

Teacher Package

Mathematics Exemplar Task Grade 1 – Number Sense and Numeration Teacher Package

Title: Going to the Zoo

Time Requirements: 70–100 minutes (total)

- 20–30 minutes to complete Pre-task 1
- 20–30 minutes to complete Pre-task 2
- 30–40 minutes to complete the exemplar task

The pre-task activities will take several classroom periods to complete and should be done on different days.

Make large blocks of time available in order to facilitate the students' learning. You could present one task per day to the students. Alternatively, any one of the tasks may be spread out over a series of days, to allow the students time to consider the concepts, internalize them, and then apply them to the actual exemplar task. Note that it may take some students longer than others to complete the exemplar task.

Description of the Task

This task will require students to determine the number of possible combinations in which 16 people can be organized in cars and vans for transportation to the zoo. Students are told that a van can hold a maximum of 6 people and a car can hold a maximum of 4 people. Students are asked to explain how they solved the problem.

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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).

Students will:

1. understand and explain basic operations (addition and subtraction) of whole numbers by modelling and discussing a variety of problem situations (1m6);
2. solve simple problems involving counting, joining, and taking one group away from another, and describe and explain the strategies used (1m8);
3. represent addition and subtraction sentences (e.g., $5 + 6 = 11$) using concrete materials (e.g., counters) (1m30);
4. use concrete materials to help in solving simple number problems (1m35);
5. describe their thinking as they solve problems (1m36).

Teacher Instructions

Prior Knowledge and Skills Required

To complete this task, students should have some knowledge or skills related to the following:

- solving problems that involve multiple combinations or solutions
- solving problems using manipulative objects
- exploring addition and subtraction concepts
- communicating their problem-solving strategies and mathematical learning, both orally and in writing

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 task.

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*The rubric is reproduced on page 13 of this document.

Classroom Set-up

For the investigation of the assigned tasks, the following classroom organization is recommended:

- a meeting area for a large group
- meeting areas for small groups or partner activities
- individual workspaces
- chair designated as the mathematician’s chair

Materials and Resources Required

Before students attempt a particular task, provide them with the appropriate materials from among the following:

- copies of the student package for each student
- egg cartons as an option for children to choose to make a van or car
- three fishbowls or similar large containers
- writing instruments (pencils, erasers)
- paper
- counters (e.g., coloured tiles, small blocks, buttons, beans, centicubes, interlocking cubes)
- crayons

Have a tape recorder and audiotape available for recording students’ communication of their learning.

General Instructions*Setting the Stage*

All the student work is to be completed in its entirety at school.

Students are to work in small groups or with partners to complete the pre-task activities. Students are to work individually and independently to complete the exemplar task.

Observing the Process

As students are working on the tasks, have them explain what they are doing. Having students explain their work orally reveals deep mathematical thinking that cannot always be seen in the written work of primary students. Where students do provide written work and it is not easily read, transcribe that work at the side of the student’s page. In this space also, record any observations or comments the student makes that will be helpful in assessing the level of the student work.

You may also choose to use the mathematician’s chair to assist in the assessment process. A mathematician’s chair is similar to an author’s chair, except that a student sits in a designated chair and shares with classmates mathematics problems and solutions rather than stories or books. Expect students, while in the mathematician’s chair, to use effective speaking skills and to

communicate their thoughts clearly and completely. Also, expect classmates to use effective listening skills and to give the speaker useful feedback. To elicit feedback, you may use the following prompts:

- “What did you like about the problem?”
- “Do you agree or disagree with the solution?”
- “How could the speaker improve the problem or solution?”
- “How could the speaker change the problem to create a new problem or change the solution to arrive at a new way to solve the problem?”

See Appendix 2 for an example of a form to use in evaluating a student’s statements and performance while in the mathematician’s chair.

Posting A Word List

It would be useful to post a chart listing mathematical language that is currently being developed or used in the classroom. Such a chart will provide the students with a resource to use when communicating their mathematical learning. Words you may include for this task are: *sort, count, arrange, order, add, group, set, explain, describe, number, combination, strategy, and equals*.

Remind the students to use pictures, numbers, and words when solving their problem(s).

The Pre-tasks

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.

Task Instructions**Introductory Activities*****Pre-task 1: Number of Different Ways of Arranging Crayons (20–30 minutes)***

The students can do this activity independently, working in pairs or small groups. Each pair or small group should choose a recorder to record their discoveries.

1. Provide the pairs or small groups of students with crayons and interlocking cubes to use as manipulatives.

Present the students with the following problem:

Choose three different colours of crayons or interlocking cubes. If you arrange the crayons or cubes side by side and in a straight line inside a box – for example, red, blue, yellow – how many different colour combinations can you make?

This problem should be posted on a chart or the chalkboard and read aloud several times to the students.

2. Have the students discuss as a class what the key points are in the problem. The students need to have practice in identifying the important information in the problem and the strategies they will use to solve the problem.

You may use the following prompts:

- “Tell in your own words what you have to do.”
 - “How can you show your work using pictures, numbers, and/or words?”
3. When the students have had sufficient time to complete the task, bring the class together to have a group sharing time. This opportunity to share is essential, as students will see that there are many different ways to make combinations and solve problems. They should also discuss the different types of materials that were used to solve the problem.

Pre-task 2: Number of Ways of Placing Fish in Bowls (20–30 minutes)

Have the students do this activity in pairs. One student should record the discoveries that the pair makes.

Present the students with the following problems:

1. Your class has 12 fish and 2 bowls. Find as many different ways as you can to put the fish in the bowls. Show how you solved the problem.
2. Your class has 12 fish and 3 bowls. Find as many different ways as you can to put the fish in the bowls. Show how you solved the problem.

These problems should be posted on a chart or the chalkboard and read to the students several times.

Have the students discuss as a class what the key points are in the problems. The students need many opportunities to discuss what are the important points of information within the problems, and to discuss how the problems are alike and how they are different. Discuss the solutions with the class and ask them how they could vary the problems and what would happen if they were to vary them.

Exemplar Task (30–40 minutes)

1. Distribute a copy of the student package to each student.
2. Present the exemplar task problem in the same format as the pre-tasks. However, there will be no class discussion about key points of information in this problem. The students will have to determine on their own what those points are. Provide a variety of materials for the students to use when solving the problem (see the materials list). Inform the students that extra paper is available if they need it.
3. The problem that the students will solve independently is printed in the worksheets in Appendix 1.

Appendix 1: Student Worksheets



16 people are going to the zoo.

Vans and cars can be used to drive everyone to the zoo.

The most a van can hold is 6 people.

The most a car can hold is 4 people.

How many cars and vans could be used? Show as many ways as you can to organize the 16 people in cars and vans.

Explain how you solved the problem.

Appendix 2: Evaluation – Mathematician’s Chair

Name of Student:	
Date:	
Expectation	Comments:
– solve simple problems involving counting, joining, and taking one group away from another, and describe and explain the strategies used (1m8)	
– use concrete materials to help in solving simple number problems (1m35)	
– describe their thinking as they solve problems (1m36)	