

EQuIP Review Feedback



Lesson/Unit Name: No Matter How You Slice It

Content Area: Mathematics

Grade Level: 6

Overall Rating:

E/I

Exemplar if Improved

Dimension I – Alignment to the Depth of the CCSS

<p><i>The lesson/unit aligns with the letter and spirit of the CCSS:</i></p> <ul style="list-style-type: none"><input type="checkbox"/> Targets a set of grade-level CCSS mathematics standard(s) to the full depth of the standards for teaching and learning.✓ Standards for Mathematical Practice that are central to the lesson are identified, handled in a grade-appropriate way, and well connected to the content being addressed.✓ Presents a balance of mathematical procedures and deeper conceptual understanding inherent in the CCSS.	<p>This lesson does target a specified CCSS mathematics standard (6.NS.A.1). The focus of this standard is the interpretation and computation of quotients of fractions in the context of word problems that involve the division of fractions by fractions. The first part of this lesson focuses on the division of whole numbers by unit fractions (5.NF.B.7.C) or whole numbers by fractions rather than fractions by fractions, and then leads into situations where fractions are being divided by fractions. This lesson has a convincing situation to motivate the need for fraction division. The slicing cheese model is accessible and powerful for understanding the concept of fraction division - measurement type. This would be a great first lesson to introduce students to fraction division. This lesson would not be sufficient for students to develop a complete understanding of fraction division, especially since the majority of the problems involve cheese slicing, and there is only one problem with a different (although similar) context. Further lessons are needed in order to extend students' understanding of situations in which fraction division is applicable.</p> <p>The Standards for Mathematical practice that are central to the lesson are not identified or discussed in the lesson. However, the tasks within the lesson are rich and challenging, and students will have to engage in the Mathematical Practices in order to complete the task successfully. For instance, the lesson requires students to engage in MP1 (Make sense of problems and persevere in solving them) by requiring students to apply mathematical reasoning to answer questions (e.g. "what do you need to know in order to tell how many sandwiches you can make?"). Making explicit mention of the Standards for Mathematical Practice at appropriate junctures in the lesson would greatly strengthen it in this area.</p> <p>This lesson will allow students to develop conceptual understanding of fraction division and the visual model of a length being divided into smaller, equal lengths in a compelling application. There are several problems so that students get to practice using this method several times. There is no development of a procedure to divide fractions, other than using a visual fraction model. Further lessons will be needed in order to develop an algorithm for fraction division, and to build student fluency in this procedure.</p>
<p>Rating: 2 – Meets many of the criteria in the dimension</p>	

Dimension II – Key Shifts the CCSS

<p><i>The lesson/unit reflects evidence of key shifts that are reflected in the CCSS:</i></p> <ul style="list-style-type: none">✓ Focus: Lessons and units targeting the major work of the grade provide an especially in-	<p>Focus: This lesson focuses on 6.NS.1, which is considered major content for the grade. Students are expected to develop a model for representing fraction division using the situation of slicing cheese on their own rather than being given one by the teacher. Division and number operations with fractions constitute a major work of the grade and are given in-depth</p>
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<p>depth treatment, with especially high expectations. Lessons and units targeting supporting work of the grade have visible connection to the major work of the grade and are sufficiently brief. Lessons and units do not hold students responsible for material from later grades.</p> <ul style="list-style-type: none"> ✓ Coherence: The content develops through reasoning about the new concepts on the basis of previous understandings. Where appropriate, provides opportunities for students to connect knowledge and skills within or across clusters, domains and learning progressions. ✓ Rigor: Requires students to engage with and demonstrate challenging mathematics with appropriate balance among the following: <ul style="list-style-type: none"> – Application: Provides opportunities for students to independently apply mathematical concepts in real-world situations and solve challenging problems with persistence, choosing and applying an appropriate model or strategy to new situations. – Conceptual Understanding: Develops students' conceptual understanding through tasks, brief problems, questions, multiple representations and opportunities for students to write and speak about their understanding. – Procedural Skill and Fluency: Expects, supports and provides guidelines for procedural skill and fluency with core calculations and mathematical procedures (when called for in the standards for the grade) to be performed quickly and accurately. 	<p>treatment in this lesson. There is sufficient emphasis on developing students' conceptual understanding and de-emphasis on students merely applying an algorithm. Students are not held responsible for material from later grades. Additional work focused on dividing fractions by fractions rather than dividing whole numbers by unit fractions would help to target this lesson on the specified standard.</p> <p>Coherence: This lesson is particularly strong in the area of coherence. From the beginning, it refers teachers to foundational matters in the area of division through its "Teacher Tune-Ups." It encourages teachers to avoid introducing the algorithm for doing fraction division and rather presents a way for reasoning about this based on the foundation set in previous grades that involve dividing a whole number by a unit fraction ("Division finds the missing number in multiplication"). The opportunities, therefore, for students to make connections within and across grade levels is evident in this lesson.</p> <p>Rigor: The motivation for the problem is a real-world application of fraction division. Students will have to persist in order to solve the more challenging problems during the "Pose a Problem" phase. Students will have to choose the model and strategy to solve the problems. Using the cheese-slicing context and a visual model will help students develop conceptual understanding of fraction division, albeit only measurement division. This lesson does not develop procedural fluency in fraction division, but that is not an issue because this lesson is introductory and conceptual in nature. While this lesson contains multiple opportunities for students to apply mathematical concepts in a real-world situation involving slicing cheese from a whole block, it lacks in providing opportunities for students to independently apply these concepts. Including different contexts (cutting logs, slicing bread) would provide more challenge for the students. Conceptual understanding is emphasized throughout the lesson from the questioning to the tasks that required students to create a poster (multiple representations). Additional opportunities for students to practice their mathematical knowledge and skills independently would strengthen the rigor in this lesson.</p>
<p>Rating: 3 – Meets most to all of the criteria in the dimension</p>	

Dimension III – Instructional Supports

<p><i>The lesson/unit is responsive to varied student learning needs:</i></p> <ul style="list-style-type: none"> ✓ Includes clear and sufficient guidance to support teaching and learning of the targeted standards, including, when appropriate, the use of technology and media. ✓ Uses and encourages precise and accurate mathematics, academic language, terminology and concrete or abstract representations (e.g., pictures, symbols, expressions, equations, graphics, models) in the discipline. ✓ Engages students in productive struggle through relevant, thought-provoking questions, problems and tasks that stimulate interest and elicit mathematical thinking. 	<p>The set up and instructions for using this lesson are very clear and detailed. It would be easy for both experienced and novice teachers to use. The explanation about the Strategic Teacher-Led Discussion is particularly well-developed and supportive of teachers who need guidance in how to implement discussion. The links available to "Teacher Tune-Ups" provide teachers support in understanding the prior knowledge needed to address this lesson successfully. Additionally, in the section of "Discussing Handout #1," there is a link to the 'meaning of the remainder' in the division of fractions. Media and technology in the form of slides and video clips are also provided. One area for improvement would be some guidance to teachers about how to engage with students or groups of students while they do the Pose a Problem worksheet. Also, it is unclear from the lesson instructions whether this worksheet is intended to be done alone or in collaboration with others.</p>
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<ul style="list-style-type: none"> ✓ Addresses instructional expectations and is easy to understand and use. ❑ Provides appropriate level and type of scaffolding, differentiation, intervention and support for a broad range of learners. <ul style="list-style-type: none"> – Supports diverse cultural and linguistic backgrounds, interests and styles. – Provides extra supports for students working below grade level. – Provides extensions for students with high interest or working above grade level. <p><u>A unit or longer lesson should:</u></p> <ul style="list-style-type: none"> ❑ Recommend and facilitate a mix of instructional approaches for a variety of learners such as using multiple representations (e.g., including models, using a range of questions, checking for understanding, flexible grouping, pair-share). ❑ Gradually remove supports, requiring students to demonstrate their mathematical understanding independently. ❑ Demonstrate an effective sequence and a progression of learning where the concepts or skills advance and deepen over time. ❑ Expect, support and provide guidelines for procedural skill and fluency with core calculations and mathematical procedures (when called for in the standards for the grade) to be performed quickly and accurately. 	<p>The questions throughout the lesson elicit mathematical thinking and promote conceptual understanding of division of fractions. The poster problem encourages students to use accurate terminology and pictorial representations to represent their solution. The lesson encourages the use of a visual fraction model which is a commonly used method of developing the idea of fraction division.</p> <p>Both the Pose a Problem task and the Workshop task require students to develop a representation and understanding of the division of fractions through a realistic and engaging context. Students will have to engage in productive struggle in order to develop a visual model and solution to the problems that are posed to them. The problems presented in this lesson tend to be repetitive, using the identical context of slicing cheese. Presenting additional scenarios that require division of fraction by a fraction would possibly increase the interest and level of productive struggle.</p> <p>The lesson is clearly laid out and therefore addresses instructional expectations. The description of the "one lesson in six phases" along with the icons is very user-friendly and provides an overall outline of the lesson format.</p> <p>There is no evidence in the lesson of differentiation and support for students from diverse cultural and linguistic backgrounds. There is no evidence of extensions for students above grade level. It would be helpful to include differentiation and supports for a wider variety of learners. The open-ended nature of the Workshop portion does allow for differentiation in that students get to choose the numbers they want to work with. Also, the introductory video in the Launch will help ELLs understand the context of the problems. It would be stronger with some specific mention of how to support those working above and below grade-level.</p>
<p>Rating: 2 – Meets many of the criteria in the dimension</p>	

Dimension IV – Assessment

<p><i>The lesson/unit regularly assesses whether students are mastering standards-based content and skills:</i></p> <ul style="list-style-type: none"> ❑ Is designed to elicit direct, observable evidence of the degree to which a student can independently demonstrate the targeted CCSS. ✓ Assesses student proficiency using methods that are accessible and unbiased, including the use of grade-level language in student prompts. ✓ Includes aligned rubrics, answer keys and scoring guidelines that provide sufficient guidance for interpreting student performance. <p><u>A unit or longer lesson should:</u></p> <ul style="list-style-type: none"> ❑ Use varied modes of curriculum-embedded assessments that may include pre-, formative, summative and self-assessment measures. 	<p>While there are opportunities for formative assessment throughout the lesson, this lesson does not contain an assessment component to elicit evidence of students being able to independently divide fractions. All work during this lesson is designed to be done collaboratively. Given that this is a single lesson designed to develop the conceptual basis for fraction division, and that students will not have enough experience to achieve mastery, assessing after just this lesson might be premature. Including an additional task that requires students to independently demonstrate mastery of the targeted CCSS would strengthen this lesson in the area of assessment.</p> <p>For the problems that students do work on collaboratively, there are answer keys provided. Within the commentary to the teacher, there are explanations of common misconceptions that might surface and suggestions for how to handle them. There are sample posters provided and a rubric-like chart on page 7, but this chart does not appear to be intended for assessment, but for deciding how to order presentations.</p> <p>Student self-assessment could be incorporated into the poster project by having them use their post it notes to respond to their own poster about their learning.</p>
<p>Rating: 2 – Meets many of the criteria in the dimension</p>	

Summary Comments

This lesson targets a CCSS standard, 6.NS.A.1, but does so to a limited degree. This is a great lesson to launch a unit on fraction division. Students engage in a rich task with a well-thought out context (slicing cheese) that lends itself to questions about fraction division. Its strength is in its emphasis on building conceptual understanding through questions that elicit mathematical thinking and reasoning. It also builds on the foundation of division by connecting division to multiplication and other previous concepts. Including additional opportunities for students to independently demonstrate their understanding and ability to apply this standard would increase the level of rigor. Expanding the real-world context of this lesson beyond what is presented would also increase the level of rigor. This lesson alone would not be sufficient to master 6.NS.1, nor does it seem to be intended to be, but could be used as a way to motivate and develop conceptual understanding of fraction division. A teacher would have to have further lessons ready in order for students to fully master 6.NS.1.

Rating Scales

Rating Scale for Dimensions I, II, III, IV:

3: Meets most to all of the criteria in the dimension

2: Meets many of the criteria in the dimension

1: Meets some of the criteria in the dimension

0: Does not meet the criteria in the dimension

Overall Rating for the Lesson/Unit:

E: Exemplar – Aligned and meets most to all of the criteria in dimensions II, III, IV **(total 11 – 12)**

E/I: Exemplar *if* Improved – Aligned and needs some improvement in one or more dimensions **(total 8 – 10)**

R: Revision Needed – Aligned partially and needs significant revision in one or more dimensions **(total 3 – 7)**

N: Not Ready to Review – Not aligned and does not meet criteria **(total 0 – 2)**

Rating Descriptors

Descriptors for Dimensions I, II, III, IV:

3: **Exemplifies CCSS Quality** - meets the standard described by criteria in the dimension, as explained in criterion-based observations.

2: **Approaching CCSS Quality** - meets many criteria but will benefit from revision in others, as suggested in criterion-based observations.

1: **Developing toward CCSS Quality** - needs significant revision, as suggested in criterion-based observations.

0: **Not representing CCSS Quality** - does not address the criteria in the dimension.

Descriptor for Overall Ratings:

E: **Exemplifies CCSS Quality** – Aligned and exemplifies the quality standard and exemplifies most of the criteria across Dimensions II, III, IV of the rubric.

E/I: **Approaching CCSS Quality** – Aligned and exemplifies the quality standard in some dimensions but will benefit from some revision in others.

R: **Developing toward CCSS Quality** – Aligned partially and approaches the quality standard in some dimensions and needs significant revision in others.

N: **Not representing CCSS Quality** – Not aligned and does not address criteria.