Lesson 10

Comparing Situations by Examining Ratios

Goals

- Choose and create diagrams to help compare two situations and explain whether they happen at the same rate.
- Justify that two situations do not happen at the same rate by finding a ratio to describe each situation where the two ratios share one value but not the other, that is, $a:b$ and $a:c$, or $x:z$ and $y:z$.
- Recognize that a question asking whether two situations happen "at the same rate" is asking whether the ratios are equivalent.

Learning Targets

- I can decide whether or not two situations are happening at the same rate.
- I can explain what it means when two situations happen at the same rate.
- I know some examples of situations where things can happen at the same rate.

Student Learning Goal

Let's use ratios to compare situations.

Access for Students with Diverse Abilities

- Engagement (Activity 2)
- Action and Expression (Activity 3)

Access for Multilingual Learners

- MLR1: Stronger and Clearer Each Time (Activity 3)

Instructional Routines

- 5 Practices
- Notice and Wonder

Lesson Narrative

In this lesson, students compare ratios to see if two situations involve the **same rate**. For instance:

- Two people run different distances in the same amount of time. Do they run at the same speed?
- Two people pay different amounts for different numbers of items. Do they pay the same cost per item?
- Two recipes for a drink are given. Do they taste the same?

In each case, the numbers are purposely chosen so that reasoning directly with equivalent ratios is a more appealing method than finding how-much-for-one and then scaling. The reason for this is to reinforce the concept that equivalent ratios describe the same rate, before formally introducing the notion of unit rate and methods for calculating it. Students can use any method, however. Regardless of their chosen approach, they need to be able to explain their reasoning in the context of the problem.

Lesson Timeline

Warm-up	Activity 1	Activity 2	Activity 3	Lesson Synthesis	Cool-down (Assessment)
5 mins	15 mins	15 mins	15 mins	10 min	5 mins

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Warm-up

Notice and Wonder: Treadmill Displays

5 min

Activity Narrative

This *Warm-up* familiarizes students with the context of running on a treadmill and the quantitative data it displays before they solve problems about running speed in the next activity.

When students articulate what they notice and wonder, they have an opportunity to attend to precision in the language they use to describe what they see. They might first propose less formal or imprecise language, and then restate their observation with more precise language in order to communicate more clearly.

Launch

Arrange students in groups of 3. Ask students what they know about treadmills. If not already mentioned in their responses, explain that a treadmill is an exercise machine for walking or running. Point out that while the runner does not actually go anywhere on a treadmill, a computer inside the treadmill keeps track of the distance traveled as if the runner were running outside.

This (optional) video shows a person starting a treadmill and walking at a constant speed for a few seconds.

Video 'Treadmill' available here: **player.vimeo.com/video/304136549**.

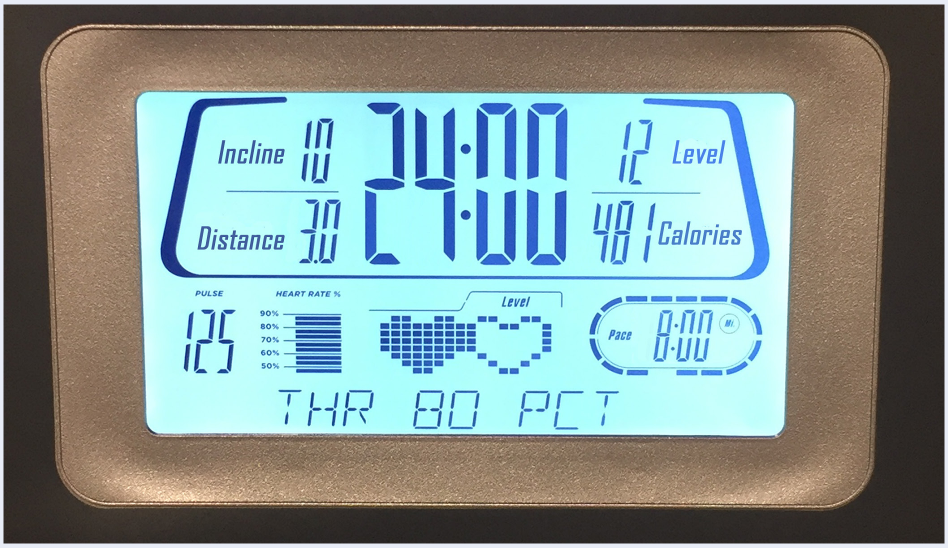
Give students a minute of quiet time to observe the images.

Ask students to be prepared to share at least one thing that they notice and one thing that they wonder about the picture. Ask them to give a signal when they have noticed or wondered about something.

Student Task Statement

What do you notice? What do you wonder?

Mai's Treadmill Display



Instructional Routines

Notice and Wonder

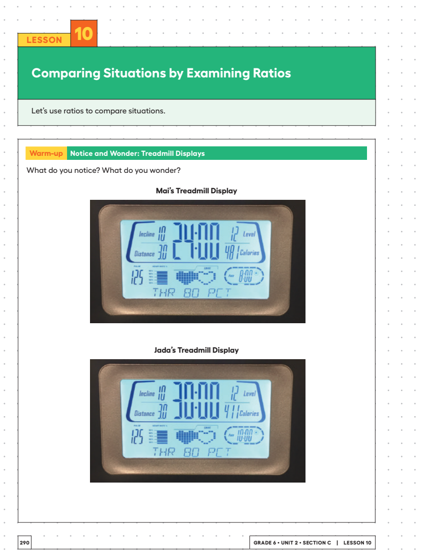
ilclass.com/r/10694948

Please log in to the site before using the QR code or URL.

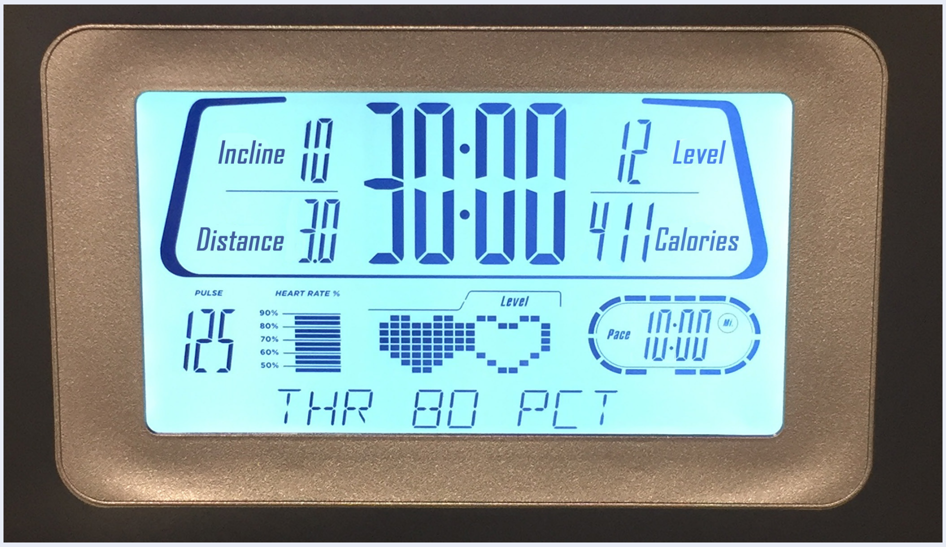
Building on Student Thinking

Because a person running on a treadmill does not actually go anywhere, it may be challenging to think about a distance covered. If this comes up, suggest that students think about running the given distances outside on a straight, flat road at a constant speed.

Student Workbook


LESSON 10
Comparing Situations by Examining Ratios
Let's use ratios to compare situations.
Warm-up Notice and Wonder: Treadmill Displays
What do you notice? What do you wonder?
Mai's Treadmill Display
Jada's Treadmill Display
GRADE 6 • UNIT 2 • SECTION C | LESSON 10

Jada's Treadmill Display



Students may notice:

- The displays show Mai's and Jada's workouts.
- A bunch of different measurements are shown: incline, distance, level, calories, pulse, heart rate, and pace.
- Both displays show 10 for incline, 3.0 for distance, 12 for level, 125 for pulse, and 80% for heart rate.
- Mai's display shows 24:00 for time, 8:00 for pace, and 481 for calories. Jada's display shows 30:00 for time, 10:00 for pace, and 411 for calories.

Students may wonder:

- In what units are incline, distance, and time measured?
- What does pace mean? Is it different from speed?
- Who is running faster?

Activity Synthesis

Ask students to share the things they noticed and wondered. Record and display their responses without editing or commentary. If possible, record the relevant reasoning on or near the images. Next, ask students,

"Is there anything on this list that you are wondering about now?"

Encourage students to observe what is on display and respectfully ask for clarification, point out contradicting information, or voice any disagreement.

If no students mention the speed of each runner, ask them what they can tell about it from the displays. Point out that Mai's display shows 24 minutes as the running time and 3 miles as the distance run, and Jada's display shows 30 minutes as the running time and 3 miles as the distance run. Tell students that they'll think more about what these quantities tell us about the runners' speed in the next activity.

Activity 1

How Do They Compare?

15 min

Activity Narrative

There is a digital version of this activity.

In this activity, students work with pairs of ratios involving distance run and elapsed time to determine which of two runners ran faster. In making comparisons, students interpret objects with equivalent distance-time ratios as having the same speed or moving "at the **same rate**."

In the first question, students compare two distance-time ratios in which one quantity (distance) has the same value and the other quantity (time) has different values. In the second question, students compare distance-time ratios in which neither quantities have the same value but the values in one ratio are multiples of those in the other.

There are several ways to reason about each situation, with or without using diagrams, as shown in the sample student responses.
To reason about the second questions, students may:

- Draw number line diagrams to see if Han and Tyler's distance-to-time ratios are equivalent.
- Multiply the values in one ratio by the same number to see if they obtain the values in the other ratio.
- Find the distance for 1 unit of time in each person's run and compare them. To make this approach less attractive, the numbers have been deliberately chosen so Han and Tyler's running time per kilometer ($4\frac{2}{7}$ minutes) is not a whole number.

In the digital version of the activity, students can choose to use an applet to create double number lines to represent given quantities, explore the problems, and solidify their thinking. The applet is similar to those in earlier lessons.

Launch

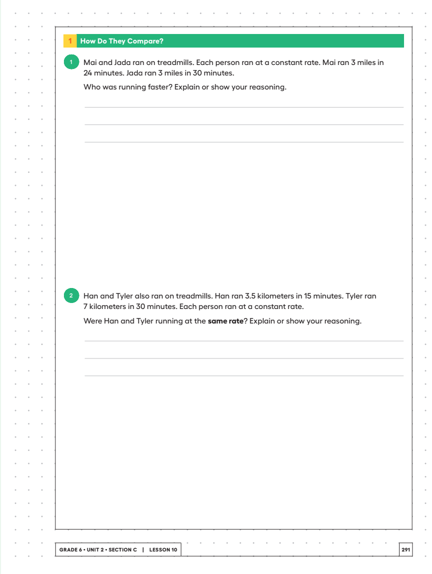
Give students 2 minutes of quiet think time to complete the first question.

Then faciliate brief discussion. Invite students who use different strategies to share their responses.

If no students use a double (or triple) number line diagram to make an argument, illustrate one of their explanations using a diagram. Remind students that even though a double (or triple) number line diagram is not always necessary, it can be a helpful tool to support arguments about ratios in different contexts.

Before students proceed to the next question, ask students if Mai and Jada were running at the **same rate** and why or why not. Students are likely to observe that two things traveling at the same speed (or the same distance in the same amount of time) are happening at the same rate, and that Mai and Jada were not running at the same rate. Highlight that when situations can be described by ratios that are equivalent, we say that they happen "at the same rate."

Student Workbook



Student Task Statement

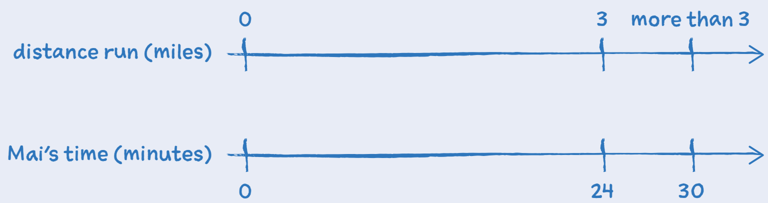
1. Mai and Jada ran on treadmills. Each person ran at a constant rate. Mai ran 3 miles in 24 minutes. Jada ran 3 miles in 30 minutes.

   Who was running faster? Explain or show your reasoning.

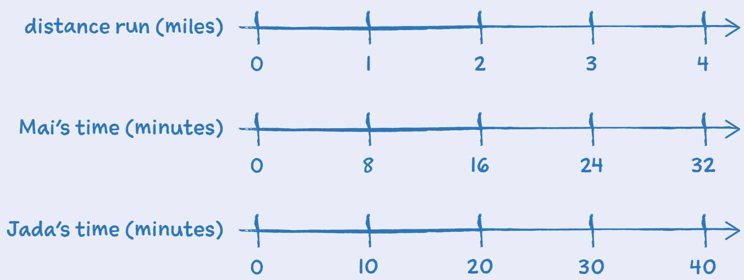
   Mai ran faster.

   Sample reasoning:

   - Mai ran 3 miles in less time than it took Jada to run 3 miles.
   - If Mai could run 3 miles in 24 minutes, she would run more than 3 miles in 30 minutes. This means she ran faster than Jada, who ran 3 miles in 30 minutes.



   - Mai ran 3 miles in 24 minutes, so she ran 1 mile in 8 minutes. Jada ran 3 miles in 30 minutes, so she ran 1 mile in 10 minutes. Mai took less time per mile, so she ran faster.



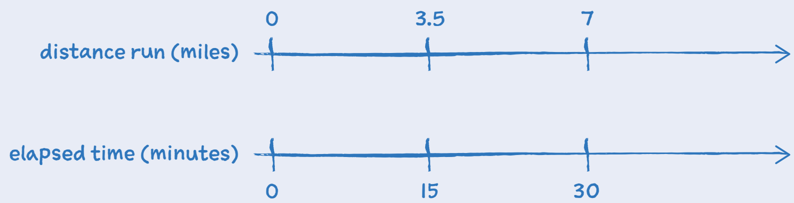
2. Han and Tyler also ran on treadmills. Han ran 3.5 kilometers in 15 minutes. Tyler ran 7 kilometers in 30 minutes. Each person ran at a constant rate.

   Were Han and Tyler running at the **same rate**? Explain or show your reasoning.

   Yes, Han and Tyler ran at the same rate.

   Sample reasoning:

   - Seven is twice 3.5, and 30 is twice 15. Tyler ran twice the distance Han ran and took twice as much time, so they ran at the same rate.
   - If Han ran for twice as much time or 30 minutes, he'd run twice 3.5, which is 7 kilometers as well.



Activity Synthesis

Invite students to share how they determined if Han and Tyler ran at the same rate. Draw students' attention to the ways in which equivalent ratios are used to make one of the corresponding quantities—either the distance or the elapsed time—the same in both situations. For instance, we can find how far Han would run in 30 minutes and compare it with Tyler's 30-minute run, or how far Tyler would run in 15 minutes and compare it with Han's 15-minute run. Emphasize that doing so can help us see if the situations involve the same rate.

Activity 2: Optional

Concert Tickets

15 min

Activity Narrative

There is a digital version of this activity.

In this activity, students encounter the idea of "same rate" in a cost context. Students have previously reasoned about prices of different numbers of items. They have interpreted the phrase "at this rate" in terms of equivalent ratios, building their intuition for what it means to "pay at the same rate." This activity reinforces the idea that paying at the same rate means paying the same unit price.

As in the previous activity, students compare ratios in which neither quantity in one ratio has the same value as in the other, but the values in one ratio are multiples of those in the other.

Monitor for different ways in which students reason about whether the ratios are equivalent. Here are some strategies they may use, from less efficient to more efficient:

- Find the dollar value for 1 ticket in each purchase and compare them. To make this approach less attractive, the numbers have been deliberately chosen so that the cost of a ticket ($\$15\frac{2}{3}$) is not a whole number.
- Draw number line diagrams.
- Multiply the values in one ratio by the same number to see if they obtain the values in the other ratio.

In the digital version of the activity, students can choose to use an applet to create double number lines to represent given quantities, explore the problems, and solidify their thinking. The applet is similar to those in earlier lessons.

Launch

Give students 2–3 minutes of quiet think time to complete the activity and then time to share their explanation with a partner.

Select a few students to share different approaches in a later discussion.

Instructional Routines

5 Practices

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Access for Students with Diverse Abilities (Activity 1, Synthesis)

Engagement: Develop Effort and Persistence.

Provide tools to facilitate information processing or computation, enabling students to focus on key mathematical ideas. For example, allow students to use partially labeled diagrams, calculators, or other digital tools to support their reasoning.

Supports accessibility for: Memory, Conceptual Processing

Student Workbook

2 Concert Tickets

Diego paid $47 for 3 tickets to a concert. Andre paid $141 for 9 tickets to a concert. Did they pay at the same rate? Explain or show your reasoning.

3 Sparkling Orange Juice

Lin and Noah each have their own recipe for making sparkling orange juice.

- Lin mixes 3 liters of orange juice with 4 liters of soda water.
- Noah mixes 4 liters of orange juice with 5 liters of soda water.

How do the two mixtures compare in taste? Explain your reasoning.

Are You Ready for More?

1. How can Lin make her sparkling orange juice taste the same as Noah's just by adding more of one ingredient? How much will she need?
2. How can Noah make his sparkling orange juice taste the same as Lin's just by adding more of one ingredient? How much will he need?

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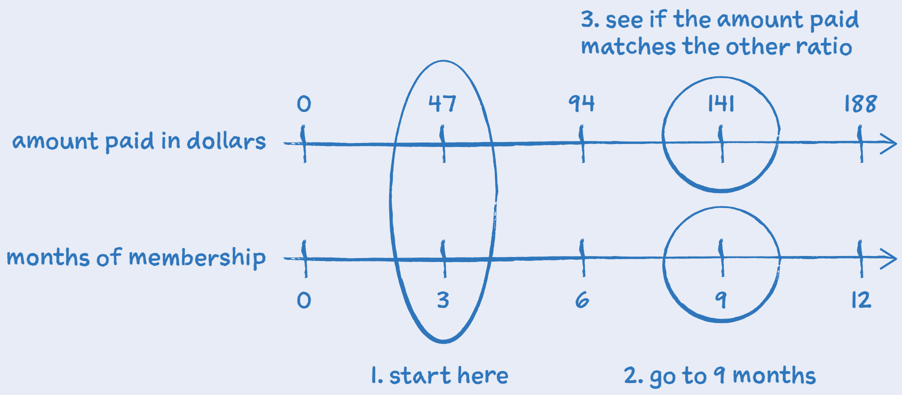
Student Task Statement

Diego paid $47 for 3 tickets to a concert. Andre paid $141 for 9 tickets to a concert. Did they pay at the same rate? Explain or show your reasoning.

Yes, they paid at the same rate.

Sample reasoning:

- Using a double number line diagram, we can see that the ratio of $47 to 3 tickets is equivalent to $141 to 9 tickets.



- Nine is $3 \cdot 3$ and 141 is $3 \cdot 47$. If Diego bought 9 tickets, it would cost $141, which is what Andre paid.
- If Andre bought only 3 tickets, then he would pay $141 \div 3$ or 47, which is the same price that Diego paid for 3 tickets.

Activity Synthesis

Invite previously selected students to share their reasoning. Sequence the discussion of strategies in the order listed in the *Activity Narrative*.

Connect the different responses to the learning goals by asking questions such as:

- *"What does it mean for Andre and Diego to be paying at the same rate?"*

  The ratios of dollars paid to tickets bought are equivalent.

- *"What are some ways of using equivalent ratios to see if Diego and Andre are paying at the same rate?"*

  One way is to find the price for 9 tickets that is equivalent to Diego's 49 to 3 dollars-to-tickets ratio, and then compare it with Andre's ratio. Another way is to find the price for 3 tickets that is equivalent to Andre's 147 to 9 dollars-to-tickets ratio, and then compare it with Diego's ratio.

- *"When comparing two ratios, why might it be helpful to make one quantity in the two situations the same?"*

  It would make it easier to see if the ratios are equivalent. If the two situations were happening at the same rate, when one quantity in both situations is the same, the other quantity also has to be the same.

Emphasize that making one of the corresponding quantities the same—either the number of tickets or the cost in this case—allows us to more easily compare the other quantity and tell whether the situations involve the same rate.

Activity 3
Sparkling Orange Juice

15 min

Activity Narrative

There is a digital version of this activity.

In this activity, students compare the tastes of two sparkling orange juice mixtures, which involves reasoning about whether the two situations involve equivalent ratios. The problem is more challenging because no values of the quantities match or are multiples of one another. Instead of finding an equivalent ratio for one recipe so that it matches the other, students need to do so for *both* recipes.

To answer the question, students can either make the values of the soda water match and then compare the orange juice amounts, or make the orange juice amounts match and compare the values for soda water. Again, they may use a double number line, multiplication, and possibly finding how much of one quantity per 1 unit of the other quantity.

Launch

Introduce the task by saying that some people make sparkling orange juice by mixing orange juice and soda water. Ask students to predict how the drink would taste if we mixed a huge amount of soda water with just a *little bit* of orange juice (it would not have a very orange-y flavor), or the other way around.

Explain that they will now compare the tastes of two sparkling orange juice recipes. Remind them that we previously learned that making larger or smaller batches of the same recipe does not change its taste.

Give students quiet think time to complete the activity and then time to share their explanation with a partner.

Instructional Routines

MLR1: Stronger and Clearer Each Time

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Access for Students with Diverse Abilities (Activity 3, Student Task)

Action and Expression: Internalize Executive Functions.

Provide students with printed double number lines to represent Lin's and Noah's recipes.

Supports accessibility for: Language; Organization

Access for Multilingual Learners (Activity 3, Student Task)

MLR1: Stronger and Clearer Each Time.

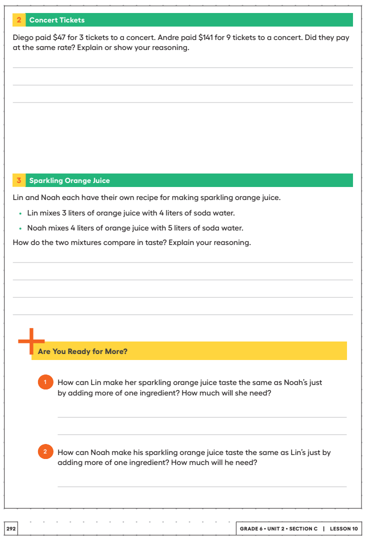
Before the whole-class discussion, give students time to meet with 2–3 partners to share and get feedback on their first draft response to the question "How do the two mixtures compare in taste?" Invite listeners to ask questions and give feedback that will help their partner clarify and strengthen their ideas and writing. Give students 3–5 minutes to revise their first draft based on the feedback they receive.

Advances: Writing, Speaking, Listening

Building on Student Thinking

Some students may say that these two recipes would taste the same because they each use 1 more liter of soda water than orange juice (an additive comparison instead of a multiplicative comparison). Remind them of when we made batches of drink mix, and that mixtures have the same taste when mixed in equivalent ratios.

Student Workbook



2 Concert Tickets

Diego paid $47 for 3 tickets to a concert. Andre paid $141 for 9 tickets to a concert. Did they pay at the same rate? Explain or show your reasoning.

3 Sparkling Orange Juice

Lin and Noah each have their own recipe for making sparkling orange juice.

- Lin mixes 3 liters of orange juice with 4 liters of soda water.
- Noah mixes 4 liters of orange juice with 5 liters of soda water.

How do the two mixtures compare in taste? Explain your reasoning.

Are You Ready for More?

1. How can Lin make her sparkling orange juice taste the same as Noah's just by adding more of one ingredient? How much will she need?
2. How can Noah make his sparkling orange juice taste the same as Lin's just by adding more of one ingredient? How much will he need?

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Student Task Statement

Lin and Noah each have their own recipe for making sparkling orange juice.

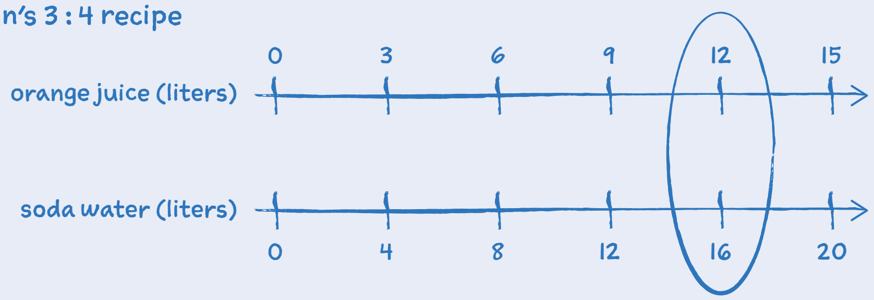
- Lin mixes 3 liters of orange juice with 4 liters of soda water.
- Noah mixes 4 liters of orange juice with 5 liters of soda water.

How do the two mixtures compare in taste? Explain your reasoning.

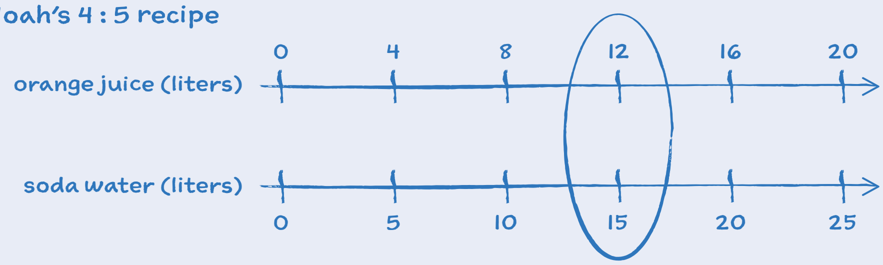
Sample responses and reasoning:

- Lin's mixture tastes a little more like soda water, and Noah's mixture tastes a little more like orange juice. If we use 12 liters of orange juice, we need 16 liters of soda water with Lin's recipe and 15 liters of soda water with Noah's recipe. Lin's mixture uses more soda water so it has a weaker orange flavor.

Lin's 3 : 4 recipe

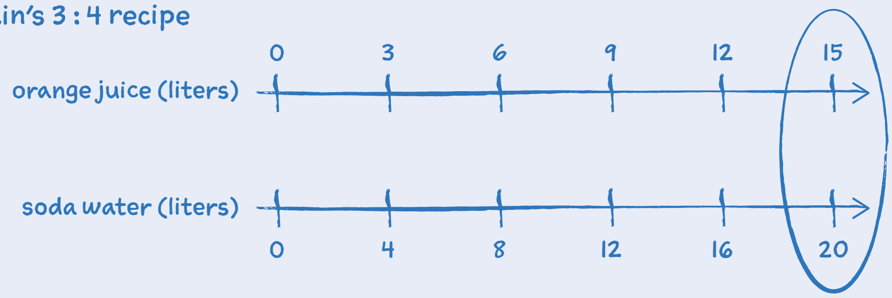


Noah's 4 : 5 recipe



- The mixtures do not taste the same. If we use 20 liters of soda water, we need 15 liters of orange juice with Lin's recipe and 16 liters of orange juice with Noah's recipe, so Noah's mixture has a stronger orange flavor.

Lin's 3 : 4 recipe



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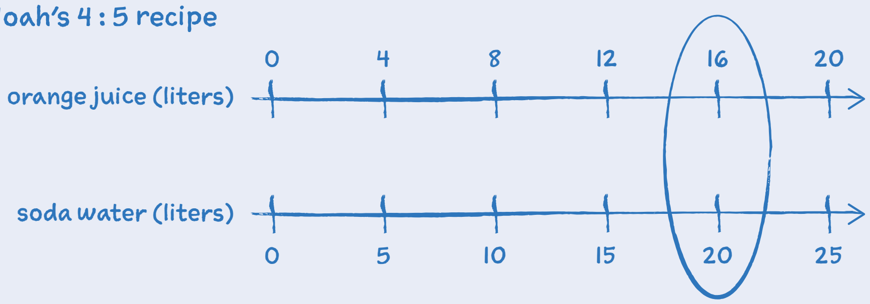


Are You Ready for More?

1. How can Lin make her sparkling orange juice taste the same as Noah's just by adding more of one ingredient? How much will she need?

   Sample response: If Lin adds $\frac{1}{5}$ liter of orange juice, then the ratio of juice to sparkling water will be $3\frac{1}{5}:4$. If we multiply each number by 5, we will have 16:20, which is equivalent to Noah's ratio.

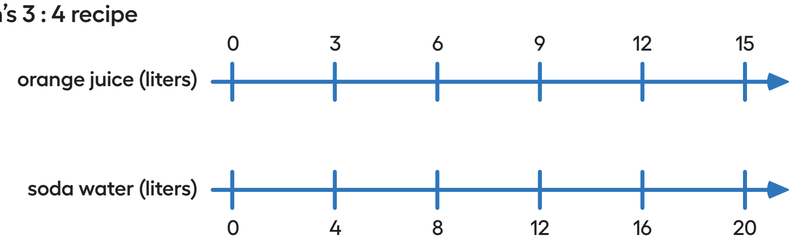
2. How can Noah make his sparkling orange juice taste the same as Lin's just by adding more of one ingredient? How much will he need?

   Sample response: If Noah adds $\frac{1}{3}$ liter of sparkling water, then the ratio of juice to sparkling water will be $4:5\frac{1}{3}$. If we multiply each number by 3, we will have 12:16, which is equivalent to Lin's ratio.

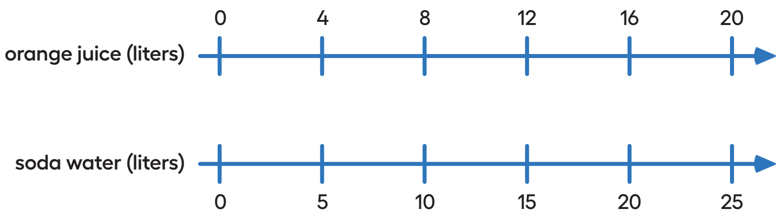
Activity Synthesis

Display two double number line diagrams for all to see: one that represents batches of Lin's 3:4 recipe and another that represents batches of Noah's 4:5 recipe. Extend the number lines to show enough batches of each recipe to be able to make comparisons.

Lin's 3 : 4 recipe



Noah's 4 : 5 recipe



Ask students to explain how they can tell that the 4:5 recipe has a stronger orange flavor. Elicit both explanations: comparing the amount of soda water for the same amount of orange juice, and the other way around. Ensure that students can articulate why each way of comparing means that the second recipe has a stronger orange flavor.

If any students calculated a unit rate for each recipe, consider inviting them to share, but support them with their choice of words. It is important to say, for example,

"In Lin's recipe, there is $\frac{3}{4}$ or 0.75 cup of orange juice per cup of soda water, but in Noah's recipe, there is $\frac{4}{5}$ or 0.8 cup of orange juice per cup of soda water."

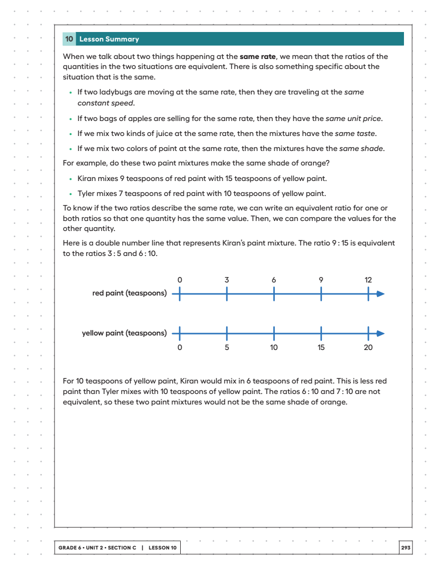
A student with this response would be comparing the number of cups of orange juice for every 1 cup of soda water in each mixture.

Ask students:

"Did Lin and Noah mix orange juice and soda water at the same rate? Why or why not?"

Highlight that the ingredients were not mixed at the same rate because the ratios of orange juice to soda water in the two recipes are not equivalent. As a result, the mixtures don't taste the same.

Student Workbook


10 Lesson Summary

When we talk about two things happening at the **same rate**, we mean that the ratios of the quantities in the two situations are equivalent. There is also something specific about the situation that is the same.

- If two ladybugs are moving at the same rate, then they are traveling at the *same constant speed*.
- If two bags of apples are selling for the same rate, then they have the *same unit price*.
- If we mix two kinds of juice at the same rate, then the mixtures have the *same taste*.
- If we mix two colors of paint at the same rate, then the mixtures have the *same shade*.

For example, do these two paint mixtures make the same shade of orange?

- Kiran mixes 9 teaspoons of red paint with 15 teaspoons of yellow paint.
- Tyler mixes 7 teaspoons of red paint with 10 teaspoons of yellow paint.

To know if the two ratios describe the same rate, we can write an equivalent ratio for one or both ratios so that one quantity has the same value. Then, we can compare the values for the other quantity.

Here is a double number line that represents Kiran's paint mixture. The ratio 9 : 15 is equivalent to the ratios 3 : 5 and 6 : 10.

For 10 teaspoons of yellow paint, Kiran would mix in 6 teaspoons of red paint. This is less red paint than Tyler mixes with 10 teaspoons of yellow paint. The ratios 6 : 10 and 7 : 10 are not equivalent, so these two paint mixtures would not be the same shade of orange.

Lesson Synthesis

In this lesson, we figured out whether two situations happen at the same rate. This can be done by comparing the values of one quantity in the ratio when the values of the other quantity are the same. To do that, it's helpful to generate equivalent ratios.

Briefly review the strategies used in the activities in this lesson.

"How did we know whether the people on the treadmill were running at the same speed?"

We checked whether they ran different distances in the same amount of time or ran the same distance in different amounts of time.

"How did we know that the people paid the same rate for the concert tickets?"

We figured out how much one person would have paid for 9 tickets if he paid at the same rate as for 3 tickets. We compared that amount to what the other person paid for 9 tickets.

"How did we know that the sparkling orange juice recipes did not taste the same?"

We found equivalent ratios so we could compare orange juice for the same amount of soda water or compare soda water for the same amount of orange juice.

"How were all these problems alike?"

We used equivalent ratios to make one part of the ratio the same and compared the other part.

Lesson Summary

When we talk about two things happening at the **same rate**, we mean that the ratios of the quantities in the two situations are equivalent. There is also something specific about the situation that is the same.

- If two ladybugs are moving at the same rate, then they are traveling at the *same constant speed.*
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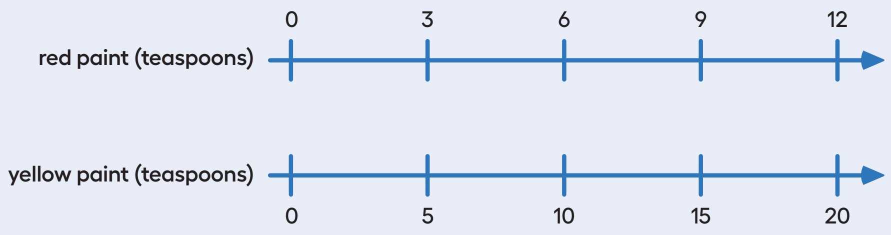


For 10 teaspoons of yellow paint, Kiran would mix in 6 teaspoons of red paint. This is less red paint than Tyler mixes with 10 teaspoons of yellow paint. The ratios 6:10 and 7:10 are not equivalent, so these two paint mixtures would not be the same shade of orange.

Cool-down

Comparing Runs

5 min

Student Task Statement

Andre ran 2 kilometers in 15 minutes, and Jada ran 3 kilometers in 20 minutes. Both ran at a constant speed.

Did they run at the *same* speed? Explain your reasoning.

They did not run at the same speed.

Sample reasoning:

- Andre would have run 6 kilometers in 45 minutes, and Jada would have run 6 kilometers in 40 minutes. Jada completes the 6 kilometers in less time, so she runs at a faster speed than Andre runs.
- Andre would have run 8 kilometers in 60 minutes, and Jada would have run 9 kilometers in 60 minutes. Jada travels further in the same amount of time, so she runs at a faster speed than Andre runs.

These examples explain why Jada runs faster and also explain why the two runners did not run at the same speed.

Responding To Student Thinking

Press Pause

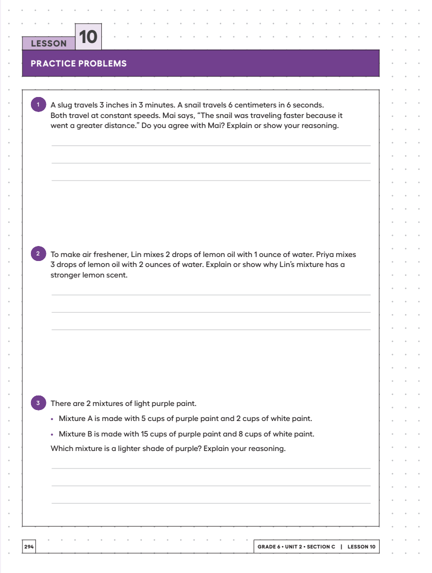
If most students struggle with comparing rates, make time to revisit how to interpret rates represented in different ways and how to compare them. For example, do this optional activity and prompt students to discuss possible ways to make comparisons before performing calculations or creating a representation:

Unit 2, Lesson 10, Activity 3 Concert Tickets

Practice Problems

7 Problems

Student Workbook



LESSON 10

PRACTICE PROBLEMS

1. A slug travels 3 inches in 3 minutes. A snail travels 6 centimeters in 6 seconds. Both travel at constant speeds. Mai says, “The snail was traveling faster because it went a greater distance.” Do you agree with Mai? Explain or show your reasoning.

2. To make air freshener, Lin mixes 2 drops of lemon oil with 1 ounce of water. Priya mixes 3 drops of lemon oil with 2 ounces of water. Explain or show why Lin’s mixture has a stronger lemon scent.

3. There are 2 mixtures of light purple paint.
   - Mixture A is made with 5 cups of purple paint and 2 cups of white paint.
   - Mixture B is made with 15 cups of purple paint and 8 cups of white paint.

   Which mixture is a lighter shade of purple? Explain your reasoning.

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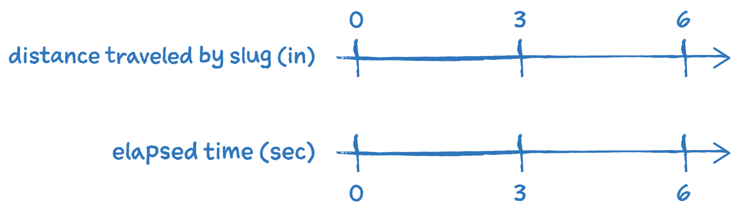
Problem 1

A slug travels 3 inches in 3 minutes. A snail travels 6 inches in 6 minutes. Both travel at constant speeds. Mai says, “The snail was traveling faster because it went a greater distance.” Do you agree with Mai? Explain or show your reasoning.

I disagree

Sample reasoning:

- The slug and the snail are both traveling 1 centimeter per second. They are traveling at the same speed.
- The double number line for the slug shows that in 6 seconds it also travels 6 centimeters.



Problem 2

To make air freshener, Lin mixes 2 drops of lemon oil with 1 ounce of water. Priya mixes 3 drops of lemon oil with 2 ounces of water. Explain or show why Lin’s mixture has a stronger lemon scent.

Sample responses:

- Priya’s mixture uses $1\frac{1}{2}$ drops of lemon oil per ounce of water, which is less lemon oil per ounce of water than Lin’s.
- If Lin doubles the amount of water to 2 ounces, she’d use 4 drops of lemon oil to make her air freshener smell the same as her original mixture. This is more lemon oil than in Priya’s 2 ounces of water.

Problem 3

There are 2 mixtures of light purple paint.

- Mixture A is made with 5 cups of purple paint and 2 cups of white paint.
- Mixture B is made with 15 cups of purple paint and 8 cups of white paint.

Which mixture is a lighter shade of purple? Explain your reasoning.

Mixture B is lighter

Sample reasoning:

- Mixture A contains 2.5 cups of purple paint per cup of white paint. Mixture B contains only 1.875 cups of purple paint per cup of white paint. Less purple paint for the same amount of white paint will result in a lighter shade of purple.
- The ratio of purple paint to white paint in Mixture A is 5:2. The ratio of purple paint to white paint in Mixture B is 15:8. The amount of purple paint in Mixture B is 3 times the amount of Mixture A, but the amount of white paint in B is 4 times the amount of A.

Problem 4

Tulip bulbs are on sale at Store A at 5 for $11.00, and the regular price at store B is 6 for $13. Is each store pricing tulip bulbs at the same rate? Explain how you know.

no

Sample reasoning: At store A, 30 bulbs would cost $66, but at store B, 30 bulbs would cost $65.

Problem 5

from Unit 2, Lesson 9

A plane travels at a constant speed. It takes 6 hours to travel 3,360 miles.

a. What is the plane's speed in miles per hour?

560 mile per hour, because $3,360 \div 6 = 560$

b. At this rate, how many miles can it travel in 10 hours?

5,600 miles, because $10 \cdot 560 = 5,600$

Problem 6

from Unit 2, Lesson 8

A pound of ground beef costs $5. At this rate, what is the cost of:

a. 3 pounds?

$15, because $5 \cdot 3 = 15$

b. $\frac{1}{2}$ pound?

$2.50, because $\frac{1}{2} \cdot 5 = 2\frac{1}{2}$

c. $\frac{1}{4}$ pound?

$1.25, because $\frac{1}{4} \cdot 5 = 1\frac{1}{4}$

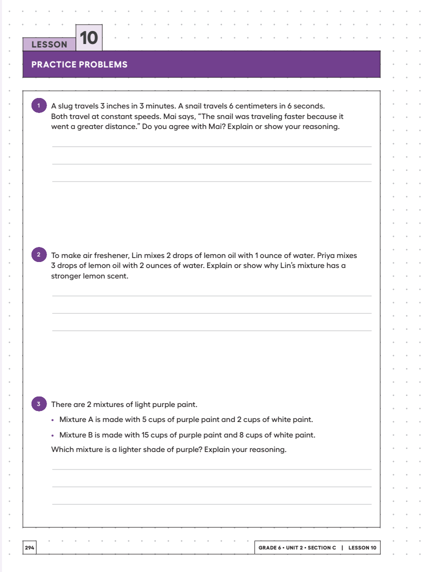
d. $\frac{3}{4}$ pound?

$3.75, three times the cost of $\frac{1}{4}$ pound

e. $3\frac{3}{4}$ pounds?

$18.75, the total cost of 3 pounds and $\frac{3}{4}$ pound

Student Workbook


LESSON 10

PRACTICE PROBLEMS

1 A slug travels 3 inches in 3 minutes. A snail travels 6 centimeters in 6 seconds. Both travel at constant speeds. Mai says, "The snail was traveling faster because it went a greater distance." Do you agree with Mai? Explain or show your reasoning.

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Which mixture is a lighter shade of purple? Explain your reasoning.

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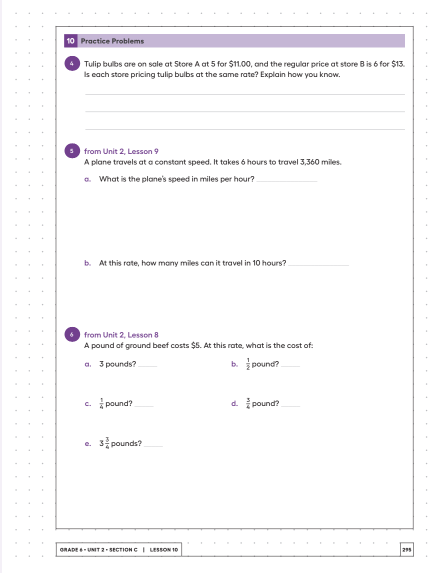
Student Workbook


10 Practice Problems

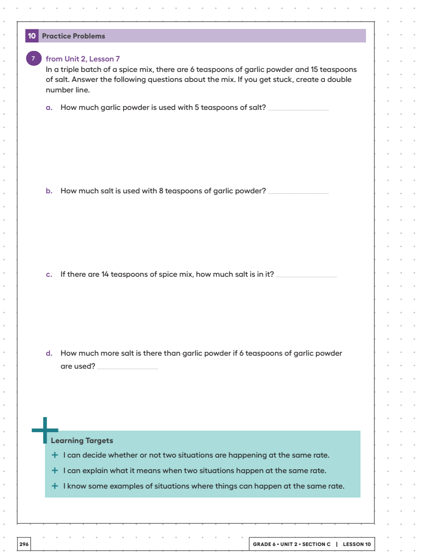
4 Tulip bulbs are on sale at Store A at 5 for $11.00, and the regular price at store B is 6 for $13. Is each store pricing tulip bulbs at the same rate? Explain how you know.

5 from Unit 2, Lesson 9
A plane travels at a constant speed. It takes 6 hours to travel 3,360 miles.
a. What is the plane's speed in miles per hour?
b. At this rate, how many miles can it travel in 10 hours?

6 from Unit 2, Lesson 8
A pound of ground beef costs $5. At this rate, what is the cost of:
a. 3 pounds?
b. $\frac{1}{2}$ pound?
c. $\frac{1}{4}$ pound?
d. $\frac{3}{4}$ pound?
e. $3\frac{3}{4}$ pounds?

GRADE 6 • UNIT 2 • SECTION C | LESSON 10 295

Student Workbook



10 Practice Problems

7 from Unit 2, Lesson 7

In a triple batch of a spice mix, there are 6 teaspoons of garlic powder and 15 teaspoons of salt. Answer the following questions about the mix. If you get stuck, create a double number line.

a. How much garlic powder is used with 5 teaspoons of salt? ______

b. How much salt is used with 8 teaspoons of garlic powder? ______

c. If there are 14 teaspoons of spice mix, how much salt is in it? ______

d. How much more salt is there than garlic powder if 6 teaspoons of garlic powder are used? ______

Learning Targets

+ I can decide whether or not two situations are happening at the same rate.
+ I can explain what it means when two situations happen at the same rate.
+ I know some examples of situations where things can happen at the same rate.

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Problem 7

from Unit 2, Lesson **7**

In a triple batch of a spice mix, there are 6 teaspoons of garlic powder and 15 teaspoons of salt. Answer the following questions about the mix. If you get stuck, create a double number line.

a. How much garlic powder is used with 5 teaspoons of salt?

2 teaspoons

b. How much salt is used with 8 teaspoons of garlic powder?

20 teaspoons

c. If there are 14 teaspoons of spice mix, how much salt is in it?

10 teaspoons

d. How much more salt is there than garlic powder if 6 teaspoons of garlic powder are used?

9 teaspoons