

Teacher Package

Mathematics Exemplar Task Grade 1 – Data Management and Probability Teacher Package

Title: Planning a Celebration

Time Requirements: 180–240 minutes (total)

- 30–40 minutes to complete Pre-task 1
- 30–40 minutes to complete Pre-task 2
- 30–40 minutes to complete Pre-task 3
- 30–40 minutes to complete Part 1
- 30–40 minutes to complete Part 2
- 30–40 minutes to complete Part 3

These activities will take place over several mathematics classes and may be done over several days in order for the students to build on the concepts being explored. A significant period of time is recommended to allow students to complete their investigations. The time that it takes each student to complete the exemplar task is not being assessed. Some students may take longer than others to complete the task.

Description of the Task

This task will require students to:

- engage in whole-class discussions to brainstorm a list of things that they could have at a celebration;
- engage in whole-class activity to sort the data, identify the categories, and label the categories;
- work individually to:
 - select one category to explore further by creating a survey question;
 - ask ten students their survey question, record the responses, and create a graph, using Graphers;
 - share with the class their graph and their recommendation for the celebration.

Students will select a category for the celebration, record the survey question they would ask about the category, pose the question to ten classmates, and record the responses made. They will then display the data in a graph and report their findings to the class.

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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. collect, organize, and describe data using concrete materials and drawings (1m92);
2. interpret displays of data using concrete materials, and discuss the data (1m93);
3. conduct an inquiry using appropriate methods (1m95);
4. collect first-hand data by counting objects, conducting surveys, measuring, and performing simple experiments (1m100).

Note that, although all of the expectations listed will be addressed through instruction relating to the task, student achievement of expectation 4 will not be assessed in the final product.

Teacher Instructions

Prior Knowledge and Skills Required

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

- sorting and classifying objects, pictures, and so forth, into different categories and labelling each category
- collecting survey data by using check marks or other techniques
- posing survey questions and collecting data based on the questions posed
- analysing data collected from survey questions
- using the software program Graphers

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 71 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
- 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
- story books or poems that highlight celebrations or parties
- clipboards or other hard surfaces for writing that students can use when collecting data
- writing instruments (pencils, erasers)
- paper
- chart paper or mural paper
- markers
- scissors
- masking tape
- pictures or graphics of items that would be found at a celebration or party (e.g., pizza, pop, cake, hats, balloons)
- sorting circles or hula hoops or string
- computer and the computer software Graphers

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 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 cannot be 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 3 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 during the task. 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: *most, least, recommend, more than, less than, graph, survey, data, sort, and category.*

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: Favourite Recess Activity (30–40 minutes)***

1. Explain to the students that you are interested in finding out a favourite recess activity for the entire class. List the choices on chart paper. This is a brainstorming activity, so accept and record all of the responses you are given, including responses that are not appropriate (e.g., swimming).
2. When you have a list of activities, cut it apart and sort the activities. Some of the possible ways to sort the data include:
 - activities you can do at recess and things you cannot do at recess
 - activities you can do for indoor recess and things you can do for outdoor recess
 - activities you can do in winter at recess and things you can do in the spring at recess
 - activities you do alone and activities you do with your friends
 Your sorting categories will depend on your class list.
3. Select one of the categories and design a survey question with the class. An example might be, “What is your favourite springtime recess activity?” The choices might be using the swings, using the slide, tag, soccer, baseball, or skipping.

4. Create a labelled graph and have students sign in beside their favourite springtime recess activity.
5. Analyse the graph together with the students. Begin with a prompt such as the following:
 - “What does this graph tell us?”
 Other prompts might include the following:
 - “How many more people chose _____ than _____?”
 - “How many fewer people chose _____ than _____?”
 - “How many people altogether chose _____?”
 - “How do you know everyone in the class has his or her choice shown on the graph?”
 - “Would this graph look the same if we asked the students in Grade 2? Why or why not?”
 - “Would this graph look the same if we asked just boys? just girls?”

Pre-task 2: Planning the Celebration (30–40 minutes)

1. Read to the students from story books or poems about celebrations. After the students have been exposed to a variety of stories, the whole class can brainstorm what they would like to have at a celebration. Any suggestions during a brainstorming session are welcomed and encouraged.
2. As the students verbalize their ideas, record them on chart or mural paper. It would be beneficial to have a picture drawn or added beside each idea. Display the brainstorming list in the classroom and make reference to it whenever necessary.

Pre-task 3: Sorting the Data (30–40 minutes)

1. Cut apart the items in the brainstorming list in Pre-task 2 and put them in a large pile.
2. Discuss the ways in which the class could sort the ideas. ***It is important that the students learn to identify these categories rather than having them given to them by the teacher.*** The class may suggest a variety of ways for sorting the information.
3. After the information has been sorted in a variety of ways, the class should decide on the categories that best represent the data.
4. Display the categories. This can be done by creating, or having a student create, a label for each of the categories. The labels should be posted in a list on chart paper or on the chalkboard. The students will use the list of categories as a resource when they create their survey question and collect their survey data.
5. To assist students in creating the choices for a survey question, have them brainstorm things that might be included in the Food category (e.g., carrots, cheese, chips, crackers).
6. For the other categories in the chart, have the students contribute possible choices. Have these choices included in the chart. Students may refer to the sorted piles of brainstormed ideas from Pre-task 2.

Exemplar Task

Part 1: Designing a Survey Question (30–40 minutes)

Each student will design a survey question based on one category from the class sorting activity. The question will help students to make a decision about what choices from the selected category they would like to include in a celebration. In formulating the choices, the students designing the survey question may select items directly from the category as listed on the chart or may select some items from the chart and add other ideas (as long as the items are appropriate to the category). Students should include two to four choices on their survey. They will ask ten classmates their survey question.

Part 2: Collecting and Displaying the Data (30–40 minutes)

Students need to decide how they will collect their data (e.g., using a checklist, using the names of the students). After they have collected their data, they will use the computer program Graphers to graph the results of their data collection. Graphers is a program that has been licensed for use by the Ministry of Education. It can be found on a CD with other ministry-licensed software that was sent to every school in the province. If you are unfamiliar with Graphers, please refer to Appendix 2.

Part 3: Analysing the Data (30–40 minutes)

Students will interpret the data in their graph and write their observations on the organizer provided. They will then share their graph with the class and use the information in the graph to explain what they would include in the celebration. The method of communication for this activity will be the mathematician’s chair. 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 and 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 employ effective listening skills and to give the student in the chair useful and usable feedback. To elicit feedback, you may use prompts such as the following:

- “What did you like about the survey question?”
- “Do you agree or disagree with the choices?”
- “How could the mathematician improve the question or the choice?”
- “How could the mathematician change the question to create a new one or change the choices to arrive at a new way of having a celebration?”

See Appendix 3 for an example of the form that you will need to use in evaluating a student’s statements and performance while in the mathematician’s chair. You may find that a tape recorder is useful for this part of the activity.

Introducing the Exemplar Task

1. Distribute a copy of the student package to each student.
2. Write the following statements on a chart and read them with the students (the statements can be read as many times as necessary):
 - Choose a category from the Celebration chart.
 - Think of a survey question. Make sure you have two to four choices from the category for your survey.
 - Decide how you will collect your data.
 - Ask ten people your survey question.
 - Use Graphers to build a graph of the data that you collected.
 - Print your graph.
3. Have the students conduct their surveys. When they have finished, bring them together while you explain the next part of the task, in which they use the computer program Graphers to display the data they have gathered. Students will need to print a copy of their graph to place in the exemplar package.
4. Prepare students for their turn in the mathematician’s chair. Some students may need prompts to help them to begin their interpretation of the data. For example:
 - “Think about the things you will say about your graph when you have your turn in the mathematician’s chair. Write your ideas in the booklet to help you to remember them.”
 - “What does your graph tell you about the information you collected?”
 - “What decision would you make for the celebration from your choices?”
 - “Why did you make that recommendation?”

Encourage students to use mathematical language from the math chart. Use some of the prompts from Pre-task 1.

Record what the students say as they share their graphs and recommendations for the celebration. The recorded statements will provide assessment information to go with what the student has written in his or her exemplar booklet. See Appendix 3 for a sample recording sheet.
5. The problem that the students will solve independently is provided in the worksheets in Appendix 1.

Appendix 1: Student Worksheets

Planning a Celebration

Your class is planning a celebration.

Create a survey question.

Ask ten people your question.

Record their choices.

My Survey Question and My Data

Here is my graph of the data I collected:

Things I will say about my graph when I share in the
Mathematician's Chair:

Appendix 2: Teacher Notes for Graphers

To create a graph:

- double-click **Warm-Up**;
- choose a set of symbols (by double-clicking);
- click the **Data Maker** icon in the left margin;
- choose enough symbols to correspond with the data (e.g., four balloon symbols if four classmates wanted balloons);
- click **Done**;
- click the **Graphs** icon in the left margin;
- click **Bar Graph** and click **GO**.

To change the category name (under the graph):

- click the name and type in the word you want;
- click **OK** or press the **Enter** key on the keyboard.

To change the category symbols:

- click the **Tools** icon;
- click the **dog** icon on the **Toolbar** (this changes picture symbols to words);
- click the word you want to change and type in the new word;
- click **OK** or press **Enter** on the keyboard;
- continue for each word you want to change.

To print the graph:

- click the **Print** icon;
- click the appropriate **Graph** icon;
- click on the **Put In** icon;
- click **Done**.

Appendix 3: Evaluation – Mathematician’s Chair

Name of Student:	
Date:	
Expectation	Comments
– collect, organize, and describe data using concrete materials and drawings (1m92)	
– interpret displays of data using concrete materials, and discuss the data (1m93)	
Language – use mathematical terminology	