Time Intervals (IT)

Overview

Students will apply their understanding of time intervals to answer questions about the time a family spent in the bathroom in the morning.

Standards

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

3.MD.A.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

Prior to the Task

Standards Preparation: The material in the chart below illustrates the standards and sample tasks that are pre-requisites for student success with this task's standards.

Grade Level Standard	The Following Standards Will Prepare Them	Items to Check for Task Readiness	Sample Remediation Items
3.MD.A.1	• 2.MD.B.6 • 2.MD.C.7	1. Marco woke up at 6:15 a.m. He got on the bus to go to school at 6:53 a.m. How long did it take Marco to get ready to go to school? a. 38 minutes 2. Addyson spent 25 minutes on her math homework. Then she spent 32 minutes on her reading homework. How much total time did Addyson spend on homework? a. 57 minutes	• http://www.illustrativemathematics.org/illustrations/1081 • http://www.illustrativemathematics.org/illustrations/1069 • http://learnzillion.com/lessonsets/173-solve-elapsed-time-word-problems • http://learnzillion.com/lessonsets/139-tell-write-and-measure-time-to-the-minute

During the Task:

- Allow students to work in groups to complete the chart. Students will have to use their understanding of place value as well as writing time to the nearest minute to determine which values are missing in the chart.
- Some students might have trouble deciding how to begin finding the end time for Carly. Ask students, "What information are you given about Carly's end time? When we write time, how many digits do we use for minutes?" Guide students to determine that the time can be between 6:30 a.m. and 6:33. a.m. (inclusive). Remind students that Carly's end time cannot be after Todd's start time.
- Remind students that all family members listed in the chart spent more than 10 minutes in the bathroom. Students who forget this information might use only 3 minutes to determine Todd's end time. Guide students to use the start time for Grandma to limit the possibilities for the number of minutes Todd spent in the bathroom.

- For question 4 in Part II, if students struggle when trying to add all five times at once, encourage them to add the time spent using two values at a time or by adding easier values first (i.e., 30 + 30 = 60 and 60 + 31 = 91).

After the Task:

Have students track the amount of time it takes for them to perform various activities at home and at school. Some activities might include brushing teeth, eating supper, doing homework, playing outside, and watching television. Another option is to have students make a list of everything they do throughout a day. Students could then use this list to track the start times and end times for each activity. When students return to class with the times, have them determine the amount of time spent on each activity and then answer questions requiring them to add and subtract time intervals from their day.

Student Instructional Task

Part I

The Weston family's house is very busy in the mornings, especially since there is only one bathroom. Todd, one of the three children, decided to create a chart to see how much time each person spends in the bathroom in the morning. The baby, Jax, erased some of the numbers on Todd's chart. The chart is shown below.

Person	Activities	Start Time	End Time	Time Spent
Mom	Brush teeth, shower, wash hair, dry hair	5:00 a.m.	5:30 a.m.	
Dad	Brush teeth, shower, shave	5:35 a.m.	5:59 a.m.	
Carly	Brush teeth, shower	6:02 a.m.	6:3	minutes
Todd	Brush teeth, shower	6:33 a.m.		3 minutes
Grandma	Brush teeth, shower, wash hair	6:5		31 minutes

Todd is working to fill in his chart so that he can share it with his family. Todd remembers that everyone spent more than 10 minutes but less than 60 minutes in the bathroom in the morning. Using the information you can see in the chart above, help Todd fill in the missing pieces of the chart below. Use clocks, models, or other tools to help you.

Person	Activities	Start Time	End Time	Time Spent
Mom	Brush teeth, shower, wash hair, dry hair	5:00 a.m.	5:30 a.m.	
Dad	Brush teeth, shower, shave	5:35 a.m.	5:59 a.m.	
Carly	Brush teeth, shower	6:02 a.m.		
Todd	Brush teeth, shower	6:33 a.m.		
Grandma	Brush teeth, shower, wash hair			31 minutes

Part II

Use the chart you helped Todd fill in on the first page to answer the following questions.

1. Who spent the most time in the bathroom? How much time did he or she spend in the bathroom?

2. Who spent the least amount of time in the bathroom? How much time did he or she spend in the bathroom?

3. How much longer did Mom spend in the bathroom than Dad? Show your work.

4. What is the total amount of time the family spent in the bathroom in the morning? Show your work.

Instructional Task Exemplar Response

Part I

The Weston family's house is very busy in the mornings, especially since there is only one bathroom. Todd, one of the three children, decided to create a chart to see how much time each person spends in the bathroom in the morning. The baby, Jax, erased some of the numbers on Todd's chart. The chart is shown below.

Person	Activities	Start Time	End Time	Time Spent
Mom	Brush teeth, shower, wash hair, dry hair	5:00 a.m.	5:30 a.m.	
Dad	Brush teeth, shower, shave	5:35 a.m.	5:59 a.m.	
Carly	Brush teeth, shower	6:02 a.m.	6:3	inutes
Todd	Brush teeth, shower	6:33 a.m.		3 minutes
Grandma	Brush teeth, shower, wash hair	6:5		31 minutes

Todd is working to fill in his chart so that he can share it with his family. Todd remembers that everyone spent more than 10 minutes but less than 60 minutes in the bathroom in the morning. Using the information you can see in the chart above, help Todd fill in the missing pieces of the chart below. Use clocks, models, or other tools to help you.

Person	Activities	Start Time	End Time	Time Spent
Mom	Brush teeth, shower, wash hair, dry hair	5:00 a.m.	5:30 a.m.	*30 minutes*
Dad	Brush teeth, shower, shave	5:35 a.m.	5:59 a.m.	*24 minutes*
Carly	Brush teeth, shower	6:02 a.m.	*6:32 a.m.*	*30 minutes*
Todd	Brush teeth, shower	6:33 a.m.	*6:46 a.m.*	*13 minutes*
Grandma	Brush teeth, shower, wash hair	*6:50 a.m.*	*7:21 a.m.*	31 minutes

***Note: Carly's end time can be no earlier than 6:30 a.m. and can end no later than 6:33 a.m.; the time spent for Carly should be accurate based on the time the student chooses. For Todd, the number of minutes for time spent should end with a 3 and because everyone spends more than 10 minutes but less than 60 minutes, time spent for Todd can be 13*

minutes or 23 minutes. The end time for Todd should correspond to that choice. Finally, the start time for Grandma can be any time between 6:50 a.m. and 6:59 a.m.

Part II

Use the chart you helped Todd fill in on the first page to answer the following questions.

***Note: All answers in this exemplar are sample responses based on the sample times listed in the chart on page one.*

1. Who spent the most time in the bathroom? How much time did he or she spend in the bathroom?

   Grandma spent the most time in the bathroom. She spent 31 minutes in the bathroom.

2. Who spent the least amount of time in the bathroom? How much time did he or she spend in the bathroom?

   Todd spent the least amount of time in the bathroom. He spent 13 minutes in the bathroom.

3. How much longer did Mom spend in the bathroom than Dad? Show your work.

   30 – 24 = 6

   Mom spent 6 minutes more in the bathroom than Dad.

4. What is the total amount of time the family spent in the bathroom in the morning? Show your work.

   30 + 24 + 30 + 13 + 31 = 54 + 30 + 13 + 31 = 84 + 13 + 31 = 97 + 31 = 128 minutes

   The family spent 128 minutes in the bathroom.

Harry's Day (IT)

Overview

Students will help Harry throughout his day by solving various multiplication problems using arrays, equal groups, and repeated addition.

Standards:

3.OA.A.1. Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 x 7.*

3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Prior to the Task

Standards Preparation: The material in the chart below illustrates the standards and sample tasks that are pre-requisites for student success with this task's standards.

Grade Level Standard	The Following Standards Will Prepare Them	Items to Check for Task Readiness	Sample Remediation Items
3.OA.A.1	• 2.OA.C.3 • 2.OA.C.4	1. Amanda used the equation 6 x 8 = 48 to find the total number of cookies she baked. Tell what each number in the equation means. a. There are 6 rows of cookies with 8 cookies in each row, which is a total of 48 cookies.	• http://www.illustrativemathematics.org/illustrations/620 • http://www.illustrativemathematics.org/illustrations/3 • http://learnzillion.com/lessonsets/395-interpret-products-of-whole-numbers-using-pictures-arrays-and-number-lines • http://learnzillion.com/lessonsets/379-interpret-products-of-whole-numbers-and-model-multiplication-using-arrays-pictures-and-equations • http://learnzillion.com/lessonsets/273-interpret-products-of-whole-numbers • http://learnzillion.com/lessonsets/60-solve-realworld-multiplication-problems
3.OA.A.3	• 3.OA.A.1 • 3.OA.A.2	1. Jarrod counted the number of lettuce plants in his garden. He counted 4 rows of 8 plants. How many lettuce plants are there in Jarrod's garden? a. 32 plants 2. http://www.illustrativemathematics.org/illustrations/365 3. http://www.illustrativemathematics.org/illustrations/262	• http://www.illustrativemathematics.org/illustrations/1531 • http://www.illustrativemathematics.org/illustrations/1540 • http://learnzillion.com/lessonsets/611-solve-multiplication-and-division-word-problems • http://learnzillion.com/lessonsets/62-solve-realworld-division-problems • http://learnzillion.com/lessonsets/60-solve-realworld-multiplication-problems

During the Task:

- As students work through this task, the teacher should have various manipulatives available so students can use them to answer the questions. Manipulatives may include counters, unit cubes, pictures of the items in the task, or the actual items used in the task.
- Ask students to explain how the multiplication equations they write for each part of the task match the drawings, repeated addition, and arrays they used to find the total. Students should use the context of each question in their explanation.
- For part 4, discuss with students other possible activities Harry and his family could be involved in during their outing. As students brainstorm a list of activities, record their ideas on the board. This will provide some starting points for students to create their own story problems. After students have created the story problems, have students exchange problems and solve the new problem they received.

After the Task:

Lead students in a discussion about the activities they would like to do as a class. After this is discussed, have students use the activities they listed to create story problems that would be solved using multiplication. After creating the scenarios, the students can exchange their problems with other groups. After solving the new problems, have students discuss they strategies they used to find the answers.

Student Instructional Task

There are 5 people in Harry's family. They are all going to the park today.

1. In the morning, Harry's mom asks him to make snack bags for his family's trip to the park. She gives him 5 bags to fill with snacks and all of the snacks for each bag.
    a. If Harry puts 9 pretzels in each bag, what is the total number of pretzels Harry will use? Use drawings to show how you found your answer. Write the multiplication equation that matches your drawing.

    b. If Harry adds 7 chocolate candies to each bag, what is the total number of chocolate candies he will use? Use repeated addition to show how you found your answer. Write the multiplication equation that matches the repeated addition.

    c. Harry wrote the equation 5 x 10 = 50 when he added crackers to the bags. Describe what each number in the equation represents.

    d. Write a multiplication equation to show the total number of peanuts Harry's mom gave him if each bag should have 4 peanuts. How many total peanuts did Harry's mom give him?

2. Harry's mom also wants him to help make sandwiches for the family. If each family member eats two sandwiches, how many total slices of ham will Harry need to make the sandwiches if he puts two slices of ham on each sandwich? Use drawings, equations, or words to show how you found your answer.

3. At the park, Harry's family finds rocks for Harry's rock collection.
    a. Each family member found 3 rocks for Harry's collection. Draw an array that shows the total number of rocks Harry will add to his collection. What is the total number of rocks Harry will add to his collection?

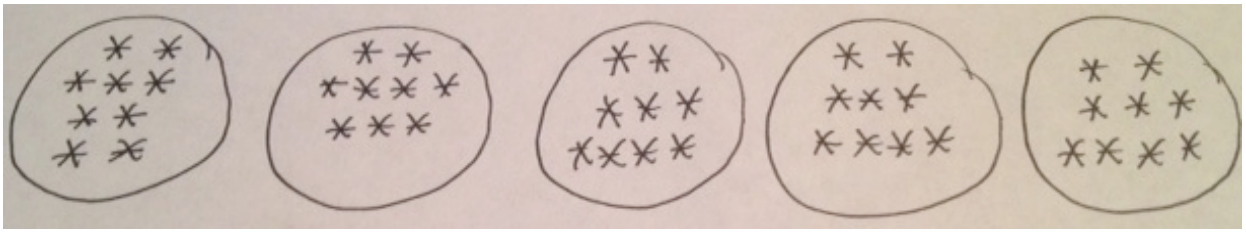
    b. Write a multiplication equation that matches the array to find the total number of rocks Harry will add to his collection.

4. Write your own story problem about an activity in Harry's day. Be sure to include an activity that will require multiplication to find the answer. Show how you can find the answer to your story problem using drawings, repeated addition, an array, and a multiplication equation.

Instructional Task Exemplar Response

There are 5 people in Harry's family. They are all going to the park today.

1. In the morning, Harry's mom asks him to make snack bags for his family's trip to the park. She gives him 5 bags to fill with snacks and all of the snacks for each bag.
    a. If Harry puts 9 pretzels in each bag, what is the total number of pretzels Harry will use? Use drawings to show how you found your answer. Write the multiplication equation that matches your drawing.



5 x 9 = 45

    b. If Harry adds 7 chocolate candies to each bag, what is the total number of chocolate candies he will use? Use repeated addition to show how you found your answer. Write the multiplication equation that matches the repeated addition.

7 + 7 + 7 + 7 + 7 = 35

5 x 7 = 35

    c. Harry wrote the equation 5 x 10 = 50 when he added crackers to the bags. Describe what each number in the equation represents.

There are 5 bags. Harry added 10 crackers to each bag. Harry used a total of 50 crackers.

    d. Write a multiplication equation to show the total number of peanuts Harry's mom gave him if each bag should have 4 peanuts. How many total peanuts did Harry's mom give him?

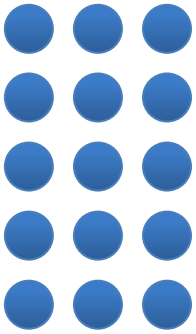
5 x 4 = 20; He used 20 total peanuts.

2. Harry's mom also wants him to help make sandwiches for the family. If each family member eats two sandwiches, how many total slices of ham will Harry need if he puts two slices of ham on each sandwich? Use drawings, equations, or words to show how you found your answer.

If each family member eats two sandwiches, then they will eat a total of 10 sandwiches because 5 x 2 = 10. If each sandwich needs 2 slices of ham, then Harry will need 20 slices of ham because 10 x 2 = 20.

Note: Student responses may vary and may be presented in the form of drawings, equations, and/or words.

3. At the park, Harry's family finds rocks for Harry's rock collection.
    a. Each family member found 3 rocks for Harry's collection. Draw an array that shows the total number of rocks Harry will add to his collection. What is the total number of rocks Harry will add to his collection?



Harry will add 15 rocks to his collection.

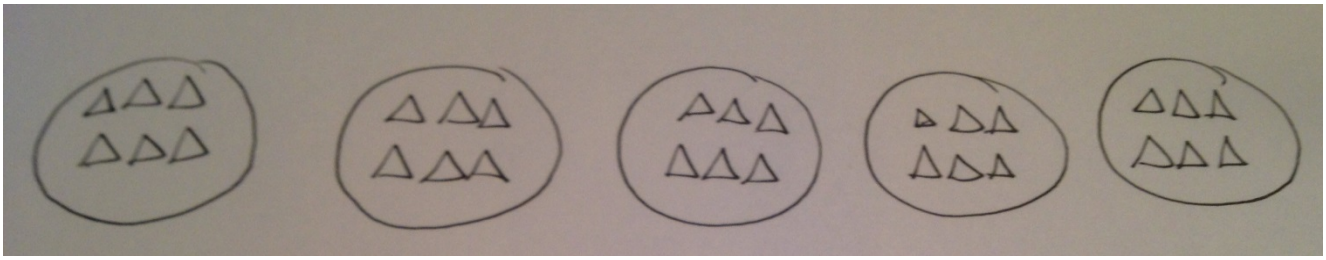
    b. Write a multiplication equation that matches the array to find the total number of rocks Harry will add to his collection.

5 x 3 = 15

4. Write your own story problem about an activity in Harry's day. Be sure to include an activity that will require multiplication to find the answer. Show how you can find the answer to your story problem using drawings, repeated addition, an array, and a multiplication equation.

Sample response: Each member of Harry's family rode his or her bike 6 laps around the park. How many total laps did Harry's family ride on their bikes?

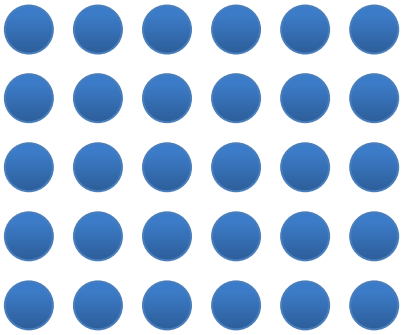
Drawing: They rode a total of 30 laps.



Repeated addition: 6 + 6 + 6 + 6 + 6 = 30

The family rode a total of 30 laps.

Array: The family rode a total of 30 laps.



Multiplication equation: 5 x 6 = 30 laps

Arianna's Birthday Party (IT)

Overview

Students will use multiplication and division to answer questions about birthday party plans and activities.

Standards

Represent and solve problems involving multiplication and division.

3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Understand properties of multiplication and the relationship between multiplication and division.

3.OA.B.6 Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*

Solve problems involving the four operations, and identify and explain patterns in arithmetic.

3.OA.D.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Prior to the Task

Standards Preparation: The material in the chart below illustrates the standards and sample tasks that are pre-requisites for student success with this task's standards.

Grade Level Standard	The Following Standards Will Prepare Them	Items to Check for Task Readiness	Sample Remediation Items
3.OA.A.3	• 3.OA.A.1 • 3.OA.A.2	1. Michael gave 6 pieces of candy to each of his 4 friends. How many total pieces of candy did he give out? a. 24 pieces of candy 2. Aleyna has 45 stickers that she wants to give to friends. She wants to give each of her friends 9 stickers. How many friends will Aleyna share her stickers with? a. 5 friends 3. http://www.illustrativemathematics.org/illustrations/344 4. http://www.illustrativemathematics.org/illustrations/365 5. http://www.illustrativemathematics.org/illustrations/262	• http://www.illustrativemathematics.org/illustrations/1531 • http://learnzillion.com/lessonsets/611-solve-multiplication-and-division-word-problems
3.OA.B.6		1. What multiplication fact can help you answer $42 \div \blacksquare = 7$? a. $7 \times \blacksquare = 42$	• http://learnzillion.com/lessonsets/341-understand-division-as-unknownfactor-problems

Grade Level Standard	The Following Standards Will Prepare Them	Items to Check for Task Readiness	Sample Remediation Items
3.OA.D.8	• 2.OA.A.1 • 3.OA.A.3	1. Brandon has a collection of 67 baseball cards. He wants to share some of his baseball cards with 6 friends. He kept 25 baseball cards for himself. If Brandon shared the remaining baseball cards equally with his friends, how many baseball cards did each friend receive? a. Each friend received 7 baseball cards. 2. http://www.illustrativemathematics.org/illustrations/13 3. http://www.illustrativemathematics.org/illustrations/1301	• http://www.illustrativemathematics.org/illustrations/1 • http://learnzillion.com/lessonsets/318-solving-two-step-word-problems-including-those-with-unknown-quantities

Real-World Preparation: The following questions will prepare students for some of the real-world components of this task:

- **What is an arcade?** An arcade in a place that has a collection of video games that customers pay to play. Some games in the arcade give tickets when players earn different levels of points. Those tickets can then be traded in for prizes at the arcade.
- **What is a bouncy castle?** A bouncy castle is an inflatable trampoline that some people rent for children to jump and play in at parties. There are some businesses that have a set of these inflatables indoors for children's parties.
- **What is a carpool?** A carpool is when people decide to use one vehicle to transport more than one person rather than using multiple vehicles to transport the same people. People who live near each other and work at the same office will often carpool to save money on gas.

During the Task:

- Struggling readers may need some assistance with completing this task. Group struggling readers with students who read more fluently and have students read the problems aloud in groups.
- Encourage students who may struggle with writing an equation or expression to draw a picture first. Then ask students to explain what their picture represents and have them connect the drawing to a written equation.
- Have students working in groups explain the reasoning they used to each of the members of the group. Have students identify methods other students have used that are different from the method they have used. Encourage students to ask questions of their classmates to clarify their understanding of the different methods they each use.
- For those students who need more concrete work before creating drawings and equations for the scenarios, provide manipulatives to represent the various situations in the problems.

After the Task:

Have students work to plan an activity in which the class could participate. This could be something like a class party or a field trip. Provide students with information they would use to plan the activity that would require them to use the four operations to determine quantities needed in the activity. Have students then participate in the activity to see how the math they used in planning helps the activity to be successful.

Student Instructional Task

Arianna is planning her birthday party with her family. They decide to have the birthday party at the local Activity Zone, where her friends can play all sorts of games and eat a variety of good snacks. As Arianna and her family plan the birthday party they run into a couple of challenges.

Help Arianna plan a great birthday party.

ACTIVITY ZONE

Video Game Arcade Maximum 6 people	Bouncy Castle Maximum 8 people
Swimming Pool Maximum 10 people	Basketball Court Maximum 10 people

Is there enough space? 30 people are attending the birthday party, including Arianna. The picture above shows which rooms are available and how many people can be in each room. Use the diagram above to help you answer the following.

a. Is there enough space for all of her friends? Show how you know your answer is correct.

b. If Arianna wants the same number of people in the swimming pool and basketball court when the arcade and bouncy castle are full, how many friends will need to be in the swimming pool and basketball court? Show how you found your answer.

Will the carpool work? Arianna plans a carpool using 6 vans to help her friends get to the party. All the friends, including Arianna, ride in the vans. How many people attending the party will need to fit in each van, if each van has the same number of people? Write and solve a multiplication or division equation that represents Arianna's carpool problem. Be sure to use a letter in your equation. Explain how you solved your equation.

A prize for Arianna: Five of Arianna's friends decide to use the tickets they won in the arcade to get a prize for Arianna. Each friend has won 8 tickets so far. The prize they want to get, a pink purse, costs 90 tickets. How many more tickets must each friend win in order to be able to get the prize?

Making sense of her presents: Arianna had a great birthday party and received 44 gifts at the party. All of her friends brought either 1 or 2 gifts.

a. If all of her friends gave her at least 1 gift, how many gave her 2 gifts?

b. When she distributed thank-you cards to all 29 friends at school on Monday, 5 friends said they forgot to give her their gift. After learning this, how many friends gave Arianna 2 gifts? Show how you found your answers using drawings or equations.

Instructional Task Exemplar Response

Arianna is planning her birthday party with her dad. They decide to have the birthday party at the local Activity Zone, where her friends can play all sorts of games and eat a variety of good snacks. As Arianna and her dad plan the birthday party they run into a couple of challenges.

Help Arianna plan a great birthday party.

ACTIVITY ZONE

Video Game Arcade Maximum 6 people	Bouncy Castle Maximum 8 people
Swimming Pool Maximum 10 people	Basketball Court Maximum 10 people

Is there enough space? 30 people are attending the birthday party, including Arianna. The picture above shows which rooms are available and how many people can be in each room. Use the diagram above to help you answer the following.

a. Is there enough space for all of her friends? Show how you know your answer is correct.

Yes there is enough space.

***Students can show there is enough space many ways.*

- *They might add 6 and 8 to get 14, subtract 14 from 30 to find there are 16 people left and say that the last two rooms (swimming and basketball) can hold up to 20, which is more than 16.*
- *They might add all of the maximums to get 34, which is more than 30, so there is enough space.*
- *They might draw 30 people in the rooms in the diagram above.*

b. If Arianna wants the same number of people in the swimming pool and basketball court when the arcade and bouncy castle are full, how many friends will need to be in the swimming pool and basketball court? Show how you found your answer.

If the arcade and bouncy castle are full, there are 14 people in those rooms. There are 16 people left (30 -14 = 16). If the same number of people should be in the swimming pool and basketball court, then 8 people should be in each room because 16 ÷ 2 = 8.

Will the carpool work? Arianna plans a carpool using 6 vans to help her friends get to the party. All the friends, including Arianna, ride in the vans. How many people attending the party will need to fit in each van, if each van has the same number of people? Write and solve a multiplication or division equation that represents Arianna's carpool problem. Be sure to use a letter in your equation. Explain how you solved your equation.

Multiplication: $6 \times p = 30$ *OR Division:* $30 \div 6 = p$

I know that 5 times 6 equals 30 and that's the same as 6 times 5, so there would need to be 5 people in each van.

**Other work or explanations are possible.*

A prize for Arianna: Five of Arianna's friends decide to use the tickets they won in the arcade to get a prize for Arianna. Each friend has won 8 tickets so far. The prize they want to get, a pink purse, costs 90 tickets. How many more tickets must each friend win in order to be able to get the prize?

$5 \times 8 = 40$ *The 5 friends have a total of 40 tickets.*

$90 - 40 = 50$ *The 5 friends need to get 50 more tickets to be able to get the prize.*

$50 \div 5 = 10$ *Each friend needs to get 10 more tickets.*

Making sense of her presents: Arianna had a great birthday party and received 44 gifts at the party. All of her friends brought either 1 or 2 gifts.

a. If all of her friends gave her at least 1 gift, how many gave her 2 gifts?

   $44 - 29 = 15$ *There were 15 friends who gave Arianna two gifts.*

b. When she distributed thank-you cards to all 29 friends at school on Monday, 5 friends said they forgot to give her their gift. After learning this, how many friends gave Arianna 2 gifts? Show how you found your answers using drawings or equations.

   If 5 people forgot to give her gifts, then only 24 friends gave her gifts, so $44 - 24 = 20$*. That means 20 people gave Arianna two gifts.*

Bobby's Field Day (IT)

Overview

The students will use multiplication and division to determine how many activities they can participate in for Field Day.

Standards

Represent and solve problems involving multiplication and division.

3.OA.A.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8*.

Prior to the Task

Standards Preparation: The material in the chart below illustrates the standards and sample tasks that are pre-requisites for student success with this task's standards.

Grade Level Standard	The Following Standards Will Prepare Them	Items to Check for Task Readiness	Sample Remediation Items
3.OA.A.2	• 3.OA.A.1	1. Write a story problem that could be represented by $63 \div 7 = 9$. a. Mandy has 63 pieces of candy that she is putting into 7 bags. There will be 9 pieces of candy in each bag. 2. http://www.illustrativemathematics.org/illustrations/1531 3. http://www.illustrativemathematics.org/illustrations/1540	• http://learnzillion.com/lessonsets/299-interpreting-wholenumber-quotients-of-whole-numbers • http://learnzillion.com/lessonsets/91-interpret-wholenumber-quotients-of-whole-numbers

Real-World Preparation: The following questions will prepare students for some of the real-world components of this task:

- **What is a field day?** A school day for classes to participate in various activities that could take place outside.

During the Task:

The students may come up with a variety of expressions for problem 3 of this task. The students must use all 24 tickets with one station and be able to explain the expression. Either provide students with copies of the tickets included in this task or provide real tickets as manipulatives.

After the Task:

The students can share their answers to problem 3 with the class to create a master list. The teacher can allow students to create various expressions using tickets and stations listed.

Have students apply these concepts to other situations like determining how many cookies each student can get if the class is given a set number of cookies or how many minutes each person can spend at a particular ride if each person in the class goes on the ride once and the class has a total of 30 minutes to ride.

Student Instructional Task

Bobby's class has earned a field day. The table below shows the field day stations and the number of tickets needed to visit each station.

Field Day Activities

Station	Number of Tickets
Bouncy House	6
Basketball	2
Bubbles	3
Face Painting	4
Relay Races	8

1. Bobby visited the bouncy house. He used a total of 12 tickets.
    a. Explain what the equation 12 ÷ 2 = 6 represents in terms of Bobby's visit to the bouncy house.

    b. Write an equation with a quotient of 2 using any of the activities listed in the table. Explain what the equation represents.

2. Using the information in the table, describe an activity at the field day that would be represented by the expression 18 ÷ 3 = 6.

3. Create an equation using a total of 24 tickets and **one** of the stations from the table. Tell how many times you could visit that station if you used all 24 tickets with no tickets left over. Explain what the equation represents.
    a. Write the equation.

    b. How many times could you visit the station?

    c. What does the equation represent?

Use this page to create tickets for students.

1 ticket	1 ticket	1 ticket	1 ticket	1 ticket
1 ticket	1 ticket	1 ticket	1 ticket	1 ticket
1 ticket	1 ticket	1 ticket	1 ticket	1 ticket
1 ticket	1 ticket	1 ticket	1 ticket	1 ticket
1 ticket	1 ticket	1 ticket	1 ticket	1 ticket
1 ticket	1 ticket	1 ticket	1 ticket	1 ticket

Instructional Task Exemplar Response

Bobby's class has earned a field day. The table below shows the field day stations and the number of tickets needed to visit each station.

Field Day Activities

Station	Number of Tickets
Bouncy House	6
Basketball	2
Bubbles	3
Face Painting	4
Relay Races	8

1. Bobby visited the bouncy house. He used a total of 12 tickets
    a. Explain what the equation 12 ÷ 2 = 6 represents in terms of Bobby's visit to the bouncy house.

    12 represents the number of total tickets, 2 is the number of times Bobby went to the bouncy house, and 6 is the number of tickets each visit cost.

    b. Write an equation with a quotient of 2 using any of the activities listed in the table. Explain what the equation represents.

    ***Note: Many answers can be accepted here as long as the quotient is 2.*

    Sample responses: 12 ÷ 6 = 2; 12 represents the number of total tickets, 6 is the number of tickets each visit cost, and 2 is the number of times Bobby went to the bouncy house.

    6 ÷ 3 = 2; 6 represents the number of total tickets, 3 is the number of tickets each visit cost, and 2 is the number of times Bobby went to the bubbles.

    8 ÷ 4 = 2; 8 represents the total number of tickets, 4 represents the number of tickets needed for each visit to face painting, and 2 represents the number of times Bobby went to face painting.

2. Using the information in the table, describe an activity at the field day that would be represented by the expression 18 ÷ 3 = 6.

    Sample Situations:

    Bobby can visit the bouncy house 3 times. A total of 18 tickets divided by 3 visits, which gave me 6 tickets spent each visit. That is the number of tickets needed for each visit to the bouncy house.

    Bobby can visit the bubbles 6 times. A total of 18 tickets divided by 6 visits, which gave me a total of 3 tickets spent each visit. That is the number of tickets needed for each visit to the bubbles.

3. Create an equation using a total of 24 tickets and **one** of the stations from the table. Tell how many times you could visit that station if you used all 24 tickets with no tickets left over. Explain what the equation represents.

   ***Note: Many responses can be accepted here.*

   a. Write the equation.

      Sample response: 24 ÷ 8 = 3

   b. How many times could you visit the station?

      Sample response: I could visit it 3 times because 24 ÷ 8= 3

   c. What does the equation represent?

      Sample response: If I use all 24 tickets at the relay races station and divide 24 by 8, which is the cost of 1 visit.

Five Sisters Running a Race (IT)

Overview

Students will locate fractions on a number line, identify equivalent fractions, and compare fractions that have the same numerator or the same denominator.

Standards

Developing understanding of fractions as numbers.

3.NF.A.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

a. Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line.

b. Represent a fraction *a*/*b* on a number line diagram by marking of *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.

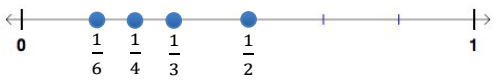
3.NF.A.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.

d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are only valid when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Prior to the Task

Standards Preparation: The material in the chart below illustrates the standards and sample tasks that are pre-requisites for student success with this task's standards.

Grade Level Standard	The Following Standards Will Prepare Them	Items to Check for Task Readiness	Sample Remediation Items
3.NF.A.2	• 2.MD.B.6	1. Draw points on the number line for $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{6}$.  2. http://www.illustrativemathematics.org/illustrations/168 3. http://www.illustrativemathematics.org/illustrations/169 4. http://www.illustrativemathematics.org/illustrations/172	• http://www.illustrativemathematics.org/illustrations/1081 • http://learnzillion.com/lessonsets/334-represent-fractions-on-a-number-line • http://learnzillion.com/lessonsets/80-fractions-on-number-lines

Grade Level Standard	The Following Standards Will Prepare Them	Items to Check for Task Readiness	Sample Remediation Items
3.NF.A.3	• 3.NF.A.1 • 3.NF.A.2	1. Marco ate $\frac{2}{3}$ of a pizza. Robert ate $\frac{2}{8}$ of the same pizza. Did Marco or Robert eat more pizza? a. Marco ate more pizza. 2. http://www.illustrativemathematics.org/illustrations/871 3. http://www.illustrativemathematics.org/illustrations/1353 4. http://www.illustrativemathematics.org/illustrations/1354 5. http://www.illustrativemathematics.org/illustrations/1356	• http://www.illustrativemathematics.org/illustrations/833 • http://www.illustrativemathematics.org/illustrations/168 • http://www.illustrativemathematics.org/illustrations/171 • http://www.illustrativemathematics.org/illustrations/173 • http://www.illustrativemathematics.org/illustrations/172 • http://learnzillion.com/lessonsets/335-understand-equivalent-fractions • http://learnzillion.com/lessonsets/337-compare-fractions-with-the-same-numerator-and-denominator

During the Task:

- Students will need to use some type of measurement tool to be able to divide the number lines into equal pieces to locate the fractions correctly. Students may use traditional tools such as inch rulers or nontraditional tools such as inch unit cubes. If necessary, adjust the number lines to fit the manipulatives or measurement tools provided for the students.
- As students compare the fractions, students can use the first set of number lines to help determine their answers to questions 2 through 4. Encourage students to use different colors when showing the locations of two sisters on one number line so they can see the different lengths for each fraction.
- When comparing fractions without a number line provided, encourage students to draw other pictures and use the size of the fractions in their drawings to answer the questions. Remind students that the pictures they draw to represent the whole must be the same size. A good tool to help with creating drawings to compare fractions is grid paper.

- Pause periodically throughout the task to give students time to discuss their answers with a partner and as a whole class. This will provide an opportunity for all students to hear the strategies and general thinking of their peers. This will give them more information and knowledge as they attempt the later parts of the task.

After the Task:

Provide students with additional practice locating fractions on a number line. Students should be able to locate fractions that are less than one as well as fractions that are greater than one on the number line using the same strategies in this task. Provide additional practice with comparing fractions with the same numerator or the same denominator and have students provide drawings or number lines to support their reasoning.

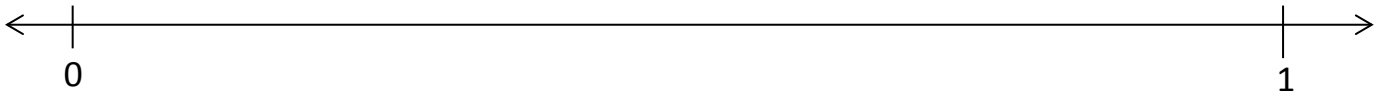
Student Instructional Task

Five sisters are training for a race. The fractions listed below tell the fraction of a mile each sister completed in 10 minutes.

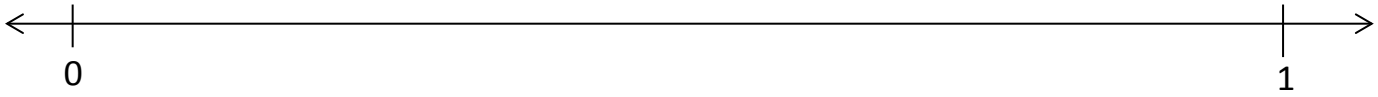
Sister	Fraction of a Mile Completed in 10 minutes
Elizabeth	$\frac{1}{2}$ mile
Laney	$\frac{1}{4}$ mile
Aliyah	$\frac{1}{8}$ mile
Jade	$\frac{1}{6}$ mile
Quin	$\frac{2}{4}$ mile

1. Show what fraction of a mile each sister completed by locating the fraction on the number lines below. Be as precise as possible when locating and marking each fraction on the number lines.

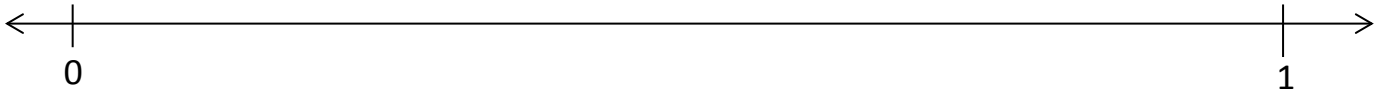
Elizabeth



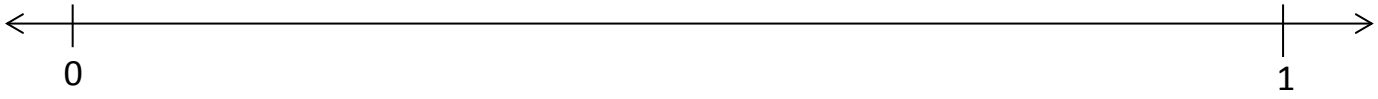
Laney



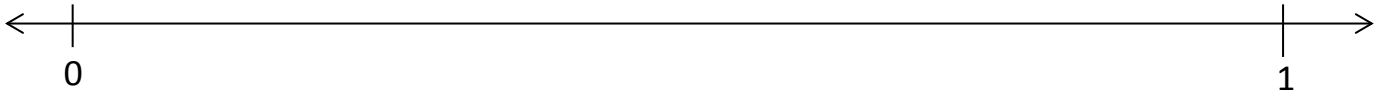
Aliyah



Jade

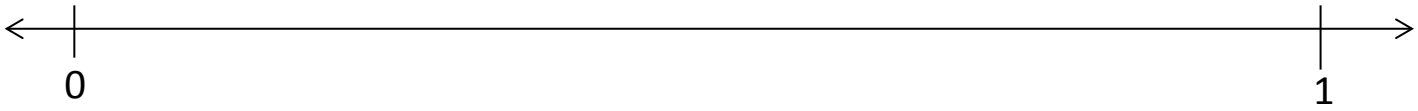


Quin



2. Compare the fraction for Elizabeth's distance to the fraction for Laney's distance. Who completed more of a mile in 10 minutes? Show how you know you are correct by showing both fractions on the number line below. Be as precise as possible when locating and marking each fraction on the number line.

3. Compare the fraction for Aliyah's distance to the fraction for Jade's distance. Who completed more of a mile in 10 minutes? Show how you know you are correct by showing both fractions on the number line below. Be as precise as possible when locating and marking each fraction on the number line.



4. Which of the four sisters, Elizabeth, Laney, Aliyah, or Jade, completed the greatest fraction of a mile in 10 minutes? Explain how you know.

5. Which of the sisters completed the same distance? How do you know? Use drawings to show your thinking.

On the day of the race, a friend recorded the distance each sister completed in 20 minutes. The table below lists the fraction of a mile each sister completed in 20 minutes.

Sister	Fraction of a Mile Completed in 20 minutes
Elizabeth	$\frac{6}{8}$ mile
Laney	$\frac{2}{4}$ mile
Aliyah	$\frac{5}{8}$ mile
Jade	$\frac{5}{6}$ mile
Quin	$\frac{3}{3}$ mile

6. Did Quin or Aliyah complete more of a mile in 20 minutes? How do you know? Use > or < to show your comparison.

7. Did Aliyah or Jade complete more of a mile in 20 minutes? How do you know? Use > or < to show your comparison.

8. Which sister was able to complete 1 mile in 20 minutes? How do you know?

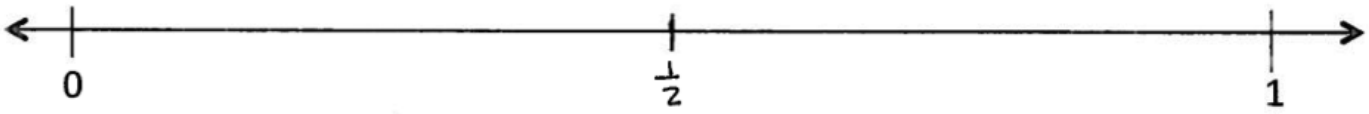
Instructional Task Exemplar Response

Five sisters are training for a race. The fractions listed below tell the fraction of a mile each sister completed in 10 minutes.

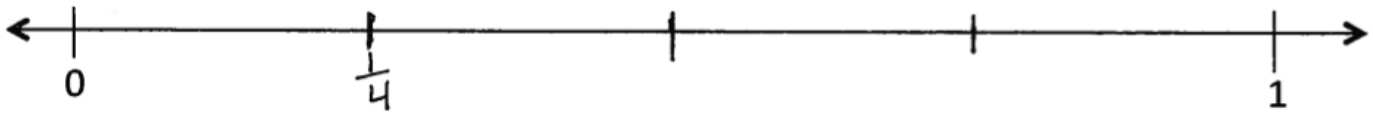
Sister	Fraction of a Mile Completed in 10 minutes
Elizabeth	$\frac{1}{2}$ mile
Laney	$\frac{1}{4}$ mile
Aliyah	$\frac{1}{8}$ mile
Jade	$\frac{1}{6}$ mile
Quin	$\frac{2}{4}$ mile

1. Show what fraction of a mile each sister completed by locating the fraction on the number lines below. Be as precise as possible when locating and marking each fraction on the number lines.

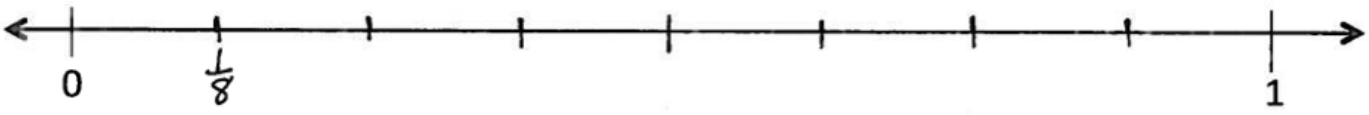
Elizabeth



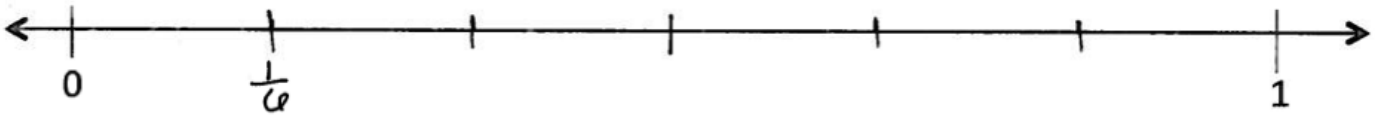
Laney



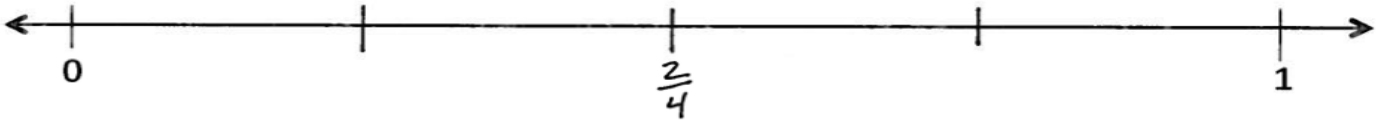
Aliyah



Jade

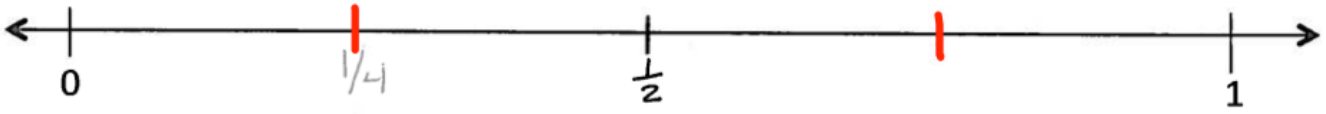


Quin



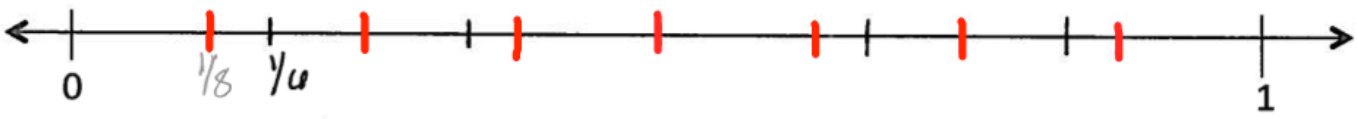
2. Compare the fraction for Elizabeth's distance to the fraction for Laney's distance. Who completed more of a mile in 10 minutes? Show how you know you are correct by showing both fractions on the number line below. Be as precise as possible when locating and marking each fraction on the number line.

   Elizabeth completed more of a mile in 10 minutes than Laney. When the two fractions are shown on the number line, $\frac{1}{2}$ is closer to 1 than $\frac{1}{4}$, so $\frac{1}{2}$ mile is more than $\frac{1}{4}$ mile.



3. Compare the fraction for Aliyah's distance to the fraction for Jade's distance. Who completed more of a mile in 10 minutes? Show how you know you are correct by showing both fractions on the number line below. Be as precise as possible when locating and marking each fraction on the number line.

   Jade completed more of a mile in 10 minutes than Aliyah. When the two fractions are shown on the number line, $\frac{1}{6}$ is closer to 1 than $\frac{1}{8}$, so $\frac{1}{6}$ mile is more than $\frac{1}{8}$ mile.

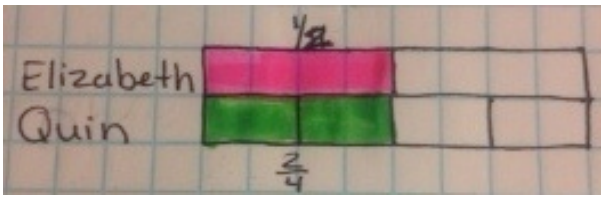


4. Which of the four sisters, Elizabeth, Laney, Aliyah, or Jade, completed the greatest fraction of a mile in 10 minutes? Explain how you know.

   Elizabeth completed the greatest fraction of a mile in 10 minutes because $\frac{1}{2}$ is the greatest fraction of the four sisters. I know that $\frac{1}{2}$ is the greatest because when I divide one whole into equal pieces each time I create more equal pieces, the smaller the pieces become. So when I divide a whole into 4 equal pieces, each $\frac{1}{4}$ is smaller than $\frac{1}{2}$. When I divide the same whole into 6 equal pieces, $\frac{1}{6}$ is smaller than $\frac{1}{2}$ too. If I divide the same whole into 8 equal pieces, $\frac{1}{8}$ is smaller than $\frac{1}{2}$.

5. Which of the sisters completed the same distance? How do you know? Use drawings to show your thinking.

   Quin and Elizabeth ran the same distance because $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent fractions. I know they are equivalent because they are the same size.



On the day of the race, a friend recorded the distance each sister completed in 20 minutes. The table below lists the fraction of a mile each sister completed in 20 minutes.

Sister	Fraction of a Mile Completed in 20 minutes
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Aliyah	$\frac{5}{8}$ mile
Jade	$\frac{5}{6}$ mile
Quin	$\frac{3}{3}$ mile

6. Did Quin or Aliyah complete more of a mile in 20 minutes? How do you know? Use > or < to show your comparison.

   Quin completed more of a mile than Aliyah in 20 minutes because $\frac{6}{8} > \frac{5}{8}$. Since both fractions have the same denominator and both fractions are of the same whole (one mile), the size of each piece when the whole is divided will be the same. 6 pieces are more than 5 pieces, when the size of the pieces is the same.

7. Did Aliyah or Jade complete more of a mile in 20 minutes? How do you know? Use > or < to show your comparison.

   Jade completed more of a mile in 20 minutes than Aliyah because $\frac{5}{8} < \frac{5}{6}$. I know this is true because $\frac{1}{6}$ of a mile is a longer distance than $\frac{1}{8}$ of a mile. If I have 5 pieces that are $\frac{1}{6}$ size, that will be bigger than 5 pieces that are $\frac{1}{8}$ size.

8. Which sister was able to complete 1 mile in 20 minutes? How do you know?

   Elizabeth completed 1 mile because $\frac{3}{3}$ is equal to 1. If I divide a whole into three equal parts and shade 3 of those parts, the whole figure will be shaded.