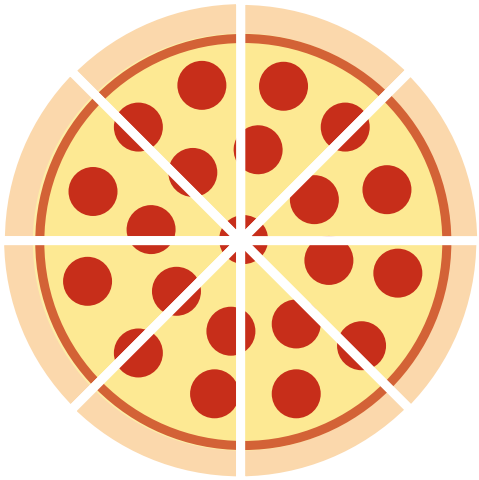
The pizza party



Few events create as much excitement and anticipation as a class pizza party. Why not harness that excitement through a math investigation during which students help plan the party? In this problem scenario, students determine how many pizzas must be ordered for a class pizza party.

Problem scenario

We are going to have a class pizza party! I found out that we will get the best deal if we order pizzas with eight slices. How many pizzas should we order? Show how you know.

See the **activity sheet** on **page 395** for an additional question.

Classroom setup

Before presenting the problem to your students, gather some materials:

- A large piece of paper for each pair or group of students to record their solutions
- Pens or markers
- A digital camera, or a smartphone or tablet with a camera

Present the problem scenario to the students. They may ask how many slices of pizza must be ordered, but they must determine the answer. You might inspire some creative thinking by asking such questions as the following:

- How many people will attend?
- Will you include teachers?
- How many slices will each person eat?
- Will everyone eat the same amount?

Have your students turn to an "elbow partner" to discuss which question they will answer today and some initial ideas of how they will determine how many slices to order. Ask one student to share today's problem with the rest of the class to ensure understanding of the task. Organize students in pairs or triads to solve the problem. Distribute the activity sheet or paper for students to record their answers.

As students engage in the activity, walk around the classroom and observe the strategies that they are using to solve the problem. You may want to take some pictures with a digital camera, a smartphone, or a tablet to help gather evidence of student thinking during the solution process. Try not to tell the students how to do the math, but rouse their thinking by using such questions as those listed above and the following:

- How many slices will you need in total?
- How could you make sure you will not run out of pizza?
- How will you find out how many pizzas you will need?

When students have solved the problem, select solutions that employ different strategies to share with the whole class. For example, some students may have assumed each person would get one slice and proceeded to use repeated subtraction of eight to determine the answer. Other students may have assumed each person would get two pieces each, first determined the total number of slices needed,

Where's the math?

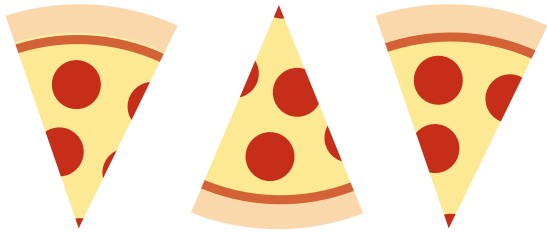
Many school division problems provide partitive contexts in which students are given the total number of objects and the number of groups the objects need to be "parted," or divided, into. Students determine how many objects will be in each group. This scenario offers students a quotative division context in which the students begin by determining the total number of pizza slices needed. The number of objects in each group—or in this case, eight pizza slices—is supplied, and they must determine how many groups (pizzas) will be needed.

Depending on their previous experiences and comfort levels with multiplication and division, most students may initially use additive strategies, such as repeated addition or subtraction of eight, to solve this problem. Other students may use multiplicative strategies, such as the distributive property, to determine that ten pizzas would be eighty slices and one more pizza would make eighty-eight slices, for a total of eleven pizzas. Some students may also use proportional reasoning to determine that if each person eats two slices, then four people represent one pizza. So, if there were twenty people, we would need five pizzas. This problem scenario provides many opportunities for a class to explore the meaning of division and to examine, compare, and connect additive and multiplicative strategies for solving a division question.

and then used repeated addition of eight until they reached the total needed. As you display different solutions, you could ask questions of the class to prompt more discussion:

- What do you think this group did to solve the problem?
- Do you have any questions about this solution?
- How many slices would each person get? How do you know?
- How did you decide how many slices to order for each person?
- How many pizzas would this group need to order?
- Would any pizza be left over? Why or why not?
- Is there a faster way than adding or subtracting eights?
- If we needed 80 slices, how many pizzas would we need? How about if we needed 100 slices?

As class members share ideas, start a list on the board or on chart paper to record students' thinking.



Extensions and modifications

Provide additional challenges for students who finish early: If each pizza costs $6.95, how much will the total cost be for all the pizzas? A further extension could be to determine the cost of each pizza slice.

If you feel that some students might be overwhelmed by the task, you could provide a "friendly number" of total slices, such as sixteen or twenty-four, and ask students to determine the number of pizzas. Calculating the total amounts mentally or by hand may be appropriate for most students; however, some students may need the use of a calculator.

Share your students' work

Try this problem in your classroom. We are interested in how your students responded to the problem, which problem-solving strategies they used, and how they explained or justified their reasoning. Send your thoughts and reflections—including information about how you posed the problem, samples of students' work, and photographs showing your problem solvers in action—by **May 1, 2015**, to Problem Solvers department editor Ed Enns, Waterloo Region District School Board, Learning Services, 51 Ardelt Avenue, Kitchener, Ontario N2C 2R5; or email him at **ed_enns@wrdsb.on.ca**. Selected submissions will be published in a subsequent issue of *TCM* and acknowledged by name, grade level, and school name unless you indicate otherwise.

Edited by **Ed Enns**, an elementary school learning services consultant with the Waterloo Region District School Board in Kitchener, Ontario, Canada. Each month, this section of the Problem Solvers department features a new challenge for students. Readers are encouraged to submit problems to be considered for future columns. Receipt of problems will not be acknowledged; however, those selected for publication will be credited to the author. Access **www.nctm.org/tcmdepartments** to find submission guidelines for all departments.

Name_____

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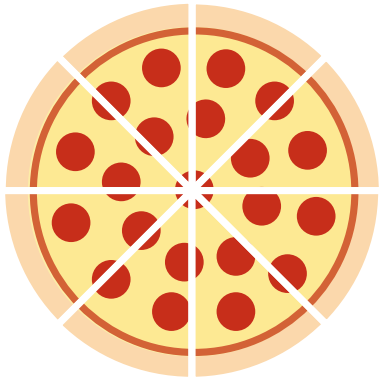

We are going to have a class pizza party! I found out that we will get the best deal if we order pizzas with eight slices.

1. How many pizzas should we order? Show how you know.

2. If each pizza costs $6.95, what will be the total cost for all the pizzas? Explain.

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