

Teacher Package

Mathematics Exemplar Task Grade 4 – Number Sense and Numeration / Data Management and Probability

Teacher Package

Title: Pizza for a Class Party

Time requirements: 130-150 minutes (total)

- Pre-task 1 – 20-30 minutes
- Pre-task 2 – 20-30 minutes
- Exemplar task – 45 minutes x 2

(Time requirements are suggestions, and may vary.)

Description of the Task

Students are given the task of ordering pizza for a class party. They will use price lists to find the cost of pizzas from two different pizza parlours and will compare the prices for the best value. Next, they will use collected and given data to make decisions about pizza that needs to be ordered. Students will solve problems related to fractional parts of pizzas, and will give all the possible combinations of toppings, from a selection of three available toppings, for a two-topping pizza.

Expectations Addressed in the Exemplar Task

Note that the codes that follow the expectations are from the Ministry of Education's *Curriculum Unit Planner* (CD-ROM).

Number Sense and Numeration

Students will:

1. represent, and explore the relationships between, decimals, mixed numbers, and fractions using concrete materials and drawings (4m1);
2. compare and order whole numbers and decimals using concrete materials and drawings (4m2);
3. understand and explain basic operations (addition and subtraction) of decimals by modelling and discussing a variety of problem situations (4m4);

4. solve problems involving whole numbers and decimals, and describe and explain the variety of strategies used (4m7);
5. compare and order whole numbers and decimals from 0.01 to 10 000 using concrete materials, drawings, and symbols (4m13);
6. represent and explain number concepts and procedures (4m15);
7. represent, compare, and order mixed numbers and proper and improper fractions with like denominators (e.g., $\frac{1}{8}$ and $\frac{2}{8}$ or $\frac{1}{4}$ and $\frac{2}{4}$) using concrete materials and drawings (4m18);
8. select the appropriate operation and solve one-step problems involving whole numbers and decimals with and without a calculator (e.g., how much change will you receive when you purchase an \$8.95 item with \$10?) (4m30).

Data Management and Probability

Students will:

9. collect and organize data and identify their use (4m101);
10. interpret displays of data and present the information using mathematical terms (4m103);
11. conduct surveys and record data on tally charts (4m108);
12. explain how data were collected and describe the results of a survey (4m110);
13. use conventional symbols, titles, and labels when displaying data (4m111);
14. construct labelled graphs both by hand and by using computer applications, and create intervals suited to the range and distribution of the data gathered (4m114);
15. read and interpret data presented on tables, charts, and graphs, and discuss the important features (4m115).

Teacher Instructions

Prior Knowledge and Skills Required

Before attempting the task, students should have had experience with the following:

- collecting, organizing, displaying, and interpreting data
- designing and conducting surveys
- representing common fractions and mixed numbers using concrete materials
- making a systematic list
- solving problems involving operations with whole numbers and decimals

The Rubric*

The rubric provided with this exemplar task is to be used to assess students' work. The rubric is based on the achievement chart given on page 9 of *The Ontario Curriculum, Grades 1–8: Mathematics, 1997*.

Before asking students to do the task outlined in this package, review with them the concept of a rubric. Rephrase the rubric so that students can understand the different levels of achievement.

Accommodations

Accommodations that are normally provided in the regular classroom for students with special needs should be provided in the administration of the exemplar tasks.

Materials and Resources Required

- Rubric – one copy for each student
- Overhead transparency of the rubric, for review with the students (optional – see General Instructions, point 2)
- Overhead projector (optional – see General Instructions, point 2)
- Student package (see Appendix 1)
- Sets of fraction pieces
- Calculators
- Computers with graphing software
- Paper and pencils

Classroom Set-up

Students will need to work at tables or desks. You may have students work in pairs or small groups for the pre-tasks. Students work individually and independently for the exemplar task.

General Instructions

1. The rubric for this task should be used to assess the students' work.
2. Before administering these tasks, review the rubric with the class. Give each student a copy of the rubric, or create a transparency to use with the class.
3. The pre-tasks are intended to ensure that students have the knowledge required to complete the exemplar task.
4. Provide students with an adequate supply of fraction pieces.
5. Provide ample time for the students to become familiar with using the fraction pieces, if they have not used this manipulative before.
6. The time frames suggested for the pre-tasks and the exemplar task may vary.
7. All of the student's work must be completed at school.
8. Encourage students to use calculators, manipulative materials (e.g., fraction pieces), and diagrams in these tasks. Remind the students to show their work.

For the exemplar task:

Part A, question 1 c) – Students should not be expected to divide \$50.00 by the cost of each two-topping pizza. However, they can use strategies such as repeated addition (keep adding the cost of the pizza to get to the greatest total less than \$50.00) or repeated subtraction (keep subtracting the cost of the pizza from \$50.00), and count the number of times the operation is performed, and determine how much money is left over.

Part A, question 2 – Students might design a survey to find the number of slices students will eat, the topping(s) they would like on their pizza, the type of crust, and so forth.

Part A, question 3 a) – To construct an active survey might be disruptive within the task. An alternative suggestion would be for students to imagine collecting the data. Otherwise, the students could collect the data during recess.

Part A, question 3 b) – Students can construct a graph by hand or by using a computer application.

Part B, questions 1, 2, and 4 – Students should use manipulative materials and/or diagrams to solve the problem. They should not be required to use fraction operations.

Part B, question 3 – Students can use any method to organize and find all possible combinations. A double ingredient (e.g., double onion) can count as a combination.

Task Instructions

Introductory Activities

The pre-tasks are designed to review and reinforce the skills and concepts that students will be using in the exemplar task and to model strategies useful in completing the task.

Pre-task 1 (20–30 minutes)

Pose the following problem:

- *Imagine that our class is going to have a pizza party and we will order large pizzas that are cut into 8 slices. Everyone is going to have 2 slices of pizza. What fraction of a pizza will each student eat?*

Have the students work in pairs or in small groups to solve the problem. Ask students to explain strategies they used.

Extend the problem:

- *Everyone in the class is going to have 2 slices of pizza. If the pizzas were cut into eighths, how many pizzas would we need to order?*

Again, have the students work collaboratively to solve the problem. Discuss solutions and strategies.

*The rubric is reproduced on page 14 of this document.

Pre-task 2 (20–30 minutes)

Show students a price list similar to the following:

The Pizza Place
 Pizza by the slice – \$2.25
 Can of pop – \$0.75

Ask the students to calculate the cost of (a) 1 slice of pizza and 2 cans of pop, (b) 2 slices of pizza and 1 can of pop, (c) 2 slices of pizza and 2 cans of pop, and so forth. Have students describe the strategies they used to calculate the costs.

Exemplar Task (45 minutes × 2)

1. Hand out the student package. (See Appendix 1 for the worksheets containing the task the students will work on independently.)
2. Remind students about the rubric, and make sure that each student has a copy of it.
3. Tell the students that they will be working independently on the assigned task.
4. Set the students to work on the task.

Appendix 1

Exemplar Task – Part A

Your class has won a pizza party for contributing a lot of canned goods to the food bank.

Your class has flyers from two pizza parlours.

PIZZA PALACE

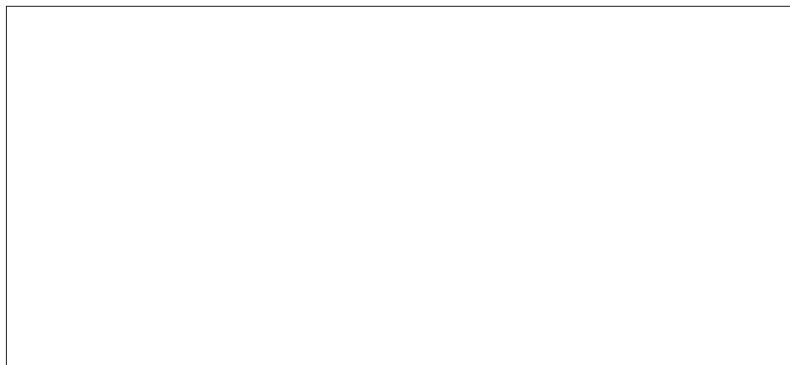
Large pizza with cheese – \$12.99
Each additional topping – \$1.45
 (maximum 3 toppings)

YUM YUM PIZZA

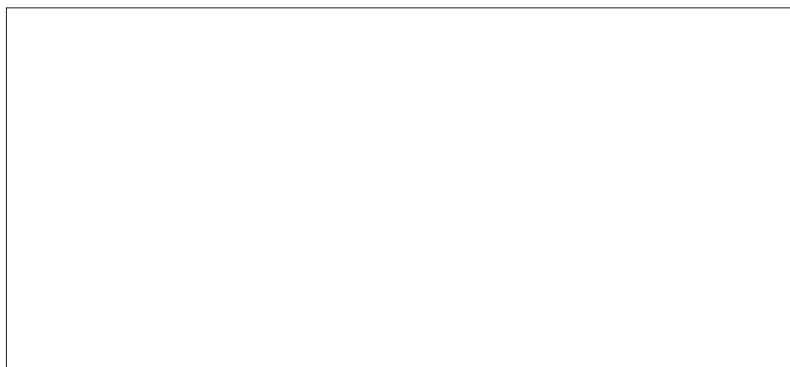
Large pizza with cheese – \$14.00
Each additional topping – \$0.99
 (maximum 3 toppings)

1. a) Find all the possible prices of large pizzas from both pizza parlours.

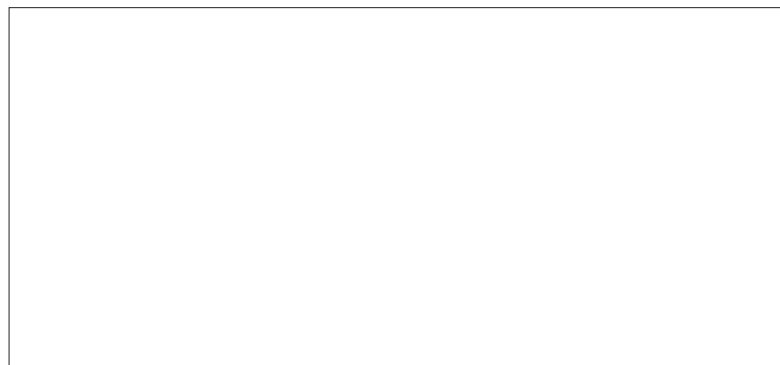
b) At which pizza parlour can the class get a better deal, Pizza Palace or Yum Yum Pizza? Explain your thinking.



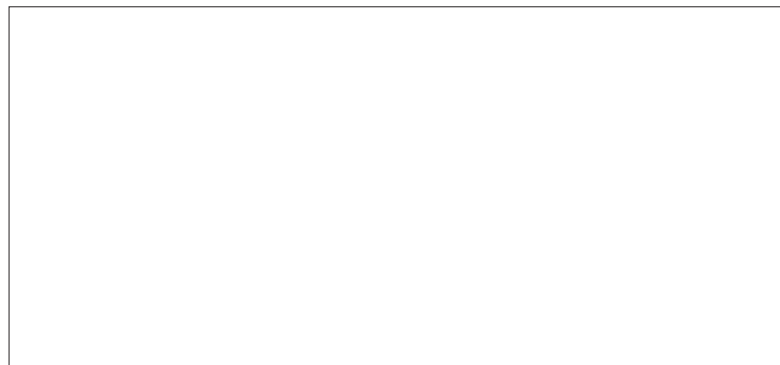
c) The class has \$50 to spend on two-topping pizzas. Where should they buy and why?



2. Your teacher puts you in charge of ordering the pizza for your class. What survey questions would you need to ask your classmates before you order the pizza?



3. a) Ask 10 classmates one of your survey questions. Collect your data in the space below.



b) Display the data you collected in a graph.

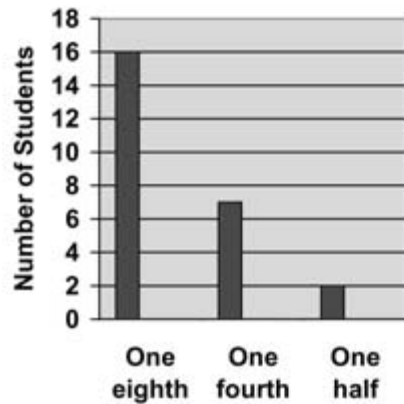
c) How would you use the data to help you decide what to order?

Part B

1. To help them decide their pizza order, students in a class gathered the following data:

How much pizza will you eat?

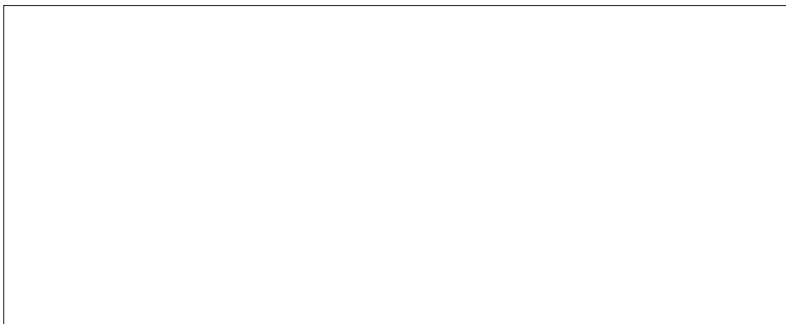
One eighth	### ### ### /
One fourth	### //
One half	//



Use the data given to decide how much pizza the class should order.

2. Many Grade 4 students can eat $\frac{1}{8}$ of a pizza. If this were true for your class, how many pizzas would you need to order? Explain your thinking.

3. Suppose you have the choice of 3 pizza toppings: mushrooms, olives, and onions. Show all the possible combinations for a two-topping pizza.



4. Suppose that $\frac{3}{4}$ of a twelve-slice pizza is left over. Show how six students could share the leftover pizza equally.

