Field of Play:
Measuring Distance, Rate, and Time
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Math Objective

Children learn about a special kind of ratio called a rate. Children compare amounts that aren't measured in the same way. They use a double number line and a table to find a unit rate. Children also use a proportion to find two equal ratios. And they use cross products to solve a proportion.

iMath Discover Activity

In this activity, children use wind-up toys to create a chart. In the chart, children record ratios that compare different measurements. Children will find each toy's unit rate of travel.

Materials
- ruler
- tape
- wind-up toys
- stop watch
- paper and pencil

➤ **Objectives**

Children will:
• use a stopwatch to time the toy.
• use a metric or customary-unit measurement tool to measure how far the toy travels.
• create a chart.
• write ratios.
• use a double number line or a table.
• write and use cross products.

Lesson Plan

Before Reading

Investigation	Math Concepts
Ask children to look at the picture on pp. 4–5. Read the text. Ask: *What is a Field Day? Have you ever participated in one? What kind of wild and wacky activities can you think of for a Field Day?* Record children's answers on the board.	Connecting to what they know helps children engage in the topic.
Ask: *What is the purpose of a ratio? How many children are there in this class? How many teachers? What is a ratio we can write using these two numbers?* Record children's answers on the board.	Accessing prior knowledge gets children to think about and engage with the topic.

Children join students and teachers as they plan a Field Day for their school. They learn to use ratios and find the unit rate, comparing two different kinds of measurements. Children use double number lines, tables, write a proportion, and use cross products.

During Reading

Investigation	Math Concepts
pp. 6–9: Read pp. 6–7 aloud. Ask: *How is a rate different from a ratio? What is an equivalent fraction?* Record children's answers on the board. Invite a volunteer to draw the double number line from p. 7 on the board. Talk students through the text using the number lines. Have children discuss the value of the table. Then, read p. 8 aloud. Ask: *What is a proportion?* Check children's understanding. Demonstrate how to solve a proportion using cross products.	Children understand ratio concepts and use ratio reasoning to solve problems. They use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

During Reading (continued)

Investigation	Math Concepts
pp. 12–13: Read p. 12 aloud. Have children work in pairs to draw a double number line and solve the problem. Then, invite a volunteer to draw the problem on the board and show the solution. Read p. 13 aloud. Ask: *How will you set up a table to find the answer?* (Refer back to p. 8 if necessary.) Have children continue working in pairs to create the table. Invite a volunteer to draw the finished table on the board.	Children use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
pp. 14–15: Invite a volunteer read pp. 14–15 aloud. Have children refer back to p. 9. Ask: *What do we need to do first? Next? Last?* Children work alone using pencil and paper to find the answer. Demonstrate how to work the problem on the board after children have finished their attempt.	Children use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. Children find proportions using cross products.
pp. 16–17: Read pp. 16–17 aloud. Brainstorm ideas with children about how to solve this problem. Have children work this problem using paper and pencil. Walk around and check their work. Demonstrate how to work the problem on the board.	Children use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
pp. 18–19: Read p. 18 aloud. Write the problem on the board. Demonstrate how to work the problem with suggestions from children. Read p. 19 aloud. Ask: *What will we need to do to find how many feet the runner ran per second?* Have children work this problem on their own with paper and pencil. Invite a volunteer to demonstrate the problem on the board.	Children use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. Children find proportions using cross products.
pp. 20–24: Place children in groups. Have them read each of these pages silently. Children discuss and work the problems on each page together. Give children ample time to complete the problems. Have each group present at least one of the problems and its solution.	Children use ratio reasoning to convert measurement units; manipulate and transform units appropriately when adding, subtracting, multiplying or dividing quantities. Children find proportions using cross products.

During Reading (continued)

Investigation	Math Concepts
pp. 25–29: Invite children to read pp. 25–26 silently. Ask: *Have you ever used a hula-hoop? Could you keep the hoop spinning?* Provide two hula-hoops. Invite two volunteers to hula-hoop for two minutes. Count how many spins of the hoop each child completes in that time. Then have children find out how many seconds it takes each hula-hooper to achieve three full spins. Read p. 27 aloud. Demonstrate how to work the problem on that page. Invite volunteers to read pp. 28–29 aloud. Encourage children to ask questions.	Children use ratio reasoning to convert measurement units; manipulate and transform units appropriately when adding, subtracting, multiplying or dividing quantities.
pp. 30–31: Children read pp. 30–31 silently. Have them work each problem using pencil and paper. Walk around and review children's work.	Children use ratio reasoning to convert measurement units; manipulate and transform units appropriately when adding, subtracting, multiplying or dividing quantities.
pp. 32–33: Read these pages aloud. Have children pair up to work the problem on page 33. Say: *Remember that pairs of gloves and socks count as one item each.*	Children use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
pp. 34–35: Children continue to work in pairs. Invite a volunteer to read these pages aloud. Have pairs work the problem together. Invite volunteers to show their work on the board.	Children understand ratio concepts and use ratio reasoning to solve problems.
pp. 36–37: Read pp. 36–37 together. Ask: *What strategy would you use to find the answer to the problem on p. 36? Let's look back at pp. 6–9 to review the possibilities.* Have children select a strategy to work the problem. Ask: *What is the purpose of traffic cones? What special features do they have?*	Children understand ratio concepts and use ratio reasoning to solve problems. They use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
pp. 38–41: Read these pages together. Children work to solve the problems on these pages using paper and pencil. Have them raise their hands if they have questions. Walk around and review children's work.	Children understand ratio concepts and use ratio reasoning to solve problems.

During Reading (continued)

Investigation	Math Concepts
pp. 42–44: Read these pages together. Answer the questions and work the problems together. Ask: *Which strategies do you think work best in this situation?*	Children understand ratio concepts and use ratio reasoning to solve problems. They use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
p. 45: Read p. 45 aloud together. Discuss with children some possible locations they might use. Provide drawing paper and art materials.	Children research, measure, and design an obstacle course.

After Reading

Ask children to restate the key ideas in the book.

Investigation	Understanding Math
Have children select two of the games from the story. Play these outside or in the park. Have children keep a chart of times and distances. Find unit rates for the activities.	Children use a real-world situation to learn ratio concepts and use ratio reasoning to solve problems.
Children keep track of how far they walk in a week using a pedometer. They create a table of distances and locations. Children find unit rates for amounts in the table.	Children use a real-world situation to learn ratio concepts and use ratio reasoning to solve problems.