons, I demonstrated mutual respect for the students by calling them by their names. Calling students by their name allows them to feel respected and appreciated in the classroom environment. In the first lesson, I taught the students about fractions on a number line. I ensured that all of the students understood the concept of number lines by asking them, “Does that make sense?” at 00:39. Even though all of the students nodded their head yes, I pointed to the first mark on the number line at 00:42 and said, “What fraction would this be?” The students all responded with, “1/4.” As I pointed to the following lines, they stated the succeeding fractions: 2/4, 3/4, and 4/4. I responded with “Excellent!” (00:52) to ensure them that they answered correctly. Checking for understanding creates a positive learning environment because it informs teachers of the learning needs in the class. When teachers are aware of the concepts that need to be taught, they can better attend to the learning needs of the students. At 01:11, a student was having technical difficulties with the SMART Board. I kindly helped her out by moving the text box down so she could drag the fraction to the appropriate place on the number line. I did not get impatient, nor did I rush her. Therefore, she knew that she could take her time. When she finished placing the fractions on the given number line, she checked her answer by clicking on the blue rectangle. The rectangle revealed the answers, and she had them all correct. At 02:02, I responded with, “Alright! Good job!” At 02:28, I got all of the students involved in the learning process by asking them to tell me the fraction that was represented by the dominoes. They all said, “1/4,” and I replied with, “Perfect!” By responding with encouraging words such as “Great” or “Excellent,” I am providing the students with positive feedback. At 03:07, a picture on the SMART Board showed a group of two bananas and four apples. I asked the students, “What fraction of apples are there?” One student responded with 4/4 (03:13). This was not correct, and with a smile I said, “Does someone want to help him out?” The next student said 3/3 (03:20). Because no one had provided the correct answer yet, I said, “Any other ideas” (03:25)? By asking for other ideas and allowing students to help others out, I demonstrated rapport with the students. The next student I called on said, “4/6” (03:27). After he explained the process he used to get the answer, I repeated his explanation to the entire class. To ensure that the students understood the process we used to get to the answer, I said “Thumbs up if you understand” (04:00). All of the students put their thumbs up to show me that everything was making sense. At 04:07, I asked the class, what fractions of the stars are... ]
yellow?” Each student had their hand up, so I said, “All together.” They responded with, “3/4.” When reviewing problems from the students’ prior academic learning, the students all stated the answers in unison. Allowing the class to answer the questions together allowed me to see if they were comprehending the mathematical concepts. It also enabled the students to feel involved and engaged in the positive learning environment.

After the Think-Pair-Share activity at 06:02, I asked for someone to raise their hand and tell me the answer they came up with in regards to the following question: If we compare two fractions, how do we know which one is bigger and which one is smaller? The student I called on said, “1/2 is just 1/2, but 2/4 is two parts.” His partner then said, “2/4 is two parts, and 1/2 is one part.” While he answered the question, I demonstrated that I was open to his answer. When he was done responding, I said, “Okay,” at 06:19. I then explained to them what they told me by drawing a visual on the SMART Board. I drew a circle and divided it into two equal parts. I involved the class in the process by asking them how much I should shade in. They told me to shade in one part. After shading in half of the circle, I drew another circle and divided it into four equal parts. When asked how much I should shade in, they said two parts. Now, both circles had the same amount shaded. After drawing the area models on the board, I asked the class, “So can we tell which one is bigger? Or are they equal?” This visual allowed the students to determine that the fractions were equal. I then encouraged the students who provided me with the answer by telling them that they gave me equivalent fractions, which was good. At 06:54, I called on another student to tell me how we can figure out if one fraction is bigger than the other. The student said, “If we have 1/2 and 1 whole, 1 whole is bigger.” I demonstrated her answer by drawing another area model on the SMART Board. I asked for one more thought, and at 07:11, a student said that the denominator will be larger. I knew the lesson was going in the right direction, and at 07:17 I said, “Alright, let’s check that out.” At 09:50, I checked for the students’ understanding again by asking them to put their thumbs up if they understood.

In the second video clip, a student compares two area models by putting the greater than sign in between the two models to show that the fraction to the left was larger. The model to the left displayed two out of four pieces shaded, and the model to the right displayed one out of four pieces shaded. At 10:44, I challenged the student by asking him to write the fraction under each model. For the first model, he wrote 1/2. For the second model, he started writing a fraction with 1 as the numerator, but he was having trouble identifying the denominator because for the first area model, he put 2 as the denominator. He knew he could not put 1/2 because the model had 1/4 of the area shaded in. To help him out, I told him to let the denominator be 4. Thus, he changed the first model to 2/4, and he identified the second model as 1/4. By giving him a little push, I demonstrated responsiveness because I briefly interrupted the activity to support his learning needs. I then challenged the class at 11:26 by asking, “If you didn’t have the picture (the area models), how would you know that 2/4 is bigger?” One student responded, but she did not use the terms numerator and denominator like I had hoped. As a result, I guided her answer at 11:40 by asking, “By looking at the numerator, how do we know which one is bigger?” The student thought about the question for a little bit and told me that one fraction is bigger because the fraction with 2 as the numerator is bigger than the fraction with 1 as the numerator. By giving this student a second chance with the question, I demonstrated rapport and responsiveness. Starting at 13:18, I began involving the entire class again by telling them to provide the answers as a group. After they stated the correct answers, I encouraged them at 13:30 and said, “Alright, excellent job!” with a thumbs up. At 13:40, I had a student come up to the board to put the given fractions in order from least to greatest. I told the class, “As she’s doing this, all of you can check your answers and think of it in your head. Figure out if she’s right.” By motivating the rest of the students to check their classmate’s answers, they were able to remain focused in the activity. When the student completed the activity at 14:09, I said “Thumbs up if you agree with her.” The whole class put their thumbs up, and I knew that I could move on to the next concept. Throughout my lessons, I exhibited a positive, supportive, and kind attitude toward the learners.]
3. Engaging Students in Learning

Refer to examples from the video clip(s) in your responses to the prompts.

a. Explain how your instruction engaged students in developing understanding of mathematical concepts.

During my lessons, I always motivated the students to become engaged in developing understanding of the mathematical concepts I was teaching. At 00:23, I said, “Together, we will count the jumps. At 00:28, the class joined me in counting and said, “One, two, three, four.” At 02:07 I said, “Again, we’ll count the jumps together.” The whole class said, “One, two, three, four, five, six” as I pointed to each of the marks on the number line. At 02:14, I said, “So six jumps means we’ll use fractions that are…” The class completed my statement and said, “Six.” By allowing the entire class to respond with their answers, I was motivating the students to be involved in the learning process. In both of the video clips, I was consistently posing questions to the students. Frequently asking questions allowed me to informally check for the students’ understanding. Moreover, it encouraged the students to always be thinking about the concepts.

A question the students had to answer in the second video clip was, if we compare two fractions, how do we know which one is bigger and which one is smaller (05:08)? At 05:14, I engaged the students in the learning process by doing a Think-Pair-Share activity and asking the students to turn to their partner and describe how they would decide if a fraction is bigger or smaller. I let the students share their ideas with one another for about forty seconds. The Think-Pair-Share strategy allows students to develop understanding of a particular concept while working together to answer a question. At 13:40, I had a student come up to the board to put the given fractions in order from least to greatest. I told the class, “As she’s doing this, all of you can check your answers and think of it in your head. Figure out if she’s right.” This allowed all of the students to be engaged in the activity, even when they were not at the board answering the prompt. When asked questions, the students consistently raised their hands to respond. Furthermore, when calling students up to the board to answer particular questions, I selected a different learner each time in order to ensure that all students had an equal opportunity to learn.

b. Describe how your instruction linked students’ prior academic learning and personal, cultural, and community assets with new learning.

Throughout my instruction, I linked the students’ prior academic learning with new learning. At 02:28 in the first video clip, I asked the students to tell me the fraction that was represented by the dominoes. At 02:58 in the second video clip, the students were to state the fraction that was shown on the dominoes. Next, at 03:07, I asked the class, “What fraction of apples are there?” At 04:07, the students had to identify the fraction of the stars that were yellow. These questions were review for the students. At 04:20, I said, “Identify the fraction of the shaded portion of the object.” Before the students answered the first problem, I said, “What do we have to do to figure out the fraction” (04:29)? This question motivated the students to think back to the content they learned in previous lessons. The student I called on said that we have to count how many pieces there are all together, and then we have to count how many of those pieces are shaded. At 07:42 in the video, I asked which fraction was bigger: 1/4 or 2/4. One student knew 2/4 was bigger, so I drew a greater than sign, representing that 2/4 is bigger than 1/4. I referred to the students’ prior academic learning by asking them if they remembered the “greater than,” “less than,” and “equal to” signs from second grade. I also informed them that they can use a number line to compare fractions, which is what they learned about in lesson 1 (Fractions on a Number Line). In my lessons, I encouraged the students to use their background knowledge by asking them questions regarding mathematical concepts they learned previously.

My instruction linked the students’ prior personal, cultural, and community assets with new learning because I connected the concept of comparing fractions to an item they were familiar with. At 08:39, I had the students visualize fractions by looking at pizza slices. By relating
fractions to pizza slices, the learners became very engaged in what was being taught. Both pizzas in the picture had twelve slices, but one had 5/12 shaded in while the other had 7/12 shaded in. At 09:29, I asked, “So by looking at this, would you rather have 5/12 of a pizza or 7/12 of a pizza?” They all responded with 7/12 because they would get more slices of pizza.

4. Deepening Student Learning during Instruction

Refer to examples from the video clip(s) in your explanations.

a. Explain how you elicited and built on student responses to promote thinking and develop understandings of mathematical concepts.

At 00:00 in the first video clip, I showed the students a number line on the SMART Board and said, “We have 1/4, 1/2, 3/4, and 4/4.” I promoted thinking among the students at 00:06 by asking them, “What is another name for 1/2?” This challenged the students, for they did not have the knowledge of equivalent fractions yet. One student raised his hand and said, “2/4.” I demonstrated that the 1/2 mark on the number line is also equal to 2/4 when the number line is divided into fourths. At 02:14 in the first video clip, I said, “So six jumps means we’ll use fractions that are…” I was evoking the students to respond with “six.” At 03:07, a picture on the SMART Board showed a group of two bananas and four apples. I asked the students, “What fraction of apples are there?” One student responded with 4/4 (03:13). This was not correct, and the next student said 3/3 (03:20). The next student I called on said, “4/6” (03:27). I knew that not all of the students understood why it was 4/6, so I elicited and built on the student’s response by asking him, “Why did you get 4/6?” After he provided his explanation, I repeated it to the entire class, just in case some students did not hear him. I said, “So all together, there are six pieces of fruit. We have four apples and two bananas. Since we’re just looking at the apples, we have four. So that makes 4/6.” In the second video clip, a student compares two area models by putting the greater than sign in between the two models to show that the fraction to the left was larger. He then wrote the appropriate fraction under each model. The model to the left represented 2/4, and the model to the right represented 1/4. At 11:26, I developed understandings of mathematical concepts among the learners by asking the class “If you didn’t have the picture (the area models), how would you know that 2/4 is bigger?” One student responded, but she did not use the terms numerator and denominator like I had anticipated. As a result, I built on her response and said, “By looking at the numerator, how do we know which one is bigger?” Throughout my lessons, I changed the student response format from whole-class responses, to raising hands to answer questions, and to coming up to the SMART Board to respond to the prompts.

b. Explain how you used representations (manipulatives, models, tools, diagrams, charts) to support students’ understanding and use of mathematical concepts.

In each of my lessons, I used representations (manipulatives, models, tools, diagrams, charts) to support the students’ understanding and use of mathematical concepts. In the first video clip, I had multiple number line diagrams displayed on the SMART Board. The diagrams provided the students with a visual of how to place fractions on a number line. Beginning at 02:58 in the second video clip, I reviewed basic fraction concepts with the students. First, I had a visual of dominoes on the board. These dominoes represented specific fractions and it allowed the students to see that dominoes can be used as manipulatives when working with fractions. At 03:05, I had a picture of four apples and two bananas. The students had to determine the fraction of apples in the group. At 04:06, the learners had to identify the fraction represented by the shaded stars in the visual. At 04:18, there was a group of three area models. The students’ task was to identify the shaded portion of each object. At 06:23, I drew an area model to explain the concept of comparing fractions to the students. At 08:39, I used visuals of pizza to help the students understand how to compare fractions with the same denominator.
5. Analyzing Teaching

Refer to examples from the video clip(s) in your responses to the prompts.

a. What changes would you make to your instruction—for the whole class and/or for students who need greater support or challenge—to better support student learning of the central focus (e.g., missed opportunities)?

Consider the variety of learners in your class who may require different strategies/support (such as students with IEPs or 504 plans, English language learners, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students).

After watching myself teach both lessons 1 and 3, I discovered several changes I would make to my instruction. At the beginning of lesson 1, I asked, “What is another name for 1/2” (00:06)? A student raised his hand and said, “2/4.” This was correct, but I could have asked him how he knew 1/2 was the same as 2/4. Maybe not all of the students understood why 1/2 can also be called 2/4, so it would have been beneficial to have the student explain his reasoning. When the student finished placing the fractions on the number line diagram at 02:00, I could have asked her to provide me with another name for 2/4. This would have prompted her to look at 2/4 on the number line and recognize that it also equals 1/2. Again, when the student completed the activity in which she had to place the fractions in the appropriate positions on the number line, I could have asked her to give me another name for 3/6. This would have challenged her to locate 3/6 on the number line and determine that it is equivalent to 1/2.

I noticed that a few times during the video clips, I had my back turned to the class when I was helping a student at the SMART Board. This may have made the rest of the students feel unengaged and that I was only focusing on the student completing the activity on the SMART Board. When I went to the ELMO document camera at 08:24, I again had my back turned to some students sitting behind me. I could have moved those students sitting behind me to the front of the room. I could have also positioned myself so that my body faced the students in front of me and behind me. By having my back turned to the students, behavior issues could have occurred. While there were not any behavior issues with my class, there could have been issues with a different class. When asking the students what fraction of apples there were out of the six pieces of fruit, one student responded with 4/4 (03:13). Instead of asking another student for the answer, I could have asked the first student, “How did you come up with 4/4?” This would have provided him with the opportunity to explain his reasoning. I could have then built on his response by explaining the correct process to use when figuring out the answer. When the students had to identify the shaded portion of the objects at 04:44, I could have challenged them by instructing them to provide me with the fraction of the unshaded region on each object.

During the Think-Pair-Share activity, I could have given more students an opportunity to share their thoughts. There were a lot of good conversations going on between the students, but I only called on three groups. When the student said that the denominator will be larger at 07:11, I could have asked him or others to expand on his answer. I could have even asked the students who answered to come up to the board and demonstrate their idea. This would have been a good transition to the next slide at 07:19. Multiple times throughout my lessons, I told the students that they can use a number line to compare fractions (08:04 and 10:06). I briefly stated that they could use a number line to compare fractions to 1/2 by determining if the fraction is above or below 1/2. What I did not do was show them how they could use a number line to compare fractions. It does not help the students by just telling them, they need to see how they can use the number line tool to compare two different fractions. While I exhibited a positive attitude and caring demeanor toward the students, I could have been more enthusiastic when teaching the lessons. I believe that by demonstrating enthusiasm toward the concepts I am...
teaching, the students’ interest in the subject would be enhanced, and their engagement in developing understanding would be improved.

b. Why do you think these changes would improve student learning? Support your explanation with evidence of student learning AND principles from theory and/or research.

By asking students to explain the reasoning behind their answers, student learning is enhanced because then all of the students know how their classmate solved a particular problem. Research suggests that elementary students learn more when teachers turn the questions back on them by asking “why?” and “how?” In a symposium at the annual Association for Psychological Science research meeting, panelists discussed how and when asking students for explanations can best improve their learning. “Often students are able to say facts, but not able to understand the underlying mathematics concept, or transfer a problem in math to a similar problem in chemistry,” said Joseph Jay Williams, a cognitive science and online education researcher. “We know generating explanations leads to better educational outcomes generally. When children explain events, they learn more than when just getting feedback about the accuracy of their predictions,” said Cristine H. Legare, an assistant psychology professor and the director at the University of Texas. Research shows that it is important for educators to be explicit in how they focus students’ attention when they ask for an explanation of something (Students Can Learn by Explaining).

Asking questions and encouraging students to expand on their answers creates challenges that support student learning. By asking my students to provide me with another name for 2/4 or 3/6, they are learning because I am promoting higher order thinking skills. When students are asked to provide another name for 2/4 or 3/6, their brain is being engaged to think about their answer in another form. According to readingrockets.org, higher order thinking is thinking beyond restating the facts. It requires students to do something with the facts — understand them, infer from them, connect them to other facts and concepts, categorize them, manipulate them, put them together in new ways, and apply them as we seek new solutions to new problems (How to Increase Higher Order Thinking). When students develop higher order thinking skills, they are improving their conceptual understanding of a topic, procedural fluency, mathematical reasoning, problem-solving skills, and critical thinking skills. Research suggests that in order to engage students in critical thinking, the educator needs to act as a facilitator to allow for discussion and encourage a freer thought process. With activities that enhance critical thinking, students are better able to understand why something has occurred. This deeper understanding allows the students to better analyze the mathematical content being taught (The Importance of Teaching Critical Thinking).

If I made changes during the Think-Pair-Share activity, I would be providing the students with more opportunities to share their thoughts. Research says that students need many opportunities to talk in a linguistically rich environment. It has been proven that students’ learning is enhanced when they can elaborate on ideas through conversation. Students have the opportunity to learn higher-level thinking skills from their peers, gain the extra time or prompting they may need, and gain confidence when reporting ideas to the whole class. The Think-Pair-Share strategy makes classroom discussions more productive, as students have already had an opportunity to think about their ideas before participating in class discussions. According to research, the Think-Pair-Share strategy enables students to internally process, organize, and retain ideas. Furthermore, it also allows them to consider the viewpoints of their peers. When sharing their findings, students take ownership of their learning and negotiate meanings rather than relying on the teacher to provide the answers (Think-Pair-Share Cooperative Learning Strategy). By calling on more students after a Think-Pair-Share activity, I am allowing the whole class to hear more than one perspective. I am also providing opportunities for the students to build on their own thoughts and ideas about the topic at hand.]
Assessment Task 3:
Assessing Student Learning
Part A:
Student Work Samples
Fraction Assessment

1. The number that is above the fraction bar is known as the _____________.
   A. Denominator
   B. Fractionator
   C. Numerator
   D. None of the above

2. The number that is below the fraction bar is known as the _____________.
   A. Fractionator
   B. Numerator
   C. Denominator
   D. None of the above

3. What fraction of the figure is shaded? \[\frac{3}{5}\] Unshaded? \[\frac{2}{5}\]

4. Identify the fractions that are represented by the shaded figures.

   \[\frac{5}{8}\] \[\frac{1}{3}\] \[\frac{8}{12}\]
5. Complete the number line.

![Number line diagram]

6. Which fraction is the arrow pointing to on the number line? \( \frac{4}{6} \)

![Number line diagram]

7. Represent the following fractions on the number line diagram below:

\[
\frac{9}{10}, \frac{1}{2}, \frac{3}{10}, \frac{6}{10}, \frac{1}{10}
\]

![Number line diagram]

8. Claire's teacher asked her to represent fourths on a number line diagram. Help Claire complete the task and label each fractional part.

![Number line diagram]

9. What is the measurement of the pencil?

- A. \( \frac{3}{5} \) inches
- B. \( \frac{3}{6} \) inches
- C. \( \frac{2}{5} \) inches
- D. \( \frac{2}{6} \) inches
10. Explain what an equivalent fraction is. An equivalent fraction is something that is equal like \( \frac{1}{2} \) and \( \frac{3}{6} \).

11. Draw a model that represents a fraction equivalent to \( \frac{3}{6} \).

12. Do the fraction circles below represent equivalent fractions? Explain why or why not. Yes, they are equivalent fractions because they are both \( \frac{1}{2} \).

13. Which model below represents a fraction equivalent to \( \frac{4}{5} \)?

A. ⭐⭐⭐⭐⭐

B. ⬅️⬜⬜⬜⬜

C. ❤️❤️❤️❤️❤️❤️❤️❤️❤️❤️❤️

D. ⬅️⬜⬜⬜⬜

14. Use your fraction strips to determine equivalent fractions for \( \frac{1}{4} \). List the equivalent fractions discovered. \( \frac{2}{8}, \frac{3}{12} \).
Use your fraction strips to compare the following fractions.

15. Circle the larger fraction.
   \[
   \frac{7}{8} \quad \frac{7}{12}
   \]

16. Use \(>,<,\) or \(=\) to compare the pair of fractions.
   \[
   \frac{1}{4} < \frac{3}{10}
   \]

17. Use \(<,>,\) or \(=\) to compare the pair of fractions.
   \[
   \frac{3}{4} = \frac{6}{8}
   \]

Use your fractions strips to order the following fractions from least to greatest.

18. \[
\frac{2}{3} \quad \frac{1}{2} \quad \frac{4}{5}
\]

19. \[
\frac{3}{10} \quad \frac{2}{12} \quad \frac{1}{4}
\]

Solve the following word problem.

20. Jordan’s pizza was divided into 8 equal slices. He ate 5 of them.

   Melissa’s pizza was the same size, but hers was divided into 6 equal slices.
   She ate 4 of them. Who ate more pizza? Explain. Melissa ate more than Jordan because 8 and 6 are the denominators and the lower the denominator the more they ate.
Name: Student 2

Fraction Assessment

1. The number that is above the fraction bar is known as the _____________.
   A. Denominator
   B. Fractionator
   C. Numerator
   D. None of the above

2. The number that is below the fraction bar is known as the _____________.
   A. Fractionator
   B. Numerator
   C. Denominator
   D. None of the above

3. What fraction of the figure is shaded? ______ Unshaded? ______

   ![Shaded Figure]

4. Identify the fractions that are represented by the shaded figures.
   - 
   - 
   - 

   \[
   \frac{5}{8}, \quad \frac{1}{3}, \quad \frac{5}{10}
   \]
5. Complete the number line.

6. Which fraction is the arrow pointing to on the number line? _______

7. Represent the following fractions on the number line diagram below:

8. Claire’s teacher asked her to represent fourths on a number line diagram. Help Claire complete the task and label each fractional part.

9. What is the measurement of the pencil?
   A. \( \frac{3}{5} \) inches
   B. \( \frac{3}{6} \) inches
   C. \( \frac{2}{5} \) inches
   D. \( \frac{2}{6} \) inches
10. Explain what an equivalent fraction is.

A **equivalent fraction** is a different fraction but the same answer.

11. Draw a model that represents a fraction equivalent to $\frac{3}{6}$.

\[ \frac{1}{2} \quad \frac{3}{6} \]

12. Do the fraction circles below represent equivalent fractions? Explain why or why not.

Yes, they both represent $\frac{1}{2}$.

13. Which model below represents a fraction equivalent to $\frac{4}{5}$?

- A. ★★☆☆☆☆☆
- B. ☻☻☻☻☻☻☻
- C. ♥♥♥♥♥♥♥♥
- D. ○○○○○ ○

14. Use your fraction strips to determine equivalent fractions for $\frac{1}{4}$. List the equivalent fractions discovered.

\[ \frac{2}{8} \quad \frac{3}{12} \]
Use your fraction strips to compare the following fractions.

15. Circle the larger fraction.
   \[ \frac{7}{8} \quad \frac{7}{12} \]

16. Use $>$, $<$, or $=$ to compare the pair of fractions.
   \[ \frac{1}{4} \quad \frac{3}{10} \]

17. Use $<$, $>$, or $=$ to compare the pair of fractions.
   \[ \frac{3}{4} = \frac{6}{8} \]

Use your fractions strips to order the following fractions from least to greatest.

18. \[ \frac{2}{3} \quad \frac{1}{2} \quad \frac{4}{5} \]

19. \[ \frac{3}{10} \quad \frac{2}{12} \quad \frac{1}{4} \]

Solve the following word problem.

20. Jordan’s pizza was divided into 8 equal slices. He ate 5 of them.

Melissa’s pizza was the same size, but hers was divided into 6 equal slices.
She ate 4 of them. Who ate more pizza? Explain.
Fraction Assessment

1. The number that is above the fraction bar is known as the __________._
   A. Denominator
   B. Fractionator
   C. Numerator
   D. None of the above

2. The number that is below the fraction bar is known as the __________._
   A. Fractionator
   B. Numerator
   C. Denominator
   D. None of the above

3. What fraction of the figure is shaded? \( \frac{3}{5} \) Unshaded? \( \frac{2}{5} \)

4. Identify the fractions that are represented by the shaded figures.
5. Complete the number line.

6. Which fraction is the arrow pointing to on the number line? \( \frac{2}{5} \)

7. Represent the following fractions on the number line diagram below:

8. Claire’s teacher asked her to represent fourths on a number line diagram. Help Claire complete the task and label each fractional part.

9. What is the measurement of the pencil?
   A. \( \frac{3}{5} \) inches
   B. \( \frac{3}{6} \) inches
   C. \( \frac{2}{5} \) inches
   D. \( \frac{2}{6} \) inches
10. Explain what an equivalent fraction is.

It's the biggest thing

11. Draw a model that represents a fraction equivalent to $\frac{3}{6}$.

\[
\begin{array}{c}
\text{Model}
\end{array}
\]

12. Do the fraction circles below represent equivalent fractions? Explain why or why not.

because it has bigger slices

13. Which model below represents a fraction equivalent to $\frac{4}{5}$?

A. \[
\begin{array}{c}
\text{Model A}
\end{array}
\]

B. \[
\begin{array}{c}
\text{Model B}
\end{array}
\]

C. \[
\begin{array}{c}
\text{Model C}
\end{array}
\]

D. \[
\begin{array}{c}
\text{Model D}
\end{array}
\]

14. Use your fraction strips to determine equivalent fractions for $\frac{1}{4}$. List the equivalent fractions discovered.
Use your fraction strips to compare the following fractions.

15. Circle the larger fraction.
   \[
   \frac{7}{8} \quad \frac{7}{12}
   \]

16. Use $>$, $<$, or $=$ to compare the pair of fractions.
   \[
   \frac{1}{4} \quad \frac{3}{10}
   \]

17. Use $<$, $>$, or $=$ to compare the pair of fractions.
   \[
   \frac{3}{4} \quad \frac{6}{8}
   \]

Use your fractions strips to order the following fractions from least to greatest.

18. \[
   \frac{2}{3} \quad \frac{1}{2} \quad \frac{4}{5}
   \]

19. \[
   \frac{3}{10} \quad \frac{2}{12} \quad \frac{1}{4}
   \]

Solve the following word problem.

20. Jordan’s pizza was divided into 8 equal slices. He ate 5 of them.

   Melissa’s pizza was the same size, but hers was divided into 6 equal slices.

   She ate 4 of them. Who ate more pizza? Explain.
Part B: Evidence of Feedback
Student 1 Feedback

Student 1: Student needing greater challenge

Student 1,

I am so impressed by your hard work and dedication in our fraction unit. You have proven that you fully understand how to identify fractions on a number line, how to represent equivalent fractions, and how to compare and order fractions. Excellent job on the fraction assessment! You answered all of the questions correctly, and you demonstrated that you have a solid understanding of basic fractional concepts. When representing equivalent fractions, you used multiple tools such as area models and fraction strips to help you solve the problems. You also used these resources when comparing and ordering fractions. Well done! Because you have achieved all of the objectives for the fraction unit, I want to challenge you to investigate these questions: Can a number line continue past 1? If so, what would it look like? I also want you to brainstorm the ways in which rulers and number lines are similar and different. Lastly, do you think it is possible to find equivalent fractions through multiplication and division? When you think you might know the answer to these questions, let me know and we will work through them together. Again, great job on getting 100% on your assessment! Keep up the good work!

-Miss Summers
Student 2 Feedback

Student 2: Student with minor gaps in academic knowledge

Student 2,

You have grown tremendously since the beginning of the unit. You have shown that your understanding of fractions on a number line, equivalent fractions, and comparing fractions is improving. Overall, you did a great job on the fraction assessment. There were a few mistakes made throughout the assessment, however.

On question #3, you put 3 for the shaded region of the figure, and 2 for the unshaded region of the figure. For this question, you needed to write your answer in the form of a fraction. So, instead of 3 for the shaded area of the figure, it should have been written as 3/5. Also, instead of 2 for the unshaded area of the figure, it should have been written as 2/5. I think you may have read the question too quickly and did not see that you needed to put your answers in the form of a fraction.

Don’t forget to count the number of jumps between the tick marks on number lines. For question #6, you did not count the number of jumps correctly. This was just a minor error in counting. Instead of 4/5, the answer should have been 4/6. Remember that any fraction with the same numerator and denominator equals one whole. So, 4/4 should have been placed underneath the 1 on the number-line model. A ruler is very similar to a number line diagram. On question #9, there are six intervals between the tick marks. Thus, the 1/2 mark is another name for 3/6.

You have shown that you have a good understanding of equivalent fractions. On question #13, I see you circled choice D, but chose choice A instead. Your first choice was correct because 4 out of 5 circles are shaded green. Make sure you double check your answers. When comparing and ordering fractions, don’t be afraid to use your fraction strips, fractions circles, or area models. These tools will make solving these problems a lot easier. Keep working hard! You’re doing great. Just take your time and use your resources.

-Miss Summers
Student 3 Feedback

**Student 3: Student with gaps in academic knowledge**

Student 3,

Your understanding of fractions is emerging and you are working hard to better understand fractions on a number line, equivalent fractions, and comparing fractions. After looking at your fraction assessment, I can tell that you are having a difficult time with some fractional concepts. When identifying fractions on a number line, remember to count the jumps between the tick marks. On question #6, I see you counted five intervals, but there are actually six intervals. Also, the arrow is pointing to the fourth interval on the number line. Thus, the answer is 4/6. On question #7, the number line diagram should have been divided into ten equal parts because the denominator on the given fractions is 10.

On question #8, you did not divide your number line into fourths using tick marks. This is a very important step. I will meet with you and we will revisit the strategies you can use to identify fractions on a number line. Remember that any fraction with the same numerator and denominator equals one whole. So, 4/4 should have been placed underneath the 1 on the number line model. Think back to the lesson about equivalent fractions. Equivalent fractions are two different fractions that equal the same amount. Remember to use your tools to help you create equivalent fractions. I will work with you to help you understand the strategies you can use to represent equivalent fractions. These strategies will help you solve questions #11 and #14 on the assessment.

Reflect back on the lesson about comparing fractions. Don’t forget that when looking at two fractions with the same numerator, we have to look at the denominators to see which fraction is larger/smaller. On question #15, 7/8 is actually bigger than 7/12 because the denominator is smaller. The smaller the denominator, the larger the fraction. Use your resources when comparing and ordering fractions. Fraction strips are very useful when determining the size of fractions. I will work with you on this concept to help you understand which strategies to use when comparing two or more fractions.

Keep working hard and stay confident. You have the right idea on these fractional concepts; you just need to use the strategies we talked about during previous lessons. Fraction strips, fraction circles, and area models are very helpful tools that will help you solve the problems you are struggling with!

-Miss Summers
Part C: Assessment Commentary
1. **Analyzing Student Learning**
   
a. Identify the specific learning objectives measured by the assessment you chose for analysis.

   [The learning objectives measured by the summative fraction assessment I chose for analysis are aligned to the following Common Core State Standards:
   
   - **CCSS.MATH.CONTENT.3.NF.A.2:**
     
     o Understand a fraction as a number on the number line; represent fractions on a number line diagram.
       
       - **CCSS.MATH.CONTENT.3.NF.A.2.A:**
         
         • Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.
       
       - **CCSS.MATH.CONTENT.3.NF.A.2.B:**
         
         • Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.]

   - **CCSS.MATH.CONTENT.3.NF.A.3:**
     
     o Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
       
       - **CCSS.MATH.CONTENT.3.NF.A.3.A:**
         
         • Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
       
       - **CCSS.MATH.CONTENT.3.NF.A.3.B:**
         
         • Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.
       
       - **CCSS.MATH.CONTENT.3.NF.A.3.D:**
         
         • Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

   By meeting these Common Core State Standards, the students were able to develop an understanding of fractions as numbers.]

b. Provide a graphic (table or chart) or narrative that summarizes student learning for your whole class. Be sure to summarize student learning for all evaluation criteria submitted in Assessment Task 3, Part D.
Fractions on a Number Line

Common Core State Standards:

Equivalent Fractions

Common Core State Standards:
c. Use evidence found in the 3 student work samples and the whole class summary to analyze the patterns of learning for the whole class and differences for groups or individual learners relative to

- conceptual understanding
- procedural fluency AND
- mathematical reasoning or problem-solving skills

Consider what students understand and do well, and where they continue to struggle (e.g., common errors, confusions, need for greater challenge).

After analyzing the whole class summary and the 3 student work samples chosen for this commentary, I can determine that the students’ understanding of fractions on a number line, fraction equivalency, and fraction comparison is emerging. Page 1 of the summative assessment consisted of four questions that aligned to the following Common Core State Standard: CCSS.MATH.CONTENT.3.NF.A.1: Understand a fraction \( \frac{1}{b} \) as the quantity formed by 1 part when a whole is partitioned into \( b \) equal parts; understand a fraction \( \frac{a}{b} \) as the quantity formed by \( a \) parts of size \( \frac{1}{b} \). The whole class met this standard, for all of the students answered the four questions correctly. While this standard was not my main focus in the learning segment, it was necessary for me to see that the students had a solid understanding of fractions. The 3 focus students answered all four questions correctly and demonstrated a conceptual understanding of fractions as numbers.

Page 2 of the fraction summative assessment consisted of five questions that required the students to use their conceptual understanding, procedural fluency, mathematical reasoning, and problem-solving skills to appropriately place fractions on a number line diagram. The questions aligned to the following Common Core State Standards:

CCSS.MATH.CONTENT.3.NF.A.2: Understand a fraction as a number on the number line; represent fractions on a number line diagram, CCSS.MATH.CONTENT.3.NF.A.2.A: Represent
a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into $b$ equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line, and CCSS.MATH.CONTENT.3.NF.A.2.B: Represent a fraction $a/b$ on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size $a/b$ and that its endpoint locates the number $a/b$ on the number line. The majority of the class performed well on these questions, for they were able to use procedural fluency to appropriately place fractions on the given number lines. The Student 3 work sample in Part A of this task shows an example of a particular student who has struggled with the concept of fractions on a number line. In this work sample, the student answered question #5 correctly, but was unable to solve question #6. For question #6, the student shows no signs of applying procedures to solve the problem (such as drawing jumps between the tick marks). For question #7, this student failed to divide the number line model into ten equal parts, and thus did not represent the given fractions in the appropriate place on the number line. For question #8, the student did not use tick marks to divide the number line diagram into fourths. The student also did not label “1” as 4/4. For question #9, the student did not use mathematical reasoning or problem-solving skills to determine the measurement of the pencil. In the Student 2 work sample, the student demonstrates some application of number line procedures, but accuracy was not consistent among the problems. For question #6, the student did not use procedural fluency (such as counting the jumps between the tick marks) to determine which fraction the arrow was pointing to on the number line. For question #7, Student 2 did not label 1/2 on the number line model because the student did not recognize that 5/10 was considered 1/2. For question #8, the student made the same mistake as Student 3, for the “1” on the number line was not labeled as 4/4. For question #9, the student did not use mathematical reasoning or problem-solving skills to determine the length of the pencil. Lastly, the Student 1 work sample exhibits the student’s conceptual understanding, procedural fluency, mathematical reasoning, and problem-solving skills. Student 1 consistently and accurately applied number line procedures to solve all five problems. Although the majority of the class performed well, a learning pattern is the class’ inaccuracy of the placement of fractions on a number line diagram.

Page 3 of the fraction summative assessment contained five questions that required the students to use their procedural fluency, mathematical reasoning, and problem-solving skills to demonstrate their conceptual understanding of equivalent fractions. The questions aligned to the following Common Core State Standards: CCSS.MATH.CONTENT.3.NF.A.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size, CCSS.MATH.CONTENT.3.NF.A.3.A: Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line, and CCSS.MATH.CONTENT.3.NF.A.3.B: Recognize and generate simple equivalent fractions, e.g., $1/2 = 2/4$, $4/6 = 2/3$. Explain why the fractions are equivalent, e.g., by using a visual fraction model. Overall, the whole class exhibited a solid understanding of fraction equivalency. Student 3, however, did not demonstrate conceptual understanding of equivalent fractions. When asked to explain what an equivalent fraction is (question #10), the student responded with, “It’s the biggest thing.” Question #11 asked the students to draw a model that represents a fraction equivalent to 3/6. Student 3 drew an area model with five out of six parts shaded and exhibited no signs of procedural fluency or mathematical reasoning. Question #12 asked, “Do the fraction circles below represent equivalent fraction? Explain why or why not.” One fraction circle represented 4/8 and the other fraction circle represented 6/12. Student 3 circled the fraction circle that had 6/12 shaded. The student then wrote, “Yes, because it has bigger slices.” For question #13, the students were to select a model that represented a fraction equivalent to 4/5. Student 3 was able to use conceptual understanding to correctly answer question #13. For question #14, the students had to use their fraction strips to determine equivalent fractions for 1/4. They were asked to list the equivalent fractions they discovered. Student 3 did not use problem-solving skills and instead
drew a trapezoid divided into five parts. Student 2 displays a solid understanding of equivalent fractions. The student used conceptual understanding, procedural fluency, and mathematical reasoning to correctly answer questions #10, #11, and #12. For question #13, the student failed to use mathematical reasoning and selected a model that represented 4/8. Yet, the student wrote 4/5 next to the correct option. Student 2 solved question #14 by using problem-solving skills and procedural fluency to find fractions equivalent to 1/4. Finally, Student 1 demonstrates that conceptual understanding, procedural fluency, mathematical reasoning, and problem-solving skills were used to successfully answer all five problems regarding equivalent fractions. Even though the majority of the class performed well, a learning pattern is the class’ inaccuracy of drawing a model that represents a fraction equivalent to a particular fraction.

Page 4 of the fraction summative assessment was comprised of six questions that required the students to use their procedural fluency, mathematical reasoning, and problem-solving skills to demonstrate their conceptual understanding of the comparison of fractions. The questions aligned to the following Common Core State Standards: CCSS.MATH.CONTENT.3.NF.A.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size and CCSS.MATH.CONTENT.3.NF.A.3.D: Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. The majority of the class performed well with these questions, for it is evident that they understand the concept of comparing fractions. In the Student 3 work sample, the student does not exhibit an understanding of fraction comparison. For questions #15–#19, the students were to use their fraction strips to compare the given fractions. When asked to circle the larger fraction (7/8 or 7/12), Student 3 did not circle the correct fraction because mathematical reasoning and problem-solving skills were not used to help solve the problem. For questions #13 and #14, the students were directed to use <, >, or = to compare the given pair of fractions. Student 3 shows no signs of applying procedures to solve the problems. For questions #18 and #19, the students were asked to use fraction strips to put the given fractions in order from least to greatest. Student 3 failed to use procedural fluency, mathematical reasoning and problem-solving skills to put the fractions in order from least to greatest. Question #20 required the students to pull out important information from the word problem. Student 3 was able to apply procedural fluency and problem-solving skills to find the correct answer. In the Student 2 work sample, the student demonstrates some conceptual understanding of fraction comparison. For question #15, the student used mathematical reasoning to determine that 7/8 is larger than 7/12. On question #16, Student 2 did not successfully compare 1/4 and 3/10. On question #17, the student compared 3/4 and 6/8 correctly by using procedural fluency and problem-solving skills. On questions #18 and #19, Student 2 put the given fractions in order from greatest to least, but not from least to greatest like the directions had said. The student may have just made a slight error when reading the directions. On question #20, Student 2 provided the correct answer, but did not provide an explanation or show any work. Thus, I am unable to determine how well the student understood the process to solve this problem. Lastly, the Student 1 work sample demonstrates the student’s conceptual understanding, procedural fluency, mathematical reasoning, and problem-solving skills in comparing and ordering fractions. Student 1 answered all six questions correctly. While the majority of the class performed well, a learning pattern is the class’ common error in ordering fractions from least to greatest. They need to be able to use tools (fraction strips, fraction circles, area models) to successfully order fractions from least to greatest or from greatest to least.]

d. If a video or audio work sample occurs in a group context (e.g., discussion), provide the name of the clip and clearly describe how the scorer can identify the focus student(s) (e.g., position, physical description) whose work is portrayed.
2. Feedback to Guide Further Learning

Refer to specific evidence of submitted feedback to support your explanations.

a. Identify the format in which you submitted your evidence of feedback for the 3 focus students. (Delete choices that do not apply.)

- Written directly on work samples or in separate documents that were provided to the focus students

If a video or audio clip of feedback occurs in a group context (e.g., discussion), clearly describe how the scorer can identify the focus student (e.g., position, physical description) who is being given feedback.

b. Explain how feedback provided to the 3 focus students addresses their individual strengths and needs relative to the learning objectives measured.

The feedback provided to the 3 focus students addresses their individual strengths and needs relative to the learning objectives measured. My comments on the summative assessment were used to praise the focus students on their strengths, to make connections to prior learning, and to provide a strategy to address an individual learning need. The feedback provided to Student 1 addressed the student's solid conceptual understanding of fractions on a number line, equivalent fractions, and comparing fractions. I gave praise and positive feedback to this student, for the performance on the assessment was outstanding. Because this student is advanced and performs above the third grade level, I asked higher order thinking questions that challenge the student to investigate the answer.

The feedback provided to Student 2 addresses his/her hard work and growth over the learning segment. It is evident that the student is understanding the basic concepts, procedures, mathematical reasoning, and problem-solving skills needed to place fractions on a number line, to solve equivalent fractions, and to compare fractions. The issue in Student 2’s assessment is that some answers were incorrect because the student did not take the time to show his/her work on each problem. The feedback informs the student that he/she needs to take his/her time when answering the questions, and that double checking the answers is very important.

The feedback provided to Student 3 addresses his/her lack of conceptual understanding of fractions on a number line, equivalent fractions, and comparing fractions. I explained that in order to identify fractions on a number line, it is important to count the jumps between the tick marks on the number line. On the equivalent fractions part of the assessment, I wrote, “Remember, the word equivalent is similar to the word equal. So, equivalent fractions are equal fractions.” This student also struggled with the concept of fraction comparison. I said, “Use your tools when comparing fractions. Don’t forget about the resources that will help you solve these problems (fraction strips, fraction circles, area models, etc.).” I also provided positive feedback.
in order to show the student that I believe in him/her and that he/she does have the knowledge to solve the problems. I encouraged the student to ask any questions he/she had. Moreover, I informed the student that I would work with him/her during math interventions to ensure the student possesses a clear conceptual understanding of fractions. By working one on one with this student, the student would attain the ability to confidently place fractions on a number line, solve equivalent fractions, and compare/order fractions.]

c. Describe how you will support each focus student to understand and use this feedback to further their learning related to learning objectives, either within the learning segment or at a later time.

[ I will support each focus student to understand and use this feedback to further their learning related to learning objectives at a later time. In my feedback, I let the students know that at a later time, we could discuss or review materials from the learning segment. During this later time, I would talk about the summative assessment with each focus student. I would first go over the common mistakes that the class as a whole made on the assessment. I would then explain how I graded the assessment by showing each focus student where I gave them credit. Next, I would go over the problems the focus students need to correct. Lastly, I would provide the students with the opportunity to fix any mistakes that were made on the assessment.

I will also support the focus students to understand and use this feedback on their strengths and weaknesses in relation to the learning objectives. The next steps of improvement for the focus students would not be left up to them. I would make it a priority to meet with these focus students to help them grow and increase their understanding of fractional concepts.]

3. Evidence of Language Understanding and Use

When responding to the prompt below, use concrete examples from the video clip(s) and/or student work samples as evidence. Evidence from the clip(s) may focus on one or more students.

You may provide evidence of students’ language use from ONE, TWO, OR ALL THREE of the following sources:

1. Use video clip(s) from Instruction Task 2 and provide time-stamp references for evidence of language use.

2. Submit an additional video file named “Language Use” of no more than 5 minutes in length and cite language use (this can be footage of one or more students’ language use). Submit the clip in Assessment Task 3, Part B.

3. Use the student work samples analyzed in Assessment Task 3 and cite language use.

a. Explain and provide concrete examples for the extent to which your students were able to use or struggled to use the
   - selected language function,
   - vocabulary and/or symbols, AND
   - discourse or syntax
   to develop content understandings.
The selected language function that was used in the learning segment was “represent.” This function was essential for my students to develop conceptual understanding, procedural fluency, mathematical reasoning, and problem-solving skills. Throughout the lessons, my students demonstrated an understanding of the selected language function, for they consistently represented mathematical information. The student responses to the fraction summative assessment (examples can be seen in Part A of this task) demonstrate the students’ ability to answer questions that contain the language function. Based on the way the students responded to the questions that utilized “represent” in a written context, it is clear that they have a solid understanding of the word’s meaning. The summative assessment questions that contain the language function are:

- **Question #4:** “Identify the fractions that are represented by the shaded figures.”
- **Question #7:** “Represent the following fractions on the number line diagram below.”
- **Question #8:** “Claire’s teacher asked her to represent fourths on a number line diagram. Help Claire complete the task and label each fractional part.”
- **Question #11:** “Draw a model that represents a fraction equivalent to 3/6.”
- **Question #12:** “Do the fraction circles below represent equivalent fractions? Explain why or why not.”
- **Question #13:** “Which model below represents a fraction equivalent to 4/5?”

Over the course of the three lessons regarding fractions, I used the selected language function of “represent,” vocabulary and symbols, and discourse. In the “edTPA Video Clips” file, I am continuously using mathematical vocabulary that relates to the concept and the central focus of my learning segment. The vocabulary used in the video clips are words such as “number line,” “one-half,” “fourths,” “sixths,” “fractions,” “numerator,” “denominator,” and “equivalent fractions,” and “compare.” At 05:08 in the second video clip, the students were asked the question, “If we compare two fractions, how do we know which one is bigger and which one is smaller?” A student I called on at 07:11 said that the denominator will be larger. At 07:52 in the second video clip, I reviewed the greater than (>), equal to (=), or less than (<) symbols. The students’ correct language use throughout the learning segment proves that they have a solid understanding of the mathematical vocabulary words.

### 4. Using Assessment to Inform Instruction

a. Based on your analysis of student learning presented in prompts 1b–c, describe next steps for instruction:

- For the whole class
- For the 3 focus students and other individuals/groups with specific needs

Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs or 504 plans, English language learners, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students needing greater support or challenge).

Based on my analysis of student learning presented in prompts 1b–c, I am able to determine my next steps for instruction for the whole class, for the 3 focus students, and for other individuals/groups with specific needs. Overall, the class’ performance on the summative assessment is superb. The majority of the students showed improvement from the fractions pre-assessment that was given at the beginning of the unit. Most of the students are proficient in the learning segment’s learning objectives and standards. As the graphs in prompt 1b show, there are a few students who are not fully grasping the concepts, procedures, reasoning, and problem-solving skills needed to solve problems regarding fractions on a number line, fraction equivalency, and fraction comparison. As a class, I believe the students could use more practice...
with fraction equivalency and the comparison of fractions. The students need more practice with procedural fluency and problem-solving skills. The results of the summative assessment show that while the majority of the students had a solid understanding of fractional concepts and mathematical reasoning skills, many struggled with questions requiring procedural fluency and problem-solving skills. Many of the students struggled with question #11 in the summative assessment. While they knew that equivalent fractions are two different fractions that equal the same amount, they had a difficult time drawing a model that represented a fraction equivalent to 3/6. They did not know what procedure to use, and they did not use the correct problem-solving skills. To address this issue, I would revisit the concept of equivalency by having the entire class solve problems that require the students to use procedural fluency and problem-solving skills to help them identify, represent, and generate equivalent fractions. When reviewing how to draw a model that represents a fraction equivalent to 3/6, I would encourage them to use their fraction strips, fraction circles, and other manipulatives to help them visualize which fractions are equal to 3/6. I would then show them how to draw equivalent fractions in a variety of ways. If the students were to display 3/6 using fraction circles, they would see that 3/6 is equivalent to 1/2 because half of a circle is shaded in. I would then have them create 3/6 (1/2) using eighths. By doing this, they would see that 3/6 and 1/2 is equivalent to 4/8 (shown in the figure below).

![Fraction Circle Equivalency](image1)

If the students were to display 5/10 using fraction strips, they would again see that 5/10 is equivalent to 1/2 because half of a rectangle is shaded in. I would then have them create 5/10 (1/2) using fourths. By doing this, they would see that 5/10 and 1/2 is equivalent to 2/4 (shown in the figure below).

![Fraction Strip Equivalency](image2)

While the majority of the students know how to compare and order fractions using conceptual understanding and mathematical reasoning, many of the students did not use procedural fluency and problem-solving skills when comparing and ordering fractions on page 4 of the summative assessment. To address this issue, I would revisit the concept of fraction comparison. I would have the whole class solve problems that require them to use procedural fluency and problem-solving skills to help them compare fractions. Similar to fraction equivalency, I would teach the students how to compare and order fractions with area models and fraction strips.
Student 3 is a student with gaps in his/her academic knowledge. This student was weak in his/her conceptual understanding of fractions on a number line, equivalent fractions, and comparing fractions. My next steps for Student 3 and the five other individuals with similar misconceptions would be to (1) revisit the jumping technique for fractions on a number line, (2) demonstrate how to use area models and fraction strips to represent equivalent fractions, and (3) model how to use area models and fraction strips to compare and order fractions. These students would benefit from these concrete examples of fractions.

Student 2 is a student with some minor gaps in academic knowledge. This student struggled with consistently applying procedural fluency to problems pertaining to fractions on a number line, equivalent fractions, and comparing fractions. My next steps for Student 2 and the eight other individuals who made similar mistakes with number line procedures would be to provide the students with blank number lines. These students would complete the number lines by labeling the appropriate fractional units. I would also demonstrate that the concept of fractions on a number line can be compared to a ruler. The students would be directed to measure a pencil or a piece of string by applying the procedural techniques needed to determine the length of the item. The steps I would take to help these students with equivalent fractions and comparing fractions would be to provide them with manipulatives such as fraction circles and fractions strips. They would be instructed to use these tools to help them represent equivalent fractions and to compare/order fractions.

Student 1 is an advanced student who needs a greater challenge. This student consistently performs at or above the third grade level on all assignments. Because this student is so talented, he/she demonstrated no issues in meeting the learning segment’s learning objectives and standards. My next steps for Student 1 and the four other individuals who are similarly gifted/talented would be to pose more challenging questions such as “Can a number line continue past 1?”, “If so, what would it look like?”, and “Can you describe the ways rulers and number lines are similar/different?” These questions would require the students to use higher level thinking skills. Furthermore, they would reinforce and further the students’ understanding of fractions. In addition to these higher order thinking questions, I would challenge the students to find fraction equivalency through multiplication and division.

b. Explain how these next steps follow from your analysis of student learning. Support your explanation with principles from research and/or theory.

My next steps follow my analysis of student learning because they are connected to Bruner’s stages of representation. Jerome Bruner, a psychologist, theorized that learning occurs through three stages of representation. These three stages are (1) the enactive, action-based stage, (2) the iconic, image-based stage, and (3) the symbolic, language-based stage. Stage 1 is also referred to as the concrete stage, and it involves hands-on activities. Stage 2, sometimes called the pictorial stage, involves visuals to represent the experimental learning from the first stage. Stage 3, the abstract stage, takes the images in the second stage and represents them using words and symbols (Bruner’s Stages of Representation). The three stages of representation teach students to first use conceptual understanding, to then use procedural fluency, and to finally use mathematical reasoning and problem-solving skills. By encouraging individuals like Student 1 and Student 2 to use manipulatives and visuals in the next steps, I am engaging the students in the topics of fractions on a number line, fraction equivalency, and fraction comparison. These learners need concrete representations of fractions in order to fully grasp the material they are learning. Individuals like Student 3 use words and symbols to organize information in their head by building on concepts from previous lessons. Advanced students who are proficient in procedural fluency and problem-solving skills are capable of investigating more abstract fractional concepts. Thus, these students are given more challenging tasks to extend their understanding of fractions. Bruner’s stages of representation allow students to represent mathematical problems using tangible objects, images/visuals, and words/symbols.
Part D:
Evaluation Criteria
**Fraction Summative Assessment Rubric**

<table>
<thead>
<tr>
<th>Common Core State Standard</th>
<th>Points Earned</th>
<th>Points Possible</th>
<th>Grade</th>
<th>Teacher Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CCSS.MATH.CONTENT.3.NF.A.2</strong>: Understand a fraction as a number on the number line; represent fractions on a number line diagram.</td>
<td></td>
<td>10</td>
<td></td>
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<tr>
<td>- CCSS.MATH.CONTENT.3.NF.A.2.A: Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.</td>
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<tr>
<td>- CCSS.MATH.CONTENT.3.NF.A.2.B: Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.</td>
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<tr>
<td><strong>CCSS.MATH.CONTENT.3.NF.A.3</strong>: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</td>
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<tr>
<td>- CCSS.MATH.CONTENT.3.NF.A.3.A: Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.</td>
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<tr>
<td>- CCSS.MATH.CONTENT.3.NF.A.3.B: Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.</td>
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<tr>
<td><strong>CCSS.MATH.CONTENT.3.NF.A.3</strong>: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</td>
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<tr>
<td>- CCSS.MATH.CONTENT.3.NF.A.3.D: Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols &gt;, =, or &lt;, and justify the conclusions, e.g., by using a visual fraction model.</td>
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</tbody>
</table>
Arts Integration
Fractions Arts Integration:
Fractional Me!
Symmetry Arts Integration:
Rotational Symmetry
Symmetry Arts Integration:
Translational Symmetry
Social Studies Arts Integration:
America’s National Bird
Literacy Arts Integration:
Read Aloud: *Cloudy with a Chance of Meatballs*
References


The edTPA and the Power of Arts Integration

Tricia Summers
Elementary Education
April 30, 2016
The edTPA

The edTPA is a teacher performance assessment that is used to emphasize, measure and support the skills and knowledge that all teachers need in the classroom.

3 Tasks:
1. Planning
2. Instruction
3. Assessment
Task 1: Planning

- Identify a central focus
- Write lesson plans
- Instructional materials
- Assessments
- Plan a learning segment
- 3-5 consecutive lessons
3 Lessons

**Fractions:**

*Lesson #1*: Fractions on a Number Line

*Lesson #2*: Equivalent Fractions

*Lesson #3*: Comparing Fractions
Common Core State Standards

• **Lesson #1: Fractions on a Number Line** – CCSS.MATH.CONTENT.3.NF.A.2: Understand a fraction as a number on the number line; represent fractions on a number line diagram.

• **Lesson #2: Equivalent Fractions** – CCSS.MATH.CONTENT.3.NF.A.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

• **Lesson #3: Comparing Fractions** – CCSS.MATH.CONTENT.3.NF.A.3.D: Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
Task 2: Instruction

- Record lessons
- Select a 15-minute video clip
- Reflect on teaching
- Analyze student learning
- Identify steps for improvement
- Teach lesson plans
1. Engaging Students in Learning

Refer to the video clip on your response to this prompt.

What factor would you consider to be most important in engaging students in the learning process, and why?

2. Assigning Learning

Refer to the video clip on your response to this prompt.

What strategies would you use to assign learning that is both engaging and effective for your students?
Task 3: Assessment

- Summarize student learning
- Define evaluation criteria
- Select one assessment
- Analyze 3 student work samples
- Provide feedback
- Plan for next steps
Fraction Assessment

1. The number that is above the fraction bar is known as the ____________.
   A. Denominator
   B. Fractionator
   C. Numerator
   D. None of the above

2. The number that is below the fraction bar is known as the ____________.
   A. Fractionator
   B. Numerator
   C. Denominator
   D. None of the above

3. What fraction of the figure is shaded? _______ Unshaded? _______

4. Identify the fractions that are represented by the shaded figures.
   __________
   __________
   __________

5. Complete the number line.

6. Which fraction is the arrow pointing to on the number line? _______

7. Represent the following fractions on the number line diagram below:

8. Claire's teacher asked her to represent fourths on a number line diagram.
   Help Claire complete the task and label each fractional part.

9. What is the measurement of the pencil?
   A. ______ inches
   B. ______ inches
   C. ______ inches
   D. ______ inches
10. Explain what an equivalent fraction is.

11. Draw a model that represents a fraction equivalent to \( \frac{3}{6} \).

12. Do the fraction circles below represent equivalent fractions? Explain why or why not.

13. Which model below represents a fraction equivalent to \( \frac{2}{3} \)?
   A. [Diagram A]
   B. [Diagram B]
   C. [Diagram C]
   D. [Diagram D]

14. Use your fraction strips to determine equivalent fractions for \( \frac{1}{4} \). List the equivalent fractions discovered.

15. Use your fraction strips to compare the following fractions.

16. Use \( >, < \), or \( = \) to compare the pair of fractions.

17. Use \( >, < \), or \( = \) to compare the pair of fractions.

18. Use your fractions strips to order the following fractions from least to greatest.

19. Solve the following word problem.

20. Jordan's pizza was divided into 8 equal slices. He ate 5 of them.

   Melissa's pizza was the same size, but hers was divided into 6 equal slices. She ate 4 of them. Who ate more pizza? Explain.
Assessment Results

Fractions on a Number Line
Common Core State Standards:
Assessment Results

Equivalent Fractions
Common Core State Standards:

Points (10 Possible)

Student | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20
    | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 8 | 8 | 8 | 10 | 10 | 10 | 10 | 10 | 10 | 7 | 7 | 10 | 10
### Assessment Results

Comparing Fractions
Common Core State Standards: 3.NF.A.3 and 3.NF.A.3.D

<table>
<thead>
<tr>
<th>Student</th>
<th>Points (14 Possible)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
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<tr>
<td>2</td>
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<td>12</td>
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</tbody>
</table>
In the prior activity, the students were tasked with finding fractions on a number line. The assessments were then evaluated and the results were shared with the class. The following table summarizes the number line assessment and the results:

<table>
<thead>
<tr>
<th>Number Line Assessment</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>25</td>
</tr>
<tr>
<td>Incorrect</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>

The assessment results indicated that the students had a good understanding of fractions on a number line. However, some students still struggle with the concept. Therefore, additional practice and review will be needed to ensure that all students fully understand the concept.
Fractions Arts Integration
Fractional Me!
Fractional Me!
Fractional Me!
Symmetry Arts Integration
Rotational Symmetry
Rotational Symmetry
Translational Symmetry
Social Studies
Arts Integration
America’s National Bird
Literacy Arts Integration
Questions?
Thank you!