Math Distance Learning Lesson Sample

6th Grade Mathematics - Ratios, week 1 [Remote Learning]
The following sample lesson was adapted from Illustrative Mathematics 6th grade Unit 2, Lessons1-3 and follows the 5E Instructional Model - Engage, Explore, Explain, Elaborate, Evaluate.

Important Information:

- This lesson plan is designed to be a guide for teachers in developing high quality mathematics learning opportunities for a remote instruction format.
- Tasks and activities are intended to be used in both synchronous and asynchronous settings, with adaptations made to fit your classroom and student needs.
- Synchronous learning means the instructor(s) is in a virtual classroom setting, such as Zoom or Google Meets, interacting with the students in real time.
- While our current situation requires much flexibility on the part of adults to meet individual student needs, children of all ages need some structure and routine to feel safe. One idea is to have the same types of activities on the same days of the week. Another idea is to have synchronous learning meetings on the same days each week, and provide resources and information in the same place (website or Google Classroom) or in the same format (via email or blast).
- The lesson sample was designed around the 5 E instructional model (Engage, Explore, Explain, Elaborate, Evaluate) and the New Mexico Instructional Scope.
    - Keep in mind that the 5Es do not have to be a linear progression. Engaging is not separate from exploring. Exploring is not necessarily separate from explaining. Part of exploring requires elaborating. All of these elements require evaluating.
    - Each step informs the others, even when they are more than once removed.
    - This instructional model puts the teacher in the role of facilitator, as opposed to holder-of-knowledge, guiding students through their educational journey.
- This can be used with any virtual meeting platform that allows for small group breakouts.
- The tasks, agenda, and activities should be adapted to best meet your individual students' learning needs.

Other considerations:

- Have remote learning NORMS and practice them as you would in the classroom, maybe having students repeat the most important ones for each day's lesson.
- Remind students about virtual conference protocol (Zoom/Google Meets) - muting while listening, video on/off depending on situation or small group, etc.
- Keep students' SEL in mind as you are planning and interacting with students; think about daily/weekly check-ins and how to manage student personal needs with privacy.
- Inform students *and parents* of the planned schedule and any changes weekly.
- Be clear and concise about directions for tasks, activities completed asynchronously or outside of class time. Have directions available orally and in writing.

Math Distance Learning Lesson Sample

Day 1 - lesson 6.1

Standards Alignment (CCSS-M, NSQOL):	**Standards for Mathematical Practice (SMPs):**
6.RP.1 - **Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.** B2 - **The online teacher incorporates discipline-specific technologies, tools, and resources to meet individual learner needs.** D2 - **The online teacher engages learner agency**.	#2 - Reason abstractly and quantitatively. #3 - Construct viable arguments and critique the reasoning of others. #7 - Look for and make use of structure.

Content Learning Objectives:

1. I can develop a logical definition for the concept of a ratio and come to consensus with my small group to explain our idea, using ratio notation and giving an example.
2. I can justify my reasoning in answering comparison and ratio relationship questions, using mathematical language and notation.

Mathematical Language:	**Sample Higher Order Thinking Questions:**	**Other Considerations:**
Ratio Comparison Constant speed Constant rate For every ____, there was ____ Notation: a/b a:b a to b	• What evidence do you have to support that claim? • What strategy or approach did you use in your solution? • What are other ways to solve this problem? • How is this relevant to your everyday experiences?	*Accommodations and modifications:* All accommodations and modifications indicated in student IEPs will be followed and implemented. Enrich-extend challenge exercises as sponge activity; extended activities offered to Gifted students.

Unfinished Learning	**Future Learning**	**Enrichment**
5.NF.3 - interpret fractions as division, solve word problems of whole number division that result in a fraction 5.OA.3 - generate two numerical patterns with two different rules 4.MD.1 - conversion of measurement from larger units to smaller units 3.MD.6 - measure areas by counting squares	6.RP.3 - Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. 7.RP.1 - Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. 7.RP.2 - Recognize and represent proportional relationships between quantities. 7.RP.3 - Use proportional relationships to solve multistep ratio and percent problems.	Notating ratios in more than one way; including equivalent ratios in solutions Ratio projects http://www.scholastic.com/unexpectedmath/ratio-challenge/teachers-guide.htm For students that already understand the concept of a ratio:

Additional review topics could be additive reasoning, division with whole numbers, and/or multiplication with scaling. Pre-Diagnostic Assessment (only in Canvas)	HS.NQ.1 - Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	http://tasks.illustrativemathematics.org/content-standards/6/RP/A/2/tasks/77 http://tasks.illustrativemathematics.org/content-standards/6/RP/A/2/tasks/1611

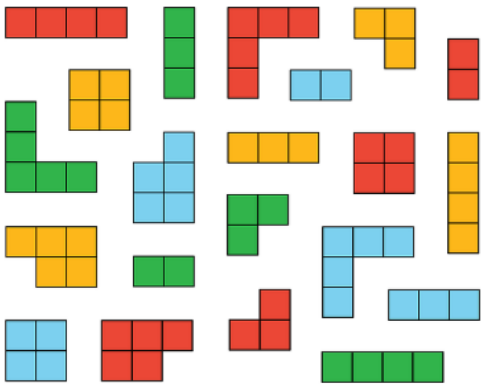
Learning Plan

*Students will need their journal/notebook or their Google drive Notes document for this lesson. (Teacher's view; Student view)

Engage - asynchronous/at home

Why is this stage important? *Giving students a chance to engage with the mathematics on their own terms both supports a positive mathematics experience and attitude, and encourages students to see math as existing beyond the classroom. Additionally, this will activate prior knowledge and allow students to make deeper connections. For teachers, this is an opportunity to gain an understanding of students' prior knowledge and identify areas for support. The goal is for students to reflect on past learning and question how it could be used to solve new problems.*

Task to be posted on Google Classroom (or Canvas), which will also send out an email with the task included. Students are to work independently of their peers but can discuss with parents and should document those discussions. This should take students around 10-15 minutes or less.

> Student-Facing Task Statement
>
> 
>
> 1. If you sorted this set by color, how many groups would you have?
> 2. If you sorted this set by area, how many groups would you have?
> 3. Think of a third way you could sort these figures. What categories would you use? How many groups would you have?

Additional task, optional:
The lesson also includes an activity that has students collect objects from around their house and sort them by various categorical characteristics. This can also be done over Zoom/Google Meet if it suits your student

needs.

Supporting unfinished learning, if needed:

a. https://tasks.illustrativemathematics.org/content-standards/6/RP/A/3/tasks/79
b. https://tasks.illustrativemathematics.org/content-standards/5/OA/B/3/tasks/1895

(60 minutes - synchronous session)

Explore - synchronous/class together (~25 minutes)

Why is this stage important? *As indicated by the name of this phase, students are to be given a chance to explore the concept more fully and with opportunities for collaboration with peers. By again working with ideas on their own terms, students enjoy a risk free zone in which they can begin to connect more deeply with the ideas being presented. A number of resources can be used here including more example scenarios presented in written format, videos of scenarios and problem solving opportunities, or working with manipulatives and tools that support deep understanding of the concepts.*

1. As a starter/Do Now, have students respond to a poll regarding their thinking about the Engage task. Post the questions from the task as a poll, with possible student answer choices. [2-3 min]
2. (After breakout room set up, instructions given/shared) In small groups, students will discuss their thinking around the task done at home and the spokesperson will be the student whose birthday is closest to Sept. 1. [5-7 min]
    a. Have them write down ways to sort the group that were thought of by more than one person. Have them discuss the word “compare”. (3 min for breakout rooms)
    b. When groups return from breakout rooms, spokespeople will share out. As comparisons are shared, write them (or type them) in different ways, making sure to label each number. Ask students what they think/talk about the ways you have written the ratios, relating to the comparison within each ratio.
    c. **Introduce the word RATIO and talk about how we use math terms that everyone agrees upon so that everyone knows what someone is talking about. Emphasize the connection between comparison and ratio
3. Another example scenario will be presented to the class to generate whole group discussion, and then have students talk more in small groups to answer questions/resolve problems in similar ratio scenarios. [10-15 minutes]
    a. Whole group - have students prepare the table in their journal/notebook before displaying the image of the paperclips (teacher’s collection). Use the sentence starters in the student-facing task to support students describing the ratios/comparisons they observe in the image of the paperclips.
    *be sure to highlight the need for labels on numbers.

category name			
category amount			

    b. Guide class discussion as students share their responses, highlighting the need for labels on numbers. (What does 6:4 mean? Six what? Four what?)
    c. When the class is ready, give breakout room instructions and put students in small groups. If time is running short, only give one link and have small groups choose two of the three questions to answer.

(*if your class has a handle on Zoom/Google Meet, students could choose the scenario they would like to work on and rename themselves to let the teacher know*.)

i. Have small groups choose a scenario, making sure that each scenario is chosen by at least two groups for comparison later.
   1. https://tasks.illustrativemathematics.org/content-standards/6/RP/A/1/tasks/76
   2. http://tasks.illustrativemathematics.org/content-standards/6/RP/A/1/tasks/2091

Explain - synchronous (~20 minutes)

Why is this stage important? *This is an opportunity for students to explain their thinking as it relates to the concept, and teachers can build on their discoveries to narrow the focus on the targeted learning. Teachers can help students synthesize new knowledge and ask questions if they need further clarification by using guided questioning techniques. For the Explain phase to be effective, students should share what they learned during the Explore phase before introducing technical information.*

4. As groups are returning from breakout rooms, post a link to the notes folder for this unit. Have a Notice/Wonder chart pasted in their Notes document (or have them create it if students are Google doc savvy) Guide the class through a discussion around the definition of a ratio, having students type it into their Notes page. [7-10 min]
   a. What do they notice about comparing numbers and ratios? What do they wonder?
   b. Add to the displayed Notice/Wonder chart for the class as students share their thoughts.
   c. Talk and have them talk about how ratios are important to daily living, different ways to express ratios, and what strategies we could use to solve problems with ratios. Model note-taking and encourage students to write things down in a manner that works for them. (*be sure to use precise mathematical vocabulary and insist on clear communication around mathematics ideas. To help students keep track, display/model note taking or highlighting/writing down important concepts that students need to remember.)
5. Using ratios in area - have students get out their grid paper (or printed grid worksheet if possible; could also use Xcel/Google sheets as grid paper) and outline a rectangle with an area of 24 units and 4x6 dimensions (may need to talk about what it means to have an area of 24 units). [10 min]
   a. Have students shade the squares within the outlined rectangle in a 2:1 ratio (2 colors such that one color appears twice as often). Ask them to show their shaded rectangles on camera and talk about the different ways to have a 2:1 ratio that students came up with.
   b. Ask students to think about other ways to have an area of 24. (may need to write/type these on the screen, such as 8x3, 2x12, etc.) Have them draw/outline a shape that has an area of 24 that is not 4x6, and then shade it in a 2:1 ratio.
   c. Have students show their new shapes on the camera, and talk about how each one has both an area of 24 and a shaded ratio of 2:1, or how it could be adjusted to meet those specs.

Elaborate - synchronous (~10 minutes)

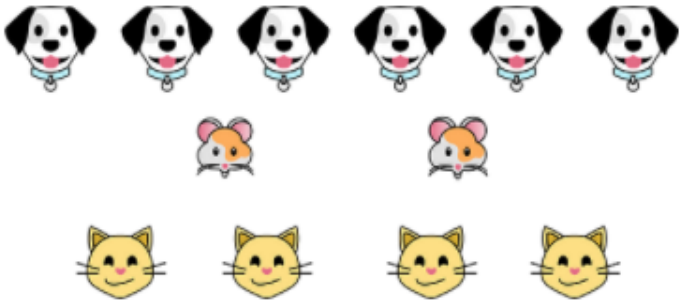
Why is this stage important? *To gain deeper understanding and further develop their skills, students need the opportunity to apply new learning to novel situations. This is also a chance for students to further consider problem solving strategies that have been discussed and narrow down those that seem efficient to them for use in future similar problem solving situations, as well as cement their knowledge before evaluation.*

6. Introduce the next task, and talk about how we were using a picture to do a ratio, and now we'll use a

ratio to create a picture. Also have students write the ratio in at least 2 ways to show what their picture represents: http://tasks.illustrativemathematics.org/content-standards/6/RP/A/1/tasks/2158

   a. Students will have independent thinking time, and if time, send to breakout rooms for them to discuss. If not, have students volunteer to share their thinking, and we will discuss as a class to support understanding of ratio language while answering the questions together.

7. Use the Cool Down here in small groups, one response with all names included. Can have them submit on Classroom, or in the Chat of the virtual platform.

> Student-Facing Task Statement
>
> Here is a collection of dogs, mice, and cats:
>
> 
>
> Write *two* sentences that describe a ratio of types of animals in this collection.

Evaluate - synchronous

Why is this stage important?

This stage is for the students to evaluate their learning, as well as to get feedback from the teacher. This is not just a chance for a worksheet that gets graded but should be accomplished with consideration from both the teacher and the student before continuing to build on conceptual understanding. This could also mean that students are involved in determining how their understanding will be assessed.

Students will complete the practice on their own and will submit work via Google Classroom, including reflection on the learning, their thinking, and the work being submitted. Give feedback on submitted work/reflection, and set a meeting time for small group questions based on trends in student work.

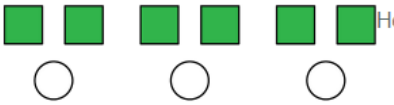
Practice sheet from IM:
https://nmped.instructure.com/courses/14/quizzes/129?module_item_id=359

Extra practice sheet, if needed:
https://www.commoncoresheets.com/Math/Ratios/Finding%20Ratios%20Visual/English/1.pdf

Summary to share with students/parents:

Lesson 1 Summary

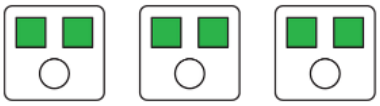
A **ratio** is an association between two or more quantities. There are many ways to describe a situation in terms of ratios. For example, look at this collection:



Here are some correct ways to describe the collection:

- The ratio of squares to circles is $6:3$.
- The ratio of circles to squares is 3 to 6.

Notice that the shapes can be arranged in equal groups, which allow us to describe the shapes using other numbers.



- There are 2 squares for every 1 circle.
- There is 1 circle for every 2 squares.

Glossary Terms

ratio

A ratio is an association between two or more quantities.

For example, the ratio $3:2$ could describe a recipe that uses 3 cups of flour for every 2 eggs, or a boat that moves 3 meters every 2 seconds. One way to represent the ratio $3:2$ is with a diagram that has 3 blue squares for every 2 green squares.

Math Distance Learning Lesson Sample

Day 2 - lesson 6.2

Standards Alignment (CCSS-M, NSQOL):	**Standards for Mathematical Practice (SMPs):**
6.RP.1 - **Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.** B2 - **The online teacher incorporates discipline-specific technologies, tools, and resources to meet individual learner needs.** D2 - **The online teacher engages learner agency**.	#3 - Construct viable arguments and critique the reasoning of others. #5 - Use appropriate tools strategically. #7 - Look for and make use of structure.

Content Learning Objectives:

1. I can describe, orally and in writing, associations between quantities using ratio language such as "for every __, there is __" and "the ratio of a:b is __:__".
2. I can present ratio relationships in diagrams, labeling with mathematical language and ratio notation.

Mathematical Language:	**Sample Higher Order Thinking Questions:**	**Other Considerations:**
Ratio Comparison Constant speed Constant rate For every ____, there was ____ Notation: a/b a:b a to b	• What evidence do you have to support that claim? • What strategy or approach did you use in your solution? • What are other ways to solve this problem? • How is this relevant to your everyday experiences?	*Accommodations and modifications:* All accommodations and modifications indicated in student IEPs will be followed and implemented. Enrich-extend challenge exercises as sponge activity; extended activities offered to Gifted students.
Unfinished Learning	**Future Learning**	**Enrichment**
5.NF.3 - interpret fractions as division, solve word problems of whole number division that result in a fraction 5.OA.3 - generate two numerical patterns with two different rules 4.MD.1 - conversion of measurement from larger units to smaller units 3.MD.6 - measure areas by counting squares Additional review topics could be additive reasoning, division with whole	6.RP.3 - Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. 7.RP.1 - Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. 7.RP.2 - Recognize and represent proportional relationships between quantities. 7.RP.3 - Use proportional relationships to solve multistep ratio and percent problems. HS.NQ.1 - Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units	Notating ratios in more than one way; including equivalent ratios in solutions Ratio projects http://www.scholastic.com/unexpectedmath/ratio-challenge/teachers-guide.htm For students that already understand the concept of a ratio:

numbers, and/or multiplication with scaling.	consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	http://tasks.illustrativemathematics.org/content-standards/6/RP/A/2/tasks/77 http://tasks.illustrativemathematics.org/content-standards/6/RP/A/2/tasks/1611

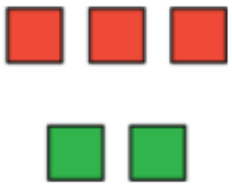
Learning Plan

*Students will need their journal/notebook or their Google drive Notes document for this lesson. (Teacher's view; Student view)

Engage - asynchronous/at home

Task to be posted on Google Classroom (or Canvas), which will also send out an email with the task included. Students are to work independently of their peers but can discuss with parents and should document those discussions. This should take students around 5 minutes or less.

- Post the image of the diagram below with the following questions:
  - What could this diagram represent?
  - What ratio is represented here?
  - What are two other ways to write that ratio?



(60 minutes - synchronous session)

Explore - synchronous/class together (~28 minutes)

1. As a starter/Do Now, have students respond to a poll regarding their thinking about the Engage task. Post the questions from the task as a poll, with possible student answer choices. Discuss poll responses as a class and what each means for the diagram shown. [2-3 min]
2. Whole group-breakout rooms-Whole group: Display the image of the snap cubes. Give students a minute or so to think about the cubes in the picture and to jot down a few notes about the stacks of cubes. Answer any questions about the set up, color, or number of cubes in each stack. Ask students to pick two stacks, and draw a diagram and write a ratio showing the number of cubes in their two chosen stacks. [7-10 min]
   a. Breakout rooms: Partners - students will discuss the ratios and diagrams they came up with and will choose one to share for the pair. They will write a sentence describing the ratio between their chosen pair of stacks.
   b. Back to whole group: Invite a few pairs to share out. Press for details as they explain, asking them to clarify, elaborate, or give examples. Revoice student ideas to demonstrate mathematical language.
      i. Discuss whether or not students were able to interpret one another's drawings accurately. If not, what may have led to confusion?
      ii. If no one wrote ratios in which all numbers are the same (e.g., 1 to 1, or 3:3), ask if the following sentence is acceptable and why or why not: "The ratio of green cubes to blue cubes is 2 to 2." If students suspect that ratios are only used to associate quantities with different values, clarify that this is not the case.
3. Another example scenario will be presented to the class to generate whole group discussion, and then have students talk more in small groups to answer questions/resolve problems in similar ratio

scenarios. [10-15 minutes]

a. Whole group - (this could be distributed before class time; if not, students can respond in their journals/notebooks) Introduce the task about baking bread with the given statement (A bread recipe calls for 5 cups of flour and 2 teaspoons of yeast.), and ask students to draw the given scenario. Take a minute to allow students to show their diagrams and discuss any misconceptions, talk about similarities between diagrams shown. http://tasks.illustrativemathematics.org/content-standards/6/RP/A/tasks/2157
b. When the class is ready, give breakout room instructions and put students in small groups. Have small groups do parts (a) and (b), attempting (c) if time allows. Let students know that two groups will talk about their answer to part (a) and another two groups will talk about their answer to part (b).
c. Back to whole group: Have groups share out their responses to parts (a) and (b), guiding discussion to highlight accurate diagrams with batches indicated. (introducing equivalent ratios) Do part (c) as a class, allowing groups that attempted it to lead the discussion. Clear up any misconceptions about drawings and how some students created multiple batches.

Explain - synchronous (~17 minutes)

4. As the discussion from the bread problem is coming to an end, transition to the next task - Elena's paint. First show the statement with the ratio, and have students draw a diagram in their journal. Show the given diagram and allow students to adjust their diagrams. Address any questions or comments as a class.
    a. Whole group - as a class, choose the statements about Elena's paint ratio that are correct. Allow students to share their choices and thinking before talking about what each means. If needed, hint that there are two incorrect statements.
    b. Small group breakouts - explain that each small group will answer the second part of the activity about Jada's paste mixture. As a group, they will enter their diagrams and statements in a Google doc shared with the teacher (or Jamboard or other group work platform).
    c. Whole group - as students return, have one group's work displayed for discussion. Highlight efficient diagrams, and discuss statements given. Correct any that may be inaccurate, with discussion.

Elaborate - synchronous (~15 minutes)

5. Introduce the next task, http://tasks.illustrativemathematics.org/content-standards/6/RP/A/tasks/2152
    a. Students will have independent thinking time, and if time, send to breakout rooms for them to discuss. If not, have students volunteer to share their thinking, and we will discuss as a class to support understanding of ratio language while answering the questions together.
6. Cool Down in small groups, one response with all names included. Can have them submit on Classroom, or in the Chat of the virtual platform. http://tasks.illustrativemathematics.org/content-standards/6/RP/A/tasks/61
7. Give instructions for the practice page. Go over any questions.

Evaluate - asynchronous

Students will complete the practice on their own and will submit work via Google Classroom, including reflection on the learning, their thinking, and the work being submitted. Give feedback on submitted work/reflection, and set a meeting time for small group questions based on trends in student work.

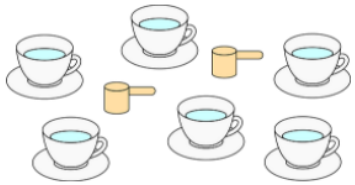
Practice sheet from IM:
https://curriculum.illustrativemathematics.org/MS/teachers/1/2/2/practice.html
Optional other task:
http://tasks.illustrativemathematics.org/content-standards/6/RP/A/tasks/2164

Summary to share with students/parents:

Lesson 2 Summary

Ratios can be represented using diagrams. The diagrams do not need to include realistic details. For example, a recipe for lemonade says, "Mix 2 scoops of lemonade powder with 6 cups of water."

Instead of this:



We can draw something like this:

This diagram shows that the ratio of cups of water to scoops of lemonade powder is 6 to 2. We can also see that for every scoop of lemonade powder, there are 3 cups of water.

Day 3 - lesson 6.3 [video demonstration for this lesson]

Standards Alignment (CCSS-M, NSQOL):

6.RP.1 - **Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.**

B2 - **The online teacher incorporates discipline-specific technologies, tools, and resources to meet individual learner needs.**
D2 - **The online teacher engages learner agency**.

Standards for Mathematical Practice (SMPs):

#2 - Reason abstractly and quantitatively.
#3 - Construct viable arguments and critique the reasoning of others.
#7 - Look for and make use of structure.

Content Learning Objectives:

1. I can explain equivalent ratios in terms of multiple batches of a recipe using mathematical language and diagrams of ratio relationships.

2. I can justify my reasoning in answering ratio questions, using mathematical language, ratio notation, and diagrams of ratios.

Mathematical Language:
Ratio
Comparison
Constant speed
Constant rate
For every ____, there was ____

Notation:
a/b a:b a to b

Sample Higher Order Thinking Questions:
- What evidence do you have to support that claim?
- What strategy or approach did you use in your solution?
- What are other ways to solve this problem?
- How is this relevant to your everyday experiences?

Other Considerations:
Accommodations and modifications:
All accommodations and modifications indicated in student IEPs will be followed and implemented.
Enrich-extend challenge exercises as sponge activity; extended activities offered to Gifted students.

Unfinished Learning
5.NF.3 - interpret fractions as division, solve word problems of whole number division that result in a fraction
5.OA.3 - generate two numerical patterns with two different rules
4.MD.1 - conversion of measurement from larger units to smaller units
3.MD.6 - measure areas by counting squares

Additional review topics could be additive reasoning, division with whole numbers, and/or multiplication with scaling.

Future Learning
6.RP.3 - Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
7.RP.1 - Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
7.RP.2 - Recognize and represent proportional relationships between quantities.
7.RP.3 - Use proportional relationships to solve multistep ratio and percent problems.
HS.NQ.1 - Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

Enrichment
Notating ratios in more than one way; including equivalent ratios in solutions

Ratio projects

http://www.scholastic.com/unexpectedmath/ratio-challenge/teachers-guide.htm

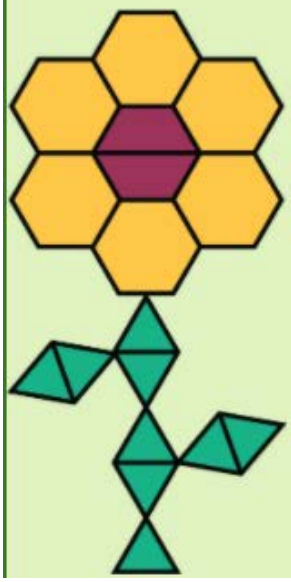
For students that already understand the concept of a ratio:
http://tasks.illustrativemathematics.org/content-standards/6/RP/A/2/tasks/77

http://tasks.illustrativemathematics.org/content-standards/6/RP/A/2/tasks/1611

Learning Plan
*Students will need their journal/notebook or their Google drive Notes document for this lesson.
(Teacher's view; Student view)

Engage - asynchronous/at home
Task to be posted on Google Classroom (or Canvas), which will also send out an email with the task included. Students are to work independently of their peers but can discuss with parents and should document those discussions. This should take students around 5 minutes or less.

This flower is made up of yellow hexagons, red trapezoids, and green triangles.



1. Write sentences to describe the ratios of the shapes that make up this pattern.
2. How many of each shape would be in two copies of this flower pattern?

(60 minutes - synchronous session)

Explore - synchronous/class together (~25 minutes)

1. As a starter/Do Now, have students share their sentences written to describe the pattern in the flower image by typing the chat. Have students share their thinking to generate discussion around the ratios. Then have a student share their response to the second question and go over any questions or comments from the class. [2-3 min]
2. Whole group-breakout rooms-Whole group: http://tasks.illustrativemathematics.org/content-standards/6/RP/A/tasks/2164 [10-12 min]
    a. The task will be introduced in whole group, with part (a) done together as a class. The goal is for students to see the reasoning behind equivalent ratios and how multiplication/division can get us to an equivalent ratio.
    b. In small groups, students will do parts (c), (d), and (e), making notes about everyone's thinking in the group. Part (e) should involve coming to consensus as a small group.
    c. When students return, have someone in the group type their definition of equivalent ratios. *Make sure to tell them when to press Enter. They should type it in the box and wait for Enter so that groups are sharing at the same time.
3. Another example scenario will be presented to the class to generate whole group discussion and support learning from the breakout room experience. [7-10 min] http://tasks.illustrativemathematics.org/content-standards/6/RP/A/tasks/2156
    a. Introduce the task by talking about regular tea versus sweet tea. Do part (a) together as a class, and allow students to share their thinking. Explain the directions for small groups.
    b. Breakout rooms - in small groups, students will do parts (b) and (c). One person in the group should be the scribe to collect all members' ideas in a group Google doc.

Explain - synchronous (~20 minutes)

4. As groups are returning from breakout rooms, have a Notice/Wonder chart displayed for them to copy into their notebook. Choose one or two groups' responses to be shared with the group (no names). Once they have prepared their N/W chart, display the first chosen small group responses. [6-8 min]
    a. Have students write at least one thing they notice and at least one thing they wonder from the given response, part (b). Discuss first what students noticed, then what they wondered and highlight any instances of where the two might overlap. Do this again for the second small group responses as needed.
    b. Repeat for part (c).
    c. Guide the discussion to help all students understand that equivalent ratios used in cooking results in the same taste, supporting the idea that equivalent ratios are indeed equal (leads to proportional reasoning).
5. Next task - Cookie Recipe: Introduce with the question "What does it mean to *double* a recipe?" If several students catch on quickly, ask "What about *triple*?" [10-12 min]
    a. As a class, walk through drawing a diagram for the given ratio (5:2). Once students have their diagrams ready, work through questions #2 and #3 as a class.
    b. Explain the breakout room directions for small groups - answering question #4. In breakout rooms, students will work together to answer the last two questions, exploring the idea of creating more and more batches based on doubling, tripling, etc., the amounts in a recipe.
    c. While in breakout rooms, they also need to choose a spokesperson to share their ideas in the Chat box.

Elaborate - synchronous (~10 minutes)

6. Invite groups to share their responses and diagrams with the class. A key point to emphasize during discussion is that when we double (or triple) a recipe, we also have to double (or triple) each ingredient. Record a working (but not final) definition for equivalent ratio that can be displayed for at least the next several lessons.
7. Use the Cool Down here in small groups, one response with all names included. Can have them submit on Classroom, or in the Chat of the virtual platform.
   Student-Facing Task Statement: *Usually when Elena makes bird food, she mixes 9 cups of seeds with 6 tablespoons of maple syrup. However, today she is short on ingredients. Think of a recipe that would yield a smaller batch of bird food but still taste the same. Explain or show your reasoning.*

Evaluate - asynchronous

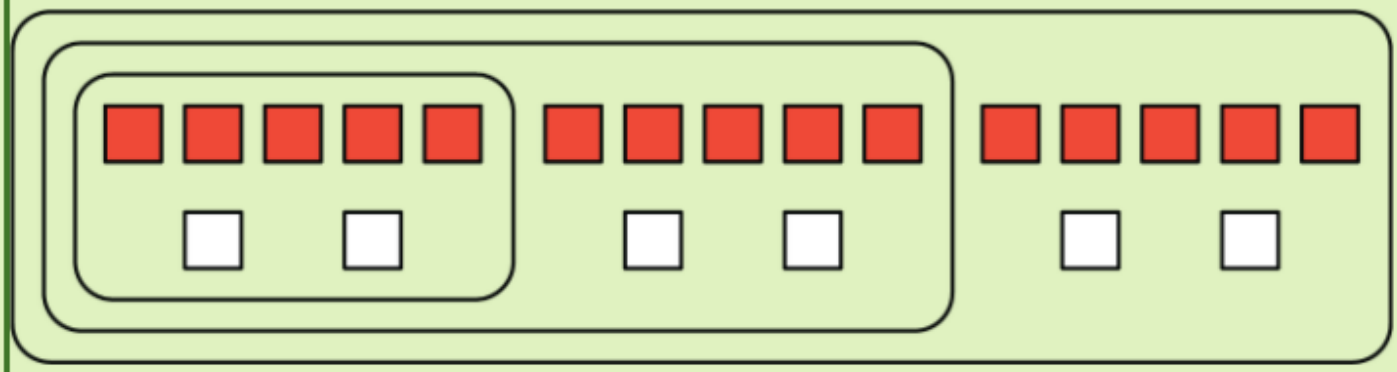
Practice will be real-life: Have students work with a parent/guardian to half/double/triple a recipe that has been made previously in the home. Students could either video themselves working with their parents or document on paper/Google doc to show the discussion and math used in the cooking. Upon completion, the video or document should be shared via Google Classroom or email.

Summary to share with students/parents:

A recipe for fizzy juice says, "Mix 5 cups of cranberry juice with 2 cups of soda water."

To double this recipe, we would use 10 cups of cranberry juice with 4 cups of soda water. To triple this recipe, we would use 15 cups of cranberry juice with 6 cups of soda water.

This diagram shows a single batch of the recipe, a double batch, and a triple batch:



Expand Image

We say that the ratios $5:2$, $10:4$, and $15:6$ are **equivalent**. Even though the amounts of each ingredient within a single, double, or triple batch are not the same, they would make fizzy juice that tastes the same.

Additional resources:

Math content/instruction

https://www.map.mathshell.org/stds.php?standardid=1706

http://wodb.ca/

Using the 5Es instructional model

https://lesley.edu/article/empowering-students-the-5e-model-explained

https://study.com/academy/lesson/5e-lesson-plan-template-for-math.html

https://www.knowatom.com/blog/what-is-the-5e-instructional-model