# Grade 4

# **Mathematics Standard**

• Explain why a fraction  $\frac{a}{b}$  is equivalent to a fraction  $\frac{(n \times a)}{(n \times b)}$  by using visual

fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

# **Mathematical Practices**

- Make sense of problems and persevere in solving them.
- Construct viable arguments and critique the reasoning of others.

# Vocabulary

- equivalent fractions
- area

# **Materials**

- Artistic Arrangements student page, one for each group
- chart paper
- · crayons, colored pencils
- colored dot stickers, two of any color
- scissors (optional)

# Task 28 Artistic Arrangements

Represent equivalent fractions

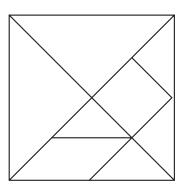
## **TASK**

#### **Artistic Arrangements**

Mr. Pica's 4th-grade art class is learning about the use of positive and negative space. Their assignment is to cover  $\frac{3}{4}$  of the area of the square shown in Figure 9.2, using it as their positive space. They need to leave the rest of the area blank for their negative space.

Complete Mr. Pica's assignment using your choice of colors. You may add additional lines inside the square to suit your design. You must explain how the positive space in your artwork is equivalent to  $\frac{3}{4}$  using words, pictures, and equations.

Figure 9.2 Mr. Pica's Square





#### ALTERNATE LEARNING ENVIRONMENT

Families or providers who might be facilitating this task with students at home may consider using space on a sidewalk or in a driveway to duplicate the square design above. Different colored chalk may be used to color  $\frac{3}{4}$  of the area of the square.

#### TASK PREPARATION

- Think about how to organize students into heterogeneous groups of four.
- Prepare copies of the student page.



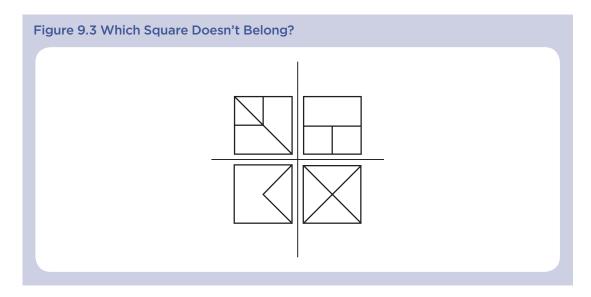


# ALTERNATE LEARNING ENVIRONMENT

This Google Doc version (https://bit.ly/3gFokTh) could be assigned by teachers who might be facilitating this task in a remote learning environment.

## **LAUNCH**

1. Project the image shown in Figure 9.3 and ask, "Which one doesn't belong?" "Why?"



- 2. Call on several students to share their ideas and justify their thinking. Prompt students to identify fractional parts and to be specific when explaining their reasoning. For example, students may say that  $\square$  doesn't belong because while  $\frac{1}{4}$  can be shown in the areas of the other squares, you can only see partitions of  $\frac{1}{8}$  and  $\frac{3}{8}$  on this square.
- 3. Have students repeat/revoice their peers' ideas and invite them to add to or ask questions about another student's ideas.

# **FACILITATE**

- 1. Display the task and organize the class into groups of four.
- 2. Distribute the student page, chart paper, crayons, and colored pencils. Students may use chart paper to enlarge the picture.
- 3. Monitor student work and listen to student discussions as they collaborate on a design that shows  $\frac{3}{8}$ .
- 4. Interview.
  - » "What fraction does this part of your design represent?"
  - » "What fraction would describe the amount of negative space in your design? How do you know?"
  - » "What equation(s) did you write to prove that your design equals  $\frac{3}{4}$  of positive space?"
- 5. Set aside time so that you can display group work around the room.

Chapter 9: Number and Operations—Fractions: Equivalence, Comparing, and More 155



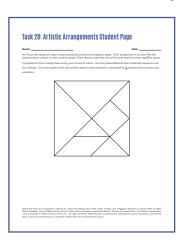
## **CLOSE: MAKE THE MATH VISIBLE**

- 1. Conduct a Something Similar and Something Different Gallery Walk.
- 2. Have students walk around the room to find peers' work that is similar or different from their group's work. Assign one colored dot to describe work that is similar and assign another color for students to use to signify work that is different.
- 3. Start the whole class discussion by reviewing work that students noted was similar to their own, then move to work that was noted as different from most groups (perhaps a work that was highly creative).
- 4. Focus the discussion on justifications about how each design encompasses  $\frac{3}{4}$  positive space and highlight these as groups discuss their work or their peers' work.

# **TASK 28: ARTISTIC ARRANGEMENTS STUDENT PAGE**



To download printable resources for this task, visit resources.corwin.com/ ClassroomReadyMath/4-5



POST-TASK NOTE	ES: REFLECTION & N	NEXT STEPS	

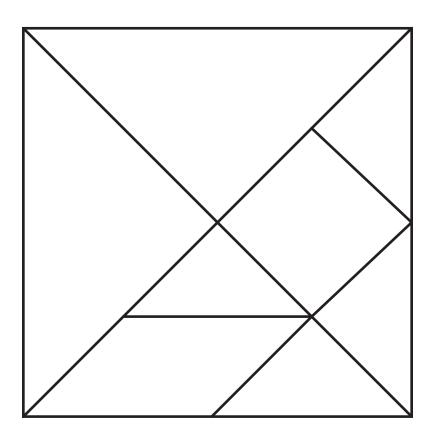


# Task 28: Artistic Arrangements Student Page

Name:	_ Date: _	

Mr. Pica's 4th-grade art class is learning about positive and negative space. Their assignment is to color  $\frac{3}{4}$  of the square below, using it as their positive space. They need to leave the rest of the area blank for their negative space.

Complete Mr. Pica's assignment using your choice of colors. You may add additional lines inside the square to suit your design. You must explain how the positive space in your artwork is equivalent to  $\frac{3}{4}$  using words, pictures, and equations.



Retrieved from the companion website for *Classroom-Ready Rich Math Tasks, Grades 4-5: Engaging Students in Doing Math* by Beth McCord Kobett, Francis (Skip) Fennell, Karen S. Karp, Delise Andrews, and Sorsha-Maria T. Mulroe. Thousand Oaks, CA: Corwin, www.corwin.com. Copyright © 2021 by Corwin Press, Inc. All rights reserved. Reproduction authorized for educational use by educators, local school sites, and/or noncommercial or nonprofit entities that have purchased the book.

# Grade 5

# **Mathematics Standard**

• Make a line plot to display a data set of measurements in fractions of a unit  $\left(\frac{1}{2}, \frac{1}{4}, \frac{1}{8}\right)$ . Use operations on fractions for this grade to solve problems involving information presented in line plots.

# **Mathematical Practice**

Reason abstractly and quantitatively.

# **Vocabulary**

- line plot
- shift (work)

# **Materials**

- Line Plot Cards student page, one set per group
- Data Analysis student page, one per group
- scratch paper or student marker boards

# Task 42 Fast Food

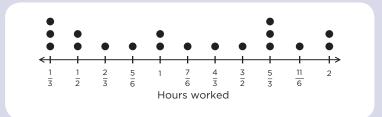
Interpret data displayed in a line plot

## **TASK**

#### **Fast Food**

Ismail runs a fast-food delivery business. Drivers for Ismail's company work anywhere from  $\frac{1}{3}$  of an hour up to 2 hours each evening delivering meals from restaurants to people's homes. Each night, Ismail collects data on how many drivers worked and how many hours they worked. The line plot (Figure 12.6) shows data for each employee who worked on one night.

Figure 12.6 Delivery Driver Line Plot



Ismail has asked us to analyze the data he's collected over the past ten nights. What are some things we might be able to figure out by looking at the line plots for those nights?

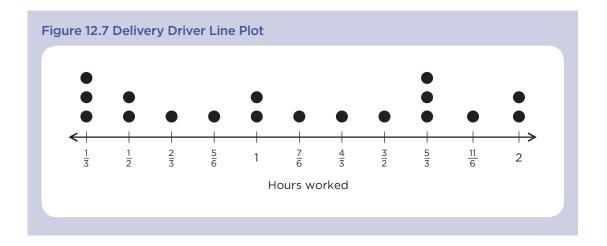
#### TASK PREPARATION

- Plan to organize students into heterogeneous groups of 3 or 4
- Prepare one set of Line Plot Cards and one Data Analysis Worksheet per group. It will be helpful to have the line plot cards cut apart so students can rearrange them and make direct comparisons between data sets.

## LAUNCH

1. Facilitate a *See, Think, and Wonder* with students using the image from the task stem (Figure 12.7).





- 2. Encourage students to Pair-to-Pair Share before taking ideas from the class.
- 3. Ask, "What do you think one dot on this line plot might represent?"
- 4. Use the information from the task to tell students the story of Ismail's company.
- 5. Ask, "Were we on the right track? What does one dot on this line plot represent? How would you describe the number of hours worked by Ismail's employees on this night? What other information could you find by reviewing these data?"

#### **FACILITATE**

- 1. Organize students into groups and distribute a set of Line Plot Cards and a Data Analysis worksheet page.
- 2. Observe. Circulate to each group to observe strategies students are using to analyze the data sets. Pay attention to how students are calculating the total number of hours. Some strategies to watch for:
  - » Students may "partner up" data points to find whole numbers of hours (e.g., notice that a driver who worked  $\frac{1}{3}$  hour and a driver who worked  $\frac{5}{7}$  hours can be paired to equal 2 hours).



# **ACCESS AND EQUITY**

Students should be encouraged to make sense of the data in whatever way feels most comfortable. If the fraction notation interferes with students' engagement in the task, encourage the use of drawn representations of analog clock faces to translate the times representing fractions of an hour into numbers of minutes and/ or provide fraction circle manipulatives so students can create physical representations of the times and combine amounts that make whole hours.

- » Students may convert from fractions of hours to minutes in order to use whole numbers for calculations (e.g.,  $\frac{1}{3}$  hour = 20 minutes).
- » Students may consider using equivalent fractions to change all the times into multiples of  $\frac{1}{6}$  in order to add them more easily.



» Students may use informal reasoning strategies such as direct comparisons between two data sets or canceling out common data points and comparing only those that do not match.

## STRENGTHS SPOTTING

Students who demonstrate strength in reasoning and proof often notice patterns and structures, particularly in real-world situations. Highlight, name, and celebrate these strengths when students exhibit them.

#### 3. Show Me.

- » Is there a night when all the employees worked exactly the same number of hours? How do you know?
- » Is there a night when many of the employees worked about the same number of hours? How is that different from when they worked exactly the same number of hours?
- » Is there a night when none of the employees worked the same number of hours? How do you know?

Note: Consider using the Show Me tool for monitoring and recording responses to the "How do you know" portion of the Show Me responses above (see Appendix B).

## **CLOSE: MAKE THE MATH VISIBLE**

- 1. Use Two Stay, One/Two Stray to mix up the groups. Have each group discuss the strategy they used to redistribute driving shifts (item 6 on the data analysis page).
- 2. Bring the class together and facilitate a discussion about the data they've analyzed. Select students/teams to share their thinking. Highlight some of the following ideas:
  - » If all the data points are the same, the line plot will show one tall stack of dots over the same value.
  - » If all the data points are different, the line plot will show no more than one dot over any given point.

# **PRODUCTIVE STRUGGLE**

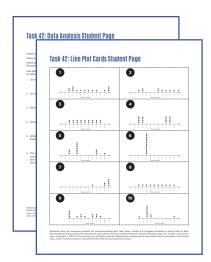
Student work on item 6 is meant to be an informal average. Teachers should not expect students to represent a formal mean in response to this prompt. Encourage students to try any strategy they can think of and remind them that mathematicians don't always find an answer to every question right away. It's okay to leave this part of the task unresolved.

- » The number of workers is not always indicative of the total number of hours; the position of each data point on the graph must also be considered (e.g., a large number of shorter shifts can add up to the same number of hours as a small number of longer shifts).
- » Driver shifts can be redistributed without changing the total number of hours by adding time to shorter shifts while taking the same amount of time away from longer shifts.



# **TASK 42: STUDENT DATA ANALYSIS WORKSHEET**

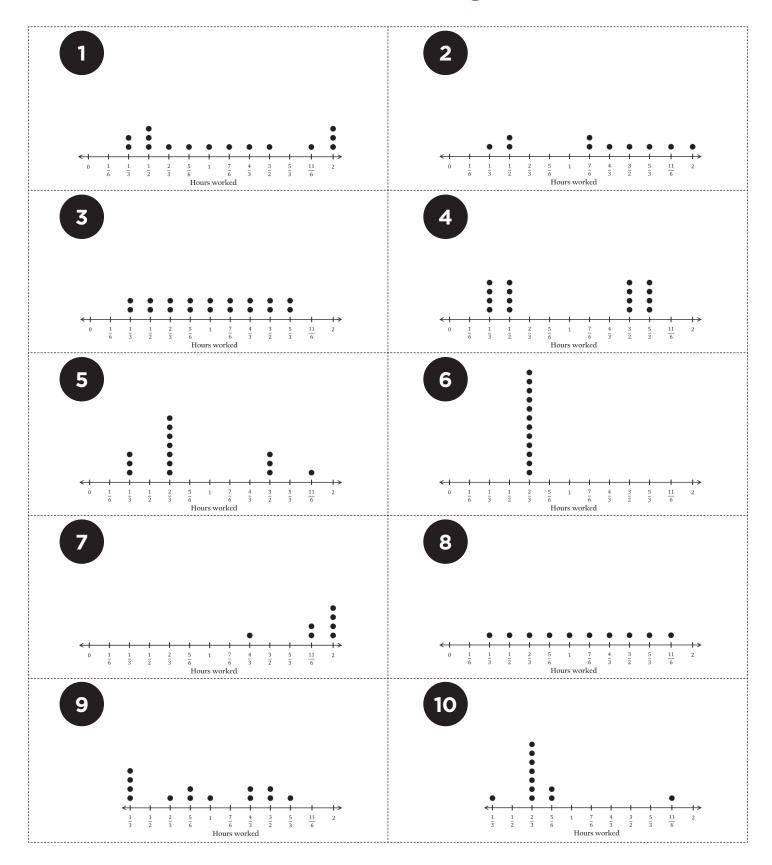
online To download printable resources for this task, visit resources.corwin.com/ ClassroomReadyMath/4-5



POST-TASK NOTES: REFLECTION & NEXT STEPS				



# Task 42: Line Plot Cards Student Page



Retrieved from the companion website for *Classroom-Ready Rich Math Tasks, Grades 4-5: Engaging Students in Doing Math* by Beth McCord Kobett, Francis (Skip) Fennell, Karen S. Karp, Delise Andrews, and Sorsha-Maria T. Mulroe. Thousand Oaks, CA: Corwin, www.corwin.com. Copyright © 2021 by Corwin Press, Inc. All rights reserved. Reproduction authorized for educational use by educators, local school sites, and/or noncommercial or nonprofit entities that have purchased the book.

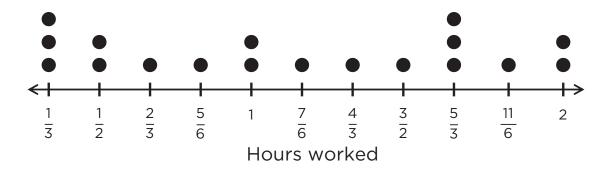
# Task 42: Data Analysis Student Page

## **Fast Food**

Ismail runs a fast-food delivery business. Drivers for Ismail's company work anywhere from  $\frac{1}{3}$  of an hour up to 2 hours each evening delivering meals from restaurants to people's homes. Each night, Ismail collects data on how many drivers worked and how many hours they worked. Ismail has asked us to analyze the data he's collected over the past ten nights.

Use data cards for nights 1 to 10 to help Ismail answer the following questions. Be prepared to explain your thinking to others.

- 1. On which night did the fewest number of drivers work? How many drivers worked that night?
- 2. On which night did the greatest number of drivers work? How many drivers worked that night?
- 3. Which night had the greatest total number of hours worked? How many hours were worked that night?
- 4. Which night had the least total number of hours worked? How many hours were worked that night?
- 5. Which two nights had the same number of drivers? Did those nights also have the same total number of hours? Explain.
- 6. The data below show the number of hours Ismail's employees are signed up to work tomorrow night. Ismail would like to make the number of hours each person works more equivalent. Show how Ismail could rearrange the shifts (the amount of time worked) without changing the total number of drivers or the total number of hours worked.



Retrieved from the companion website for *Classroom-Ready Rich Math Tasks, Grades 4-5: Engaging Students in Doing Math* by Beth McCord Kobett, Francis (Skip) Fennell, Karen S. Karp, Delise Andrews, and Sorsha-Maria T. Mulroe. Thousand Oaks, CA: Corwin, www.corwin.com. Copyright © 2021 by Corwin Press, Inc. All rights reserved. Reproduction authorized for educational use by educators, local school sites, and/or noncommercial or nonprofit entities that have purchased the book.