

"Equivalent Fractions in Food and Dining"

CCSS Standard:	Number Operations with Fractions
Lesson Developer:	Tiffany Rath
Date:	4/21/12
Focus:	Equivalent Fractions

STANDARDS:

Grade 4

Number and Operations – Fractions: 4.NF

Note: *Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.*

Extend understanding of fraction equivalence and ordering: The student will:

1. Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

PERFORMANCES:

Materials:

- One to one laptops for students
- Large Construction paper pizza with toppings
- LCD projector
- White Boards
- Square construction paper pizza

Lesson Objective: Students will be able to create an equivalent fraction with 80% accuracy on summative quiz.

- Students will construct a computer graphic using pixie with four equivalent fractions pictures and labels.
 - Students in group 2 will make construction paper model of equivalent fractions using a construction paper pizza.
 - Students will solve the real world problem of ordering adequate product for a store using equivalent fractions.
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SETTING:

Real World Setting: *Food and dining*

You are a cheese shop manager. You are faced with purchasing cheese for future sales. You must determine the amount of cheese you need buy based on the amount sold in the past. Once you have completed your

PIXIE diagram, you will share your results with the rest of the class.

SMARTSKILLS:

Level I: Acquiring Data – Data that are acquired in this standards-based task:

- **Skills:** Recognizing and creating equivalent fractions

Level II: Visualizing Information – Data from Level I that are visualized as information in this standards-based task:

- **Creating meaning:** Using concrete examples, such as pizza and Pixie computer created images to model equivalent fractions

Level III: Applying Knowledge – Visualized information from Level II that is applied knowledge in this standards-based task:

- **Solving problems:** Applying the skill of equivalent fractions to real world problems, such as ordering products
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PREFERENCES:

Student Involvement – The students will complete the task in flexible groups.

Differentiating Instruction Phase 1: The task will be differentiated based on data from pre-assessments to instructional units using the online quiz.

Differentiating Instruction Phase 2: The data-driven task will be differentiated by process. Each of the two groups will learn the material in a different modality based on the pre-assessment.

Differentiating Instruction Phase 3: The content, process, or product in Phase 2 will be differentiated by readiness (e.g., basic, proficient, advanced).

Differentiating Instruction Phase 4: The Phase 2 and 3 differentiation selections will be delivered through scaffolding.

Special Education Accommodations – Students with special needs will require the following electronic devices:

- Calculator

Special Education Accommodations – Students with special needs will require the following student responses:

- Alternative ways of completing assignments

Use of Resources – The school will provide:

- classroom materials such as pencil, paper, notebooks
- computer hardware and software
- classroom time to complete the task

Customer for Student Work – The student will present their work as evidence of task completion to peers and teachers

Assessment of Student Work – The student's teacher will be involved in assessing student work generated

to complete the task.

Assessment of Student Work – The following forms of assessment will be used to determine progress and results:

- Performance assessment
- Multiple choice test items

Reporting Results – The assessment results will be reported as a score point on a rubric.

Timeline – The estimated time needed to plan, teach, and score this task is 5 days of group work.

LEARNING:

Five Es Model of Instruction

Activity 1. Engagement: The activities in this section capture the students' attention, stimulate their thinking, and help them access prior knowledge.

The lesson will begin as a whole class. To introduce the concept equivalent fractions, I will take a construction paper pizza and cut the pizza into quarters. One quarter of the pizza will be filled with construction paper pepperoni, another sausage, peppers, and mushrooms. I will then cut the quarters in half to make eights. The students will explore the equivalent fractions by assessing if the amount of pepperoni has changed. When comparing the equivalent fractions on the board, students will discover that multiplying the numerator and the denominator by the same number creates an equivalent fraction. By a show of hands, students will see if there would be enough pizza slices for each topping desired by each class member.

Estimated Time: 15 mins.

Essential question: How do equivalent fractions apply in the real world?

Student product or performance: Class construction of pizza model for equivalent fractions.

Activity 2. Exploration: In this section, students are given time to think, plan, investigate, and organize collected information.

The class will then split into two leveled groups. One group will be working independently and the other group will work with the teacher.

The two groups will be created using data collected immediately from an online quiz. The percentage students earn on this quiz will determine the two groups.

http://www.quiz-tree.com/Fractions_Fractions-3_2_MC-4.html

Estimated Time: 30 mins.

Exploration Strategy...

In pairs, students will be asked to create a picture and label at least four equivalent fractions using the computer program PIXIE. When finished students will be asked to explain their findings to another pair of students, emphasizing how to find an equivalent fraction.

Student Work and Support will include the Pixie graphic.

Activity 3. Explanation: Students are now involved in an analysis of their exploration. Their understanding is clarified and modified because of reflective activities.

When finished with assessment, students will watch a video from Kahn academy on simplifying fractions.

http://www.khanacademy.org/math/arithmetic/fractions/e/simplifying_fractions

In the mini-lesson with the teacher, students will use white boards to simplify fractions and become comfortable with the process. As an additional assessment for this lesson extension, students will be asked to create a real world word problem, which would use the process of simplifying fractions.

Estimated Time: 25 mins.

Thinking skills activities will take place in the min-lesson with the teacher.

Technology is included in the Khan academy video.

Activity 4. Extension: This section gives students the opportunity to expand and solidify their understanding of the concept and/or apply it to a real world situation.

Students will then apply the knowledge they have acquired with the real world problem of buying cheese. In pairs from each of the two groups students will solve one of the two real world problems below as a team and present their results to the class.

Estimated Time: 30 mins.

Problem Solving

You are a cheese shop manager. You are faced with purchasing cheese for future sales. You must determine the amount of each variety of cheese you need to buy based on the amount sold in the past. Once you have completed your PIXIE diagram, you will share your results with the rest of the class. Students will receive the following information:

Cheese Variety	Fraction of total sales for group 2	Fraction of total sales for group 1	Projected total Cheese Sales for Month	Total to be purchased of each variety for the month
Gorgonzola	25/100	15/60	300 pounds	
Cheddar	30/60	4/20	"	
Swiss	20/40	55/100	"	

Student product or performance: The solution will be presented to the class.

Activity 5. Evaluation: Evaluation occurs throughout the lesson. Scoring tools developed by teachers and students target what students must know and do. Consistent use of scoring tools improves learning.

Estimated Time: As needed

Scoring tool: Rubric based on products students created throughout the lesson.

BENCHMARKING:

Student Performance One: Students will construct a computer graphic using pixie with four equivalent fractions pictures and labels.

1. Assessment Benchmarking Example: Students in group 2 will make construction paper model of equivalent fractions using a construction paper pizza.

Student Performance Two: Students will solve the real world problem of ordering adequate product for a store using equivalent fractions.

2. Real World Benchmarking Example: A small group of students will present their finding for the class to learn from.

SCORING:

Holistic Rubric: Completing a Task	
Distinguished	<ul style="list-style-type: none">• The student completes all important components of the task and communicates ideas clearly.• The student demonstrates in-depth understanding of the relevant concepts and/or process.• Where appropriate, the student offers insightful interpretations or extensions (generalizations, applications, and analogies).
Proficient	<ul style="list-style-type: none">• The student completes most important components of the task and communicates clearly.• The student demonstrates understanding of major concepts even though she/he overlooks or misunderstands some less important ideas or details.
Apprentice	<ul style="list-style-type: none">• The student completes some important components of the task and communicates those clearly.• The student demonstrates that there are gaps in his/her conceptual understanding.
Novice	<ul style="list-style-type: none">• The student shows minimal understanding.• The student is unable to generate strategy; answers may display only recall effect, lack clear communication and/or be totally incorrect or irrelevant.
Source: Kentucky Department of Education	

METACOGNITION:

Cognitive Information: I will collect the following information from students orally after they finished sharing their solutions to the class.

1. Describe what skills you needed to complete this task.
2. Explain how you solved the goal, problem, or issue in this task.
3. Explain why you completed the task your way.

Students will end the lesson with a exit ticket with the following questions:

1. What did I learn today?
2. What part of the lesson was the easiest method for me to understand?
3. When will I use this still in the future?

RESULTS:

Analyze: I will examine the data in the chart to look for trends, contributing factors, and implications of student performance over a series of assessments of the same learning standard.

Assessment: Quiz: To reinforce the learning process, a student from group 1 would pair with a student from group 2 to share and explain their PIXIE diagram about finding an equivalent fraction. For data collection students would each complete a summative assessment quiz, comparable to the online formative quiz.

http://www.quiz-tree.com/Fractions_Fractions-3_3_MC-4.html

The success of the lesson will be evaluated with the following data. The chart below will allow us to compare the effectiveness of the two group model.

Student Name	Group #	Formative Score	Summative Score	Percentage Increase

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Keywords: *ccss OR kindergarten*