
How Do They Measure Up?

Mathematics



Including:

- What Are the Height Characteristics of a Kindergarten Student?
- Which Statistic, Mean or Mode, Best Represents the Data?
- How Does the Measurement Data Compare?
- Design, Build and Test
- How Much Material Is Needed to Make an Apron ... ?
- How Much Does an Apron Really Cost?
- What Does a "One Size Fits All" T-shirt Look Like?

A Unit for Grade 5

Written by:

Gerri Puritch and Rose Salerno

Length of Unit: approximately: 16 hours

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Mathematics A Unit for Grade 5

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A Unit for Grade 5

Written by:

Geri Puritch and Rose Salerno

Toronto Catholic District School Board

Based on a unit by:

Geri Puritch and Rose Salerno

Toronto Catholic District School Board

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How Do They Measure Up?

Mathematics A Unit for Grade 5

Task Context

Students design and build a prototype of an apron for use in a Kindergarten class. The shape and design of the apron is decided through the collection and analysis of different body measurement data about the kindergarten students. Students use this experience to determine and prepare a proposal regarding ideal T-shirt size for Kindergarten students.

Catholic Graduate Expectations

CGE1d - develops attitudes and values founded on Catholic social teaching and acts to promote social responsibility, human solidarity, and the common good;

CGE2c - presents information and ideas clearly and honestly and with sensitivity to others;

CGE3b - creates, adapts, evaluates new ideas in light of the common good;

CGE3c - thinks reflectively and creatively to evaluate situations and solve problems;

CGE4a - demonstrates a confident and positive sense of self and respect for the dignity and welfare of others;

CGE4b - demonstrates flexibility and adaptability;

CGE4f - applies effective communication, decision-making, problem-solving, time, and resource management skills;

CGE5a - works effectively as an interdependent team member;

CGE5e - respects the rights, responsibilities, and contributions of self and others;

CGE7b - accepts accountability for one's own actions.

Task Summary

Students use different concrete materials, e.g., measuring tools, models to:

- collect, organize, represent, and interpret data about Kindergarten students' body measurements, using different graphic organizers and decimals;
- calculate and graphically represent the mean, mode, and range of the Kindergarten student body measurement data;
- create a life-size paper prototype of an apron that will be used in a Kindergarten class;
- estimate and calculate the area of material needed to make the apron;
- calculate the costs of purchasing different types of material to make the apron;
- design a pattern and set of instructions to make the apron.

Culminating Task Assessment

Students have been asked by The One Size Fits All clothing company to determine the best size T-shirt for students in Kindergarten. Students must use previously gathered data and prepare a proposal for the company. The T-shirts are made in four colours and used at recess and play days to identify team members.

Additional End of Unit Assessment Opportunity

Student Mathematics Portfolio

Students review, analyse, and describe their own mathematics learning, using their collection of student performance tasks (e.g., journal, quiz, in-class response to a learning task) that were completed during the



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unit (see BLM 7.1).

Links to Prior Knowledge

For this unit, students are expected to have had previous learning experiences in:

- collecting and organizing data;
- constructing labelled horizontal and vertical bar graphs and corresponding pictographs by hand, using conventional symbols, titles, labels, and scale;
- reading and interpreting data presented on tables, charts, and graphs;
- estimating, measuring, and calculating the area of polygons;
- finding the range of values in data collected;
- conversion of metric units.

Considerations

Notes to Teacher

Adaptations

Adaptations include adjustments for exceptional pupils, students with special education needs, and/or ESL/ELD students. Teachers should consult students' Individual Educational Plans (IEP) for specific directions on required accommodations and/or modifications. Use the Teacher Companion (see Ontario Curriculum Unit Planner) to browse, copy, or bookmark Special Education and ESL/ELD strategies.

Sensitivity around Students' Body Size/Image:

In this unit, the teacher must be sensitive to individual students' feelings and perceptions, regarding body image and size. The body measurements enable students to create authentic clothing, while being sensitive to students' varying levels of comfort about body size/image.

Although the context of the unit is developed around a Kindergarten class, any primary class could be used.

All body measurements could be taken without having students touch one another; that is, they could "eyeball" the required body measurements, i.e., shoulder width, length from shoulder to hip, length from back of waist to ankle, length from back of mid-thigh to ankle. Students step back about .5 m away from the student being measured, holding the tape and eyeballing the length of the body area.

Grade 5 students should be instructed to make no comments to the Kindergarten students about their body measurements and both the Grade 5 teacher and the Kindergarten teacher should monitor that this instruction is being followed.

Safety:

The teacher must monitor students' use of cutting tools.



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1 What Are the Height Characteristics of a Kindergarten Student?

Students collect, organize, and analyse different height measurements of Kindergarten students.

Catholic Graduate Expectations

CGE4f - applies effective communication, decision-making, problem-solving, time, and resource management skills;

CGE5a - works effectively as an interdependent team member;

CGE5e - respects the rights, responsibilities and contributions of self and others;

CGE7b - accepts accountability for one's own actions.

2 Which Statistic, Mean or Mode, Best Represents the Data?

Students calculate and interpret the mean and mode of the data collected (i.e., the heights of Kindergarten students).

Catholic Graduate Expectations

CGE3b - creates, adapts, evaluates new ideas in light of the common good;

CGE4a - demonstrates a confident and positive sense of self and respect for the dignity and welfare of others;

CGE4b - demonstrates flexibility and adaptability;

CGE4f - applies effective communication, decision-making, problem-solving, time and resource management skills.

3 How Does the Measurement Data Compare?

Students are introduced to the form and function of protective clothing and begin to think about an appropriate design for an apron to protect Kindergarten students from getting paint on their clothes. They measure, record, order, and compare, on a graphic organizer and/or electronic spreadsheet, measurements of Kindergarten students. Students analyse and describe their findings about the student measurement data. Students gain practice in the use of decimals.

Catholic Graduate Expectations

CGE3b - creates, adapts, evaluates new ideas in light of the common good;

CGE3c - thinks reflectively and creatively to evaluate situations and solve problems.



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4 Design, Build and Test

Students design and create a paper prototype of a three-dimensional representation of an apron, based on the mean, mode or range of the data from the Kindergarten student body measurements. Students evaluate the effectiveness of the aprons by trying them on a range of Kindergarten students.

Catholic Graduate Expectations

CGE4b - demonstrates flexibility and adaptability;

CGE4f - applies effective communication, decision-making, problem-solving, time, and resource management skills;

CGE5a - works effectively as an interdependent team member;

CGE5e - respects the rights, responsibilities and contributions of self and others.

5 How Much Material Is Needed to Make an Apron ... ?

Students calculate the area of material needed to make one apron. Using transformational geometry, students determine the smallest amount of material needed to make four aprons.

Catholic Graduate Expectations

CGE2c - presents information and ideas clearly and honestly and with sensitivity to others;

CGE3b - creates, adapts, evaluates new ideas in light of the common good;

CGE4a - demonstrates a confident and positive sense of self and respect for the dignity and welfare of others;

CGE5e - respects the rights, responsibilities, and contributions of self and others.

6 How Much Does an Apron Really Cost?

Students calculate the cost of making their aprons out of different materials.

Catholic Graduate Expectations

CGE3c - thinks reflectively and creatively to evaluate situations and solve problems.

7 What Does a "One Size Fits All" T-shirt Look Like?

Students have been asked by The One Size Fits All clothing company to determine the best size T-shirt for students in Kindergarten. Students must use previously gathered data and prepare a proposal for the company. The T-shirts are made in four colours and used at recess and play days to identify team members.

Additional End of Unit Assessment Opportunity

Student Mathematics Portfolio

Students review, analyse, and describe their own mathematics learning, using their collection of student performance tasks (e.g., journal, quiz, in-class response to a learning task) that were completed during the unit (see BLM 7.1).

What Are the Height Characteristics of a Kindergarten Student?

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Subtask 1

120 mins



Description

Students collect, organize, and analyse different height measurements of Kindergarten students.

Catholic Graduate Expectations

CGE4f - applies effective communication, decision-making, problem-solving, time, and resource management skills;

CGE5a - works effectively as an interdependent team member;

CGE5e - respects the rights, responsibilities and contributions of self and others;

CGE7b - accepts accountability for one's own actions.

Expectations

- 5m37 • demonstrate an understanding of and ability to apply appropriate metric prefixes in measurement and estimation activities;
- 5m41 – use prefixes in the metric system correctly;

Groupings

Students Working As A Whole Class
Students Working In Small Groups
Students Working Individually

Teaching / Learning Strategies

Brainstorming
Graphing

Assessment

- The teacher assesses oral descriptions, charts and graphs, chart paper responses, and Journal #1.
- Students assess their learning skills and group work skills (BLM 1.1). Note: this BLM is used for each subtask.

Assessment Strategies

Observation
Learning Log

Assessment Recording Devices

Teaching / Learning

Subtask Focus

Predicting, Collecting, Representing, and Interpreting Data

Lesson 1 - Activate Prior Knowledge

Questions to consider:

- What is height?
- How is it measured?
- Why would you need to measure height?
- What units are used to measure height?
- Have you had your height measured? When? Why?
- What is your height? (This will give a good indication of what students know about units used to measure

What Are the Height Characteristics of a Kindergarten Student?

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Subtask 1

120 mins



height.)

Shared Inquiry: How Tall Is a Kindergarten Student? How Can You Find Out?

- Discuss with the class that they are going to the Kindergarten class to collect the height measurements of a group of students.
- Provide students with directions to record the Kindergarten students' measurement in cm. Assign the Kindergarten students to each group of Grade 5 students to ensure that all students are measured and that there is not a duplication of data.
- Students measure and record the heights in cm and names of Kindergarten students.
- Have students record heights (in cm) of each student on a class chart.

Discussion: What Data Interpretations Can We Make?

- To facilitate students' analysis, students create a bar graph using class data.
- Review the important features of a graph (e.g., accurate data representation in the bars; title; labels, regular intervals in the scale; scale includes the range of data).
- Students interpret the student height data, by making three statements about the class data (e.g., ____ is taller by ____ cm than ____; 5 students are the same height).

Individual Work Sample

Journal: How do graphs help us interpret data? What can be said about the heights of the Kindergarten students? Which unit is most appropriate for measuring the height of Kindergarten students?

Lesson 2 - Why Would We Reorganize Data?

Introduction: What Was Difficult about Reading the Class Data?

Students review the data, and identify and explain orally the difficulties in interpreting the class height data (e.g., data is repeated in different areas - should be clustered).

Shared Inquiry: What Ways Can the Data Be Reorganized?

- Ask students a question such as, What ways can we organize the data to make more interpretations of the data?
- With a partner, students brainstorm ways to organize the student height data, e.g., shortest to tallest, categories of height, manually or using graphing software. Ideas are shared with the whole class.
- Have pairs or small groups of students volunteer, or assign them particular data organizational formats to ensure that a range of organizers are used in the class.
- On chart paper, students reorganize and record the student height data in different ways (e.g., in categories using a tally, categories of raw data, raw data ordered from least to greatest height, concrete graph using the post-it notes, circle graph, bar graph, pictograph) manually or using graphing software.
- Students orally identify and calculate the range of student heights, using the least and greatest height measurement from the class data charts and/or graphs.

Discussion: What Interpretations Are Reasonable and Unreasonable?

Discuss results of reorganizing the data. How does it make it clearer? How can we determine the range of heights in Kindergarten?

Individual Work Sample

Journal #1: Tell how you would determine the range in height of your Grade 5 class. How do you think the range would compare with the Kindergarten class? Why do you think this?

Adaptations

What Are the Height Characteristics of a Kindergarten Student?

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Subtask 1

120 mins



Resources

	BLM 1.1 Self- and/or Group Assessment	BLM_1.1_Slf-GrpAssessment_S.cwk
	Square Grid Chart Paper	1
	Markers	1 set
	Ruler and Measuring Tapes	1
	Stick-On Notes or Pieces of Paper ~7cmx12cm	1

Notes to Teacher

Teacher Reflections

Which Statistic, Mean or Mode, Best Represents the Data?

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Subtask 2

120 mins



Description

Students calculate and interpret the mean and mode of the data collected (i.e., the heights of Kindergarten students).

Catholic Graduate Expectations

CGE3b - creates, adapts, evaluates new ideas in light of the common good;

CGE4a - demonstrates a confident and positive sense of self and respect for the dignity and welfare of others;

CGE4b - demonstrates flexibility and adaptability;

CGE4f - applies effective communication, decision-making, problem-solving, time and resource management skills.

Expectations

- 5m115 A – analyse how data were collected and discuss the reasonableness of the results;
- 5m117 A – calculate the mean and the mode of a set of data;
- 5m110 A • evaluate and use data from graphic organizers;
- 5m5 • understand the significance of numbers within the surrounding environment;
- 5m9 A • justify in oral and written expression the method chosen for calculations: estimation, mental computation, concrete materials, algorithms, or calculators.
- 5m109 • interpret displays of data and present the information using mathematical terms;
- 5m120 – evaluate data presented on tables, charts, and graphs and use the information in discussion (e.g., discuss patterns in the data presented in the cells of a table that is part of a report on a science experiment);

Groupings

- Students Working As A Whole Class
- Students Working In Pairs
- Students Working In Small Groups
- Students Working Individually

Teaching / Learning Strategies

- Discussion
- Graphing
- Response Journal

Assessment

- The teacher and students assess the oral descriptions, notebook calculations, Journal #2.

Assessment Strategies

- Observation
- Learning Log
- Interview
- Performance Task

Assessment Recording Devices

Teaching / Learning

Subtask Focus

Calculating Mean and Mode

Lesson 1 - (For more detail, see Van de Walle text in Resources section)

Discussion:

- What is *average*?
- When is it used? (e.g., *average* rainfall; He is of *average* weight.)

Which Statistic, Mean or Mode, Best Represents the Data?

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Subtask 2

120 mins



- Lead students to the idea that there are different types of averages, i.e., mean, median, and mode.
- Have students determine the mode for various sets of data and discuss, e.g., ages of students in class, shoe size.

Mean (Van de Walle, page 375)

- Have students create a snap-cube chain, all in one colour, equal to their shoe size (or other data collected). Note: There should be no more than 12 cubes in a bar. In groups of five or six, have students work together to "level the bars" by moving snap cubes to other bars. The height of these bars is the *mean* value of the original set of bars.
- Discuss strategies used to create the "even" bars. Guide students to strategy of stacking all bars together and then re-dividing into equal-sized bars.
- To reinforce, have students create a bar graph (in small groups) of the lengths of their pens or pencils. They then cut out the bars and tape them together end-to-end. Have them determine the size of the bars if they were all of equal size. Discuss strategies used.
- These activities lead nicely to the algorithm where the numbers of a set are added together and then divided by the number of numbers in that set. With this information, have students determine the mean height of the Kindergarten students in their group.

Shared Inquiry: What Does the Mean and Mode Look Like?

- Combine two groups together and model mean and mode, using the heights of the two groups of Kindergarten students. Remind students to graph all data values, including the mean and mode (if there is one), so that they can see the distribution of the data and the place of the mode and mean.
- Ask students a question such as, How does the increase in the sample size (i.e., from one group to two groups) affect the mean and mode? How do you know?
- Combine all of the data and have students conduct the same activity.
- Orally and in a notebook, students describe the relationship between the increase in sample size and the mean, mode and range of data (e.g., mode value became apparent with more data; the mean value changed to better represent the class height data).

Discussion: What Calculations Are Made for the Range, Mean, and Mode?

Students summarize the calculations made in determining the range of data values, the mean, and the mode.

Lesson 2 - Which Statistic, Mean or Mode, Best Represents the Data?

Introduction: What is the Mean? What is the Mode?

- Discuss which measure of central tendency would be most representative of the data collected.
- Students describe the reasons for using mean or mode to describe the student height data.

Shared Inquiry: Does the Mean or Mode Best Represent the Data?

- Provide students with a problem: A class ordered pizza based on the number of pieces of pizza requested. A sample of the number of pieces ordered was: Harpreet 4, Johnny 2, Meagan 2, Yuding 5, Luisa 2. Which statistic, mean or mode, best represents this set of data? How could you use counters to represent the amount of pizza eaten by the students? (Use a counter to represent each slice of pizza ordered by each student. Use the overhead projector and an overhead acetate. Create a 2x5 grid. Select five student names and place as five labels on the 2x5 grid.)
- Students demonstrate and describe in a notebook the ways to use the counters to show and calculate the range of data values, the mean, and the mode (i.e., mode is 2).
- Have students share the mathematical actions they used to calculate the mean number of pizza slices.
- Pose a problem: How much pizza should we order next time for 5 people ... for 10 people ... for 30 people? Which statistic are you using? Explain your thinking. (e.g., $4+2+2+5+2=10$; $15/5=3$; Mean=3 slices)
- Orally and in a notebook, students justify the amount of pizza that should be ordered for 5, 10, and 30 people, using mode or mean statistics.

Which Statistic, Mean or Mode, Best Represents the Data?

Subtask 2



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Discussion: Based on Knowing the Mean and Mode, How Do You Think the Data Was Collected?






- Debrief with students what happened to the mean, mode and range of values as the size of the sample increased. Was the mean and mode of a sample size of 5 reasonable?
- Provide a context for students around data collection or have students come up with their own idea. Ask the students if they were to collect data how would they ensure that a reasonable result would occur? How would they organize the data? Would surveying 5 people produce a reasonable result?

Individual Work Sample

- Provide three sets of data where the mean > mode, mean = mode, mean < mode. Show your work.
- Journal #2 - Explain the difference between mean and mode. Provide examples to justify your explanation. Explain which measure of central tendency best represents the data. Support your answer with diagrams where necessary.

Adaptations

Resources

	Van de Walle Elementary and Middle School Mathematics: Teaching	Van de Walle
	Chart Paper	1
	Markers	
	Centicubes	30
	Calculators	1

Notes to Teacher

Bulletin Boards

Make a bulletin board of the newspaper examples of mean and mode. Use a question about mean and mode as your bulletin board title to reinforce the idea of inquiry and questioning as the focus for mathematics learning. (Sports scores or win/loss tables provide the best data.)

Teacher Reflections



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120 mins

Description

Students are introduced to the form and function of protective clothing and begin to think about an appropriate design for an apron to protect Kindergarten students from getting paint on their clothes. They measure, record, order, and compare, on a graphic organizer and/or electronic spreadsheet, measurements of Kindergarten students. Students analyse and describe their findings about the student measurement data. Students gain practice in the use of decimals.

Catholic Graduate Expectations

CGE3b - creates, adapts, evaluates new ideas in light of the common good;

CGE3c - thinks reflectively and creatively to evaluate situations and solve problems.

Expectations

- 5m114 A – display data on graphs (e.g., line graphs, bar graphs, pictographs, and circle graphs) by hand and by using computer applications;
- 5m109 A • interpret displays of data and present the information using mathematical terms;
- 5m110 • evaluate and use data from graphic organizers;
- 5m113 – design surveys, collect data, and record the results on given spreadsheets or tally charts;
- 5m117 – calculate the mean and the mode of a set of data;
- 5m119 A – construct labelled graphs both by hand and by using computer applications;
- 5m120 – evaluate data presented on tables, charts, and graphs and use the information in discussion (e.g., discuss patterns in the data presented in the cells of a table that is part of a report on a science experiment);

Groupings

- Students Working As A Whole Class
- Students Working In Small Groups
- Students Working Individually

Teaching / Learning Strategies

- Brainstorming
- Discussion
- Graphing

Assessment

- The teacher and students assess oral descriptions, graphs, body measurement strips, Journal #3.

Assessment Strategies

- Learning Log
- Observation

Assessment Recording Devices

Teaching / Learning

Subtask Focus

Measuring, Comparing, and Ordering Data

Lesson 1 - Who Wears Protective Clothing?

Introduction

Brainstorm with students where they have seen people wearing protective clothing. Focus students on clothing that is worn to do different tasks, e.g., a cook wearing an apron, a store clerk wearing a smock, a mechanic wearing coveralls, a technician wearing a lab coat.

Shared Inquiry: Designing an Apron

- Discuss the form (e.g., design, material used) and function (why is it worn?) of this type of clothing.
- Present the problem that they have been asked by the Kindergarten teacher to develop a one-size apron to be used by the Kindergarten students to keep paint off their clothes.



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Discussion

- In small groups, brainstorm what an appropriate apron for a Kindergarten student would look like. Each group presents their ideas to the class.
- Ask students: What body measurements are needed to make an apron for a Kindergarten student?
- Decide upon a common list of 4-5 measurements that would be needed to make an apron, e.g., width from underarm to underarm, width from front to back, diameter of head, distance from knees to shoulders.
- What unit of measurement would be the most appropriate in this context?
- What advantages and disadvantages would there be with the different units of measurement, e.g., importance of precision? (This will be used in the following activity.)

Lesson 2 - Taking Measurements

- Measure on each Kindergarten student the predetermined 4-5 measurements, using cm.
- Compile the measurements from the other groups to get a set of data for the whole Kindergarten class.

Shared Inquiry: What Are the Average Body Measurements?







- Provide a context: Rather than have an apron sized for each student, the Kindergarten teacher would like to create a one-size-fits-all apron. Finding the class average is one possible way this can be done.
- Ask: Using the measurement data we collected, what do you think are the average body measurements? How will you determine the average? Refer back to snap-cube lesson.
- Students determine and describe (orally and on chart paper) the mean and mode of the body measurements data.
- Students orally explain strategies to determine the mean and mode of the body measurements data.

Discussion/Journal #3

- Discuss how effective use of mean, mode or range will be in the design of an apron. What are the advantages and disadvantages of using mean, mode or range (e.g., if you develop an apron for the smallest value in a range, it may not fit the larger students)?
- In a notebook and orally, students brainstorm ways to organize, represent, and interpret the data, e.g., identify the range, create graphs, cluster the data into categories, identify least and greatest body measurements.

Adaptations

Resources

	Square Grid Chart Paper	1
	Chart Paper and Markers	1 set
	Square Grid Paper - 8-1/2 x 11	1
	Measuring Tapes	1
	Calculators	1
	Samples of Protective Clothing	

How Does the Measurement Data Compare?

Subtask 3



How Do They Measure Up?

Mathematics A Unit for Grade 5

120 mins

Notes to Teacher

Teacher Reflections



How Do They Measure Up?

Mathematics A Unit for Grade 5

Description

Students design and create a paper prototype of a three-dimensional representation of an apron, based on the mean, mode or range of the data from the Kindergarten student body measurements. Students evaluate the effectiveness of the aprons by trying them on a range of Kindergarten students.

Catholic Graduate Expectations

CGE4b - demonstrates flexibility and adaptability;

CGE4f - applies effective communication, decision-making, problem-solving, time, and resource management skills;

CGE5a - works effectively as an interdependent team member;

CGE5e - respects the rights, responsibilities and contributions of self and others.

Expectations

5m117 A – calculate the mean and the mode of a set of data;

5m120 A – evaluate data presented on tables, charts, and graphs and use the information in discussion (e.g., discuss patterns in the data presented in the cells of a table that is part of a report on a science experiment);

5m110 A • evaluate and use data from graphic organizers;

5m109 A • interpret displays of data and present the information using mathematical terms;

5m114 – display data on graphs (e.g., line graphs, bar graphs, pictographs, and circle graphs) by hand and by using computer applications;

5m66 • draw and build three-dimensional objects and models;

5m115 A – analyse how data were collected and discuss the reasonableness of the results;

Groupings

Students Working As A Whole Class

Students Working Individually

Students Working In Small Groups

Teaching / Learning Strategies

Discussion

Inquiry

Oral Explanation

Assessment

- The teacher assesses oral descriptions, paper models, Journal #4.

Assessment Strategies

Observation

Learning Log

Assessment Recording Devices

Teaching / Learning

Subtask Focus

Interpreting Data Using Three-Dimensional Representations

Lesson 1 - The Form and Function of the Apron

Introduction

Remind students that they have been asked by the Kindergarten teacher to develop a one-size apron to be used by the entire class. The apron will be used by the Kindergarten students to keep paint off their clothes. The task is to use the measurements taken and the calculations of mean, mode, and range (from the previous subtask) to develop a actual-sized paper prototype of an apron.

Shared Inquiry: What Are the Most Appropriate Measurements to Use?

- In groups, students brainstorm and plan what their apron will look like.



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- Students develop a drawing of the apron.
- Using the data collected from the previous subtask, ask each group to decide which measurements they will use and whether they will use mean, mode or range values to make the apron. They should be prepared to justify their choices.

Discussion: What Data Influenced the Construction of the Model of the Apron?

- Students orally describe the measurement data, the calculations, and mean, mode and range statistics that affected the design and construction of the apron model.
- Consider: Why did your group use the data it did? If you used mean, why? If you designed it based on the highest measurements in the range, why?

Lesson 2 - Building the Apron

Introduce students to the material they have to build the actual-sized prototype of their apron, i.e. mural paper.

Shared Inquiry

Using the plan the group created, students build an apron based on the measurements and calculations chosen.

Discussion

Orally, students describe:

- the challenges they faced in deciding on a design for the apron;
- the justification for the calculations they used, i.e. mean, mode, or range.

Individual Work Sample

- Journal #4 - What challenges arose with the design of the apron? Why did you use either mean, mode, or range in the building of your prototype?

Lesson 3 - Testing the Apron

Introduction

Students test their apron prototype.

Shared Inquiry

- Students bring the apron prototype to the Kindergarten class and test whether it fits a variety of the Kindergarten students.
- If needed, students readjust or remake their prototype based on the discoveries they make in this inquiry, e.g., overlooked measurements; limitations of using mean, mode, or range of values.

Discussion/Journal Entry

- Students write or discuss the discoveries they made.
- What was successful with your prototype?
- What challenges did you face?
- Were there further measurements needed that you had not anticipated?
- Was accuracy and precision an issue?
- Were there difficulties with the design?
- What limitations were there in using mean, mode, or range? (e.g., mean is not equal to the height of the highest student and as such, the apron was not big enough for that student)

Adaptations



How Do They Measure Up?

Mathematics A Unit for Grade 5

Resources

	Markers	1
	Mural Paper	1
	Calculators	1

Notes to Teacher

Depending on each group's design, there may be a need for gathering of measurement data not collected previously, e.g., the group designs an apron that is pulled over the head, but head diameter measurements were not taken.

Teacher Reflections



How Do They Measure Up?

Mathematics A Unit for Grade 5

180 mins

Description

Students calculate the area of material needed to make one apron. Using transformational geometry, students determine the smallest amount of material needed to make four aprons.

Catholic Graduate Expectations

CGE2c - presents information and ideas clearly and honestly and with sensitivity to others;

CGE3b - creates, adapts, evaluates new ideas in light of the common good;

CGE4a - demonstrates a confident and positive sense of self and respect for the dignity and welfare of others;

CGE5e - respects the rights, responsibilities, and contributions of self and others.

Expectations

- 5m39 A • solve problems related to the calculation of the perimeter and the area of regular and irregular two-dimensional shapes;
- 5m57 A – estimate the area of irregular polygons and measure the area by dividing the polygons into parts, using grid paper;
- 5m58 A – develop methods of using grid paper to track and measure the perimeter and area of polygons and irregular two-dimensional shapes;
- 5m67 • explore transformations of geometric figures;
- 5m68 • understand key concepts in transformational geometry using concrete materials and drawings;
- 5m83 – recognize and explain the occurrence and application of geometric properties and principles in the everyday world;

Groupings

Students Working As A Whole Class
Students Working In Small Groups
Students Working Individually

Teaching / Learning Strategies

Inquiry
Estimating
Oral Explanation

Assessment

- The teacher assesses oral explanations, written responses, and the quiz (BLM 5.1).

Assessment Strategies

Quizzes, Tests, Examinations
Observation
Learning Log

Assessment Recording Devices

Teaching / Learning

Subtask Focus

Estimating and Calculating the Area of Irregular Polygons

Lesson 1 - Area of Material Needed to Make an Apron

Students discuss the strategies that could be used in estimating and calculating the area of material needed to make one of their aprons.

Shared Inquiry - How Much Material to Make One Apron?

Using 1 cm square grid chart paper, students trace their apron onto the paper and problem solve as to what the area of one apron is.

Individual Work Sample

How Much Material Is Needed to Make an Apron ... ?

Subtask 5



How Do They Measure Up?

Mathematics A Unit for Grade 5

180 mins

Journal #5 - Write about how you determined the area of one apron and hence the amount of material needed to make it.

Lesson 2 - How Much Material to Make Four Aprons?

Introduction: Transformational Geometry

Present the problem to students that the material used to make the aprons comes in 1.5 metre wide rolls. The task is to determine the most efficient use of material, i.e., with the least amount of waste, to make four of their aprons. Brainstorm with class how to do this.

Shared Inquiry: Transformational Geometry (small groups)

- Using 1.5 metre wide mural paper, have students use their prototype from the previous activity to problem solve and determine how to use the least amount of 1.5 metre wide material to make four aprons.
- Students manipulate their apron until they have traced around it four times on the mural paper and have created as little waste as possible, i.e., used as little of the length of paper as possible.
- Have students create a 3-column chart. In the first column, students record the number of aprons (1,2,3 and 4); in the second, the length of material required (i.e., for one apron it takes 0.5 meters of material); and leave the third blank. They will use the third column in Subtask 6.
- Students determine the area of material needed to make four aprons, i.e., the area of the rectangle of material which includes the aprons and the waste.

Discussion: What Transformations Did You Use?








- Review with students the needed transformational geometry vocabulary learned in Grade 4.
- Debrief with students how they manipulated the prototype of their apron to make the most efficient use of the material.
- On dot or grid paper, students draw the transformations they made above.
- Write about the transformations they made and how they determined the area of material needed.

Individual Work Sample

Quiz (BLM 5.1) - Area of Irregular Polygons

Adaptations

Resources

	BLM 5.1 Quiz: Area of Irregular Polygons	BLM_5.1_Quiz_S.cwk
	Square Grid Chart Paper	
	Paper, Scissors, Glue, Stapler	1
	Pencils, Markers	1
	Square Grid Paper	1
	Mural Paper	1
	Calculators	1

How Much Material Is Needed to Make an Apron ... ?

How Do They Measure Up?

Mathematics A Unit for Grade 5

Subtask 5

180 mins



Notes to Teacher

Teacher Reflections



How Do They Measure Up?

Mathematics A Unit for Grade 5

60 mins

Description

Students calculate the cost of making their aprons out of different materials.

Catholic Graduate Expectations

CGE3c - thinks reflectively and creatively to evaluate situations and solve problems.

Expectations

- 5m51 A – read and write money values to \$1000;
- 5m52 A – make purchases of and change for items up to \$100;
- 5m109 • interpret displays of data and present the information using mathematical terms;
- 5m7 A • select and perform computation techniques appropriate to specific problems involving whole numbers, decimals, and equivalent fractions, and determine whether the results are reasonable;
- 5m5 • understand the significance of numbers within the surrounding environment;
- 5m32 – multiply and divide decimal numbers to hundredths by a one-digit whole number using concrete materials, drawings, and symbols;

Groupings

- Students Working As A Whole Class
- Students Working In Pairs
- Students Working In Small Groups
- Students Working Individually

Teaching / Learning Strategies

- Decision-making Models
- Learning Log/ Journal
- Oral Explanation
- Homework

Assessment

- The teacher assesses oral descriptions.

Assessment Strategies

- Learning Log

Assessment Recording Devices

Teaching / Learning

Subtask Focus

Making Money Calculations

Lesson 1 - How Much Will It Cost?

Introduction

Present the problem: Aprons can be made out of a variety of materials, e.g. vinyl, cotton, plastic. Now that we know how much material we need, calculate the cost of making the aprons out of the different materials.

Shared Inquiry

- Provide the following problem: Calculate the cost to make 1,2,3 and 4 aprons using plastic and then cotton. The cost of plastic is \$4.69/m and cotton is \$4.27/m. Since the material store only sells fabric in 1 m increments, have students use the data in their chart from Subtask 5 and round the length up to the nearest metre (enter this in the third column). For example, if it takes 0.5 m of material to make 1 apron, students would round this up to 1m.
- Organize students in pairs to check and discuss mathematics solutions, so that they are hearing the strategies and solutions created by other students and verifying their own thinking about their solution and strategies used.

Individual Work Sample

- Student text - Making Purchases and Change
- Journal Entry: Describe how you would determine the cost of 6 aprons.






How Do They Measure Up?

Mathematics A Unit for Grade 5

Adaptations

Resources

	Chart Paper, Markers	1
	Calculators	1
	Money Kit	1

Notes to Teacher

This subtask assumes that students have had prior experience in exploring decimals using Base 10 blocks.

Teacher Reflections



How Do They Measure Up?

Mathematics A Unit for Grade 5

180 mins

Description

Students have been asked by The One Size Fits All clothing company to determine the best size T-shirt for students in Kindergarten. Students must use previously gathered data and prepare a proposal for the company. The T-shirts are made in four colours and used at recess and play days to identify team members.

Additional End of Unit Assessment Opportunity Student Mathematics Portfolio

Students review, analyse, and describe their own mathematics learning, using their collection of student performance tasks (e.g., journal, quiz, in-class response to a learning task) that were completed during the unit (see BLM 7.1).

Expectations

- 5m117 A – calculate the mean and the mode of a set of data;
- 5m114 A – display data on graphs (e.g., line graphs, bar graphs, pictographs, and circle graphs) by hand and by using computer applications;
- 5m39 A • solve problems related to the calculation of the perimeter and the area of regular and irregular two-dimensional shapes;
- 5m87 A – apply translations, reflections, and rotations (e.g., using concrete materials and grid paper or isometric dot paper) to pose and solve problems;
- 5m110 A • evaluate and use data from graphic organizers;
- 5m9 A • justify in oral and written expression the method chosen for calculations: estimation, mental computation, concrete materials, algorithms, or calculators.

Groupings

- Students Working As A Whole Class
- Students Working Individually

Teaching / Learning Strategies

- Demonstration
- Inquiry
- Problem-solving Strategies
- Review

Assessment

The teacher assesses the report and pattern.

Assessment Strategies

- Performance Task

Assessment Recording Devices

- Rubric

Teaching / Learning

Project

- Provide an introductory context: A new clothing company, The One Size Fits All Canadian Kids Company, wishes to design and produce an affordable line of T-shirts for use in places such as schools and Day Care Centres. You have been chosen by the Kindergarten division of The One Size Fits All Company to develop a presentation indicating the best size T-shirt to make.
- In a written report, students describe the data they chose to use, how they analysed the data, etc. They support this report by using graphic representations of the data collected during previous subtasks.
- Students list in a table the typical Kindergarten student body measurements supported by a description of the data collection and analysis process; class body measurement data summarized by mean, mode or range statistics; graphic representations of the data; and calculations of mean and mode.
- Students submit a written proposal outlining their choice of T-shirt size, with justification for their choice.

Students hand in a written report outlining:

- how they chose the data to use;
- how data was analysed;
- calculations used and reasons for choosing either mean, mode, or range;

What Does a "One Size Fits All" T-shirt Look Like?



How Do They Measure Up?

Subtask 7

Mathematics A Unit for Grade 5

180 mins

- examples of graphic representations of the data used to make the T-shirt.







Students present their findings to the company, i.e., class.

Student Mathematics Portfolio (BLM 7.1)

Students use the Mathematics Portfolio Task (BLM 7.1) as a focus for their mathematical analyses and descriptions. Students require about 90 to 100 minutes to complete this assessment task.

Adaptations

Resources

	Written Report	
	BLM 7.1 Mathematics Portfolio Task: How Do You Measure Up?	BLM_7.1_PortfolioTsk_S.cwk
	Butcher or Mural Paper	1
	Markers, Crayons, Paints, Paintbrushes	1 set
	Rulers	1
	Calculators	1

Notes to Teacher

Student Safety

Ensure that students monitor their use of cutting tools.

Teacher Reflections



Appendices

How Do They Measure Up?

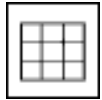
Mathematics

Resource List:
Blackline Masters:
Rubrics:
Unit Expectation List and Expectation Summary:



How Do They Measure Up?

Mathematics A Unit for Grade 5



Rubric

- Written Report** ST 7
3
Used with the culminating task to assess the student products (written report and apron).



Blackline Master / File

- BLM 1.1 Self- and/or Group Assessment** ST 1
BLM_1.1_Slf-GrpAssessment_S.cwk
- BLM 5.1 Quiz: Area of Irregular Polygons** ST 5
BLM_5.1_Quiz_S.cwk
- BLM 7.1 Mathematics Portfolio Task: How Do You Measure Up?** ST 7
BLM_7.1_PortfolioTsk_S.cwk



Print

- Van de Walle Elementary and Middle School Mathematics: Teaching Developmentally** ST 2
Van de Walle
p. 374 - 5



Material

- Butcher or Mural Paper** ST 7
1
per person
- Chart Paper** ST 2
1
per group
- Chart Paper and Markers** ST 3
1 set
per group
- Chart Paper, Markers** ST 6
1
per pair
- Markers** ST 1
1 set
per group
- Markers** ST 2
- Markers** ST 4
1
per person
- Markers, Crayons, Paints, Paintbrushes** ST 7
1 set
per group
- Mural Paper** ST 4
1
per group
Any paper could be used. It needs to be strong and large enough to make the prototype.
- Mural Paper** ST 5
1
per group
- Paper, Scissors, Glue, Stapler** ST 5
1
per group
- Pencils, Markers** ST 5
1
per person
- Ruler and Measuring Tapes** ST 1
1
per person
- Rulers** ST 7
1
per person
- Square Grid Chart Paper** ST 1
1
per pair
- Square Grid Chart Paper** ST 3
1
per pair
- Square Grid Chart Paper** ST 5
per person



How Do They Measure Up?

Mathematics A Unit for Grade 5

- Square Grid Paper** ST 5
1
per person
- Square Grid Paper - 8-1/2 x 11** ST 3
1
per group
- Stick-On Notes or Pieces of Paper ~7cmx12cm** ST 1
1
per person



Equipment / Manipulative

- Calculators** ST 2
1
per person
- Calculators** ST 3
1
per person
- Calculators** ST 4
1
per pair
- Calculators** ST 5
1
per pair
- Calculators** ST 6
1
per pair
- Calculators** ST 7
1
per person
- Centicubes** ST 2
30
per pair
- Measuring Tapes** ST 3
1
per person
- Money Kit** ST 6
1
per group
- Samples of Protective Clothing** ST 3
aprons, lab coat, etc.

Written Report



Student Name: _____
Date: _____

for use with Subtask 7 : What Does a "One Size Fits All" T-shirt Look Like? from the Grade 5 Unit: How Do They Measure Up?

Expectations for this Subtask to Assess with this Rubric:

- 5m9** • justify in oral and written expression the method chosen for calculations: estimation, mental computation, concrete materials, algorithms, or calculators.
- 5m109** • interpret displays of data and present the information using mathematical terms;
- 5m110** • evaluate and use data from graphic organizers;
- 5m115** – analyse how data were collected and discuss the reasonableness of the results;
- 5m117** – calculate the mean and the mode of a set of data;

Category/Criteria	Level 1	Level 2	Level 3	Level 4
Problem Solving 5m115 5m9	- demonstrates the use of a limited range of appropriate problem-solving strategies to determine ideal T-shirt size	- demonstrates the use of appropriate problem-solving strategies to determine ideal T-shirt size	- demonstrates the selection and use of appropriate problem-solving strategies to determine ideal T-shirt size	- demonstrates the selection and use of appropriate problem-solving strategies and modifies or creates new strategies to determine ideal T-shirt size
Understanding of Concepts 5m117 5m109	- demonstrates limited ability to interpret data regarding T-shirt size	- demonstrates some attempt to interpret data regarding T-shirt size	- uses data to make accurate interpretations regarding T-shirt size	- uses data to make accurate interpretations regarding T-shirt size and justifies them
Application	- shows limited understanding of methods used to determine mean, mode, and range of data	- shows some ability when determining mean, mode, and range of data	- is able to accurately determine mean, mode, and range of data	- is able to accurately determine mean, mode, and range of data and is able to make suitable implications

Self- and/or Group Assessment

What I (We) Have to Do	Student(s)	Date
	How I Am (We Are) Going to Do It	

Self-Assessment	<input type="checkbox"/> Individual	<input type="checkbox"/> Group
Positive Actions I (We) Took		
Suggestions for Improvement		

Student Signature(s) _____

Quiz: Area of Irregular Polygons

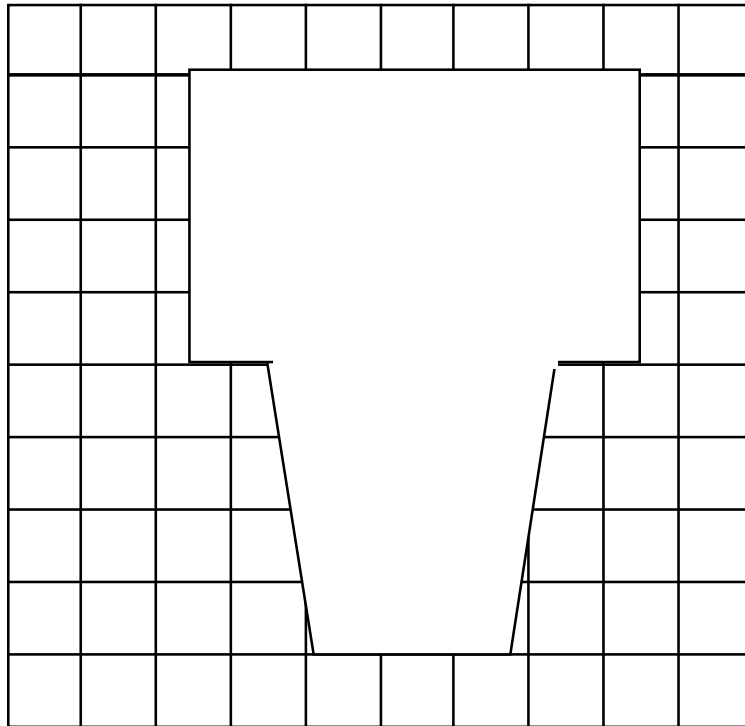
BLM 5.1

Name: _____

Date: _____

Grade 5 students are determining the amount of material that they need to create an apron. Their apron pattern piece is represented below. Each small square represents 10cm X 10cm.

* Determine the area of this apron pattern.



Explain how you determined the area.

Mathematics Portfolio Task

How Do You Measure Up?

What did you learn about Data Management, Geometry and Number Sense and Numeration throughout this unit? In this mathematics portfolio, you will describe the mathematics you learned. Look through the work that you completed during this unit (i.e., text responses, journals, tasks completed during lessons, and quizzes).

Choose ten work samples that show your understanding of the mathematical ideas listed below.

1. Explain strategies and justify calculation methods used in solving decimal problems.
2. Solve area problems.
3. Estimate and measure the area of irregular polygons by dividing polygons into parts, using grids.
4. Describe and apply geometric transformations.
5. Interpret and evaluate displays of data, using mathematical language.
6. Construct three different types of graphic organizers.
7. Calculate mean and mode.
8. Collect and organize data.

Explain these mathematical ideas listed above using, your ten work samples. Also, show improvements in your work, in terms of its accuracy, clarity, and precision of mathematical descriptions, explanations, and justification.

List the work samples that you will include in your portfolio.



How Do They Measure Up?

Mathematics A Unit for Grade 5

Selected **Assessed**

Mathematics---Number Sense and Numeration

<input type="checkbox"/> 5m5	• understand the significance of numbers within the surrounding environment;	2	
<input type="checkbox"/> 5m7	• select and perform computation techniques appropriate to specific problems involving whole numbers, decimals, and equivalent fractions, and determine whether the results are reasonable;		1
<input type="checkbox"/> 5m9	• justify in oral and written expression the method chosen for calculations: estimation, mental computation, concrete materials, algorithms, or calculators.		2
<input type="checkbox"/> 5m32	– multiply and divide decimal numbers to hundredths by a one-digit whole number using concrete materials, drawings, and symbols;	1	

Mathematics---Measurement

<input type="checkbox"/> 5m37	• demonstrate an understanding of and ability to apply appropriate metric prefixes in measurement and estimation activities;	1	
<input type="checkbox"/> 5m39	• solve problems related to the calculation of the perimeter and the area of regular and irregular two-dimensional shapes;		2
<input type="checkbox"/> 5m41	– use prefixes in the metric system correctly;	1	
<input type="checkbox"/> 5m51	– read and write money values to \$1000;		1
<input type="checkbox"/> 5m52	– make purchases of and change for items up to \$100;		1
<input type="checkbox"/> 5m57	– estimate the area of irregular polygons and measure the area by dividing the polygons into parts, using grid paper;		1
<input type="checkbox"/> 5m58	– develop methods of using grid paper to track and measure the perimeter and area of polygons and irregular two-dimensional shapes;		1

Mathematics---Geometry and Spatial Sense

<input type="checkbox"/> 5m66	• draw and build three-dimensional objects and models;	1	
<input type="checkbox"/> 5m67	• explore transformations of geometric figures;	1	
<input type="checkbox"/> 5m68	• understand key concepts in transformational geometry using concrete materials and drawings;	1	
<input type="checkbox"/> 5m83	– recognize and explain the occurrence and application of geometric properties and principles in the everyday world;	1	
<input type="checkbox"/> 5m87	– apply translations, reflections, and rotations (e.g., using concrete materials and grid paper or isometric dot paper) to pose and solve problems;		1

Mathematics---Data Management and Probability

<input type="checkbox"/> 5m109	• interpret displays of data and present the information using mathematical terms;	2	2
<input type="checkbox"/> 5m110	• evaluate and use data from graphic organizers;	1	3
<input type="checkbox"/> 5m113	– design surveys, collect data, and record the results on given spreadsheets or tally charts;	1	
<input type="checkbox"/> 5m114	– display data on graphs (e.g., line graphs, bar graphs, pictographs, and circle graphs) by hand and by using computer applications;	1	2
<input type="checkbox"/> 5m115	– analyse how data were collected and discuss the reasonableness of the results;		2
<input type="checkbox"/> 5m117	– calculate the mean and the mode of a set of data;	1	3
<input type="checkbox"/> 5m119	– construct labelled graphs both by hand and by using computer applications;		1
<input type="checkbox"/> 5m120	– evaluate data presented on tables, charts, and graphs and use the information in discussion (e.g., discuss patterns in the data presented in the cells of a table that is part of a report on a science experiment);	2	1



How Do They Measure Up? Mathematics A Unit for Grade 5

English Language

5e1	5e2	5e3	5e4	5e5	5e6	5e7	5e8	5e9	5e10
5e11	5e12	5e13	5e14	5e15	5e16	5e17	5e18	5e19	5e20
5e21	5e22	5e23	5e24	5e25	5e26	5e27	5e28	5e29	5e30
5e31	5e32	5e33	5e34	5e35	5e36	5e37	5e38	5e39	5e40
5e41	5e42	5e43	5e44	5e45	5e46	5e47	5e48	5e49	5e50
5e51	5e52	5e53	5e54	5e55	5e56	5e57	5e58	5e59	5e60
5e61	5e62	5e63	5e64	5e65	5e66				

French as a Second Language

5f1	5f2	5f3	5f4	5f5	5f6	5f7	5f8	5f9	5f10
5f11	5f12	5f13	5f14	5f15	5f16	5f17	5f18		

Mathematics

5m1	5m2	5m3	5m4	5m5	2	5m6	5m7	1	5m8	5m9	2	5m10
5m11	5m12	5m13	5m14	5m15		5m16	5m17		5m18	5m19		5m20
5m21	5m22	5m23	5m24	5m25		5m26	5m27		5m28	5m29		5m30
5m31	5m32	1	5m33	5m34		5m35	5m36	1	5m37	5m38	2	5m39
5m41	1	5m42	5m43	5m44		5m45	5m46		5m47	5m48		5m49
5m51	1	5m52	1	5m53		5m54	5m55	1	5m56	1	5m57	5m58
5m61	5m62	5m63	5m64	5m65		5m66	1	5m67	1	5m68	1	5m69
5m71	5m72	5m73	5m74	5m75		5m76	5m77		5m78	5m79		5m80
5m81	5m82	5m83	1	5m84		5m85	5m86	1	5m87	5m88		5m89
5m91	5m92	5m93	5m94	5m95		5m96	5m97		5m98	5m99		5m100
5m101	5m102	5m103	5m104	5m105		5m106	5m107		5m108	5m109	2	2
5m111	5m112	5m113	1	5m114	1	2	5m115	2	5m116	5m117	1	3
5m121	5m122	5m123	5m124									

Science and Technology

5s1	5s2	5s3	5s4	5s5	5s6	5s7	5s8	5s9	5s10
5s11	5s12	5s13	5s14	5s15	5s16	5s17	5s18	5s19	5s20
5s21	5s22	5s23	5s24	5s25	5s26	5s27	5s28	5s29	5s30
5s31	5s32	5s33	5s34	5s35	5s36	5s37	5s38	5s39	5s40
5s41	5s42	5s43	5s44	5s45	5s46	5s47	5s48	5s49	5s50
5s51	5s52	5s53	5s54	5s55	5s56	5s57	5s58	5s59	5s60
5s61	5s62	5s63	5s64	5s65	5s66	5s67	5s68	5s69	5s70
5s71	5s72	5s73	5s74	5s75	5s76	5s77	5s78	5s79	5s80
5s81	5s82	5s83	5s84	5s85	5s86	5s87	5s88	5s89	5s90
5s91	5s92	5s93	5s94	5s95	5s96	5s97	5s98	5s99	5s100
5s101	5s102	5s103	5s104	5s105	5s106	5s107	5s108	5s109	5s110
5s111	5s112	5s113	5s114	5s115	5s116	5s117	5s118	5s119	5s120
5s121	5s122	5s123	5s124	5s125	5s126	5s127	5s128		

Social Studies

5z1	5z2	5z3	5z4	5z5	5z6	5z7	5z8	5z9	5z10
5z11	5z12	5z13	5z14	5z15	5z16	5z17	5z18	5z19	5z20
5z21	5z22	5z23	5z24	5z25	5z26	5z27	5z28	5z29	5z30
5z31	5z32	5z33	5z34	5z35	5z36	5z37	5z38	5z39	5z40
5z41	5z42	5z43	5z44	5z45	5z46	5z47	5z48		

Health & Physical Education

5p1	5p2	5p3	5p4	5p5	5p6	5p7	5p8	5p9	5p10
5p11	5p12	5p13	5p14	5p15	5p16	5p17	5p18	5p19	5p20
5p21	5p22	5p23	5p24	5p25	5p26	5p27	5p28	5p29	5p30
5p31	5p32	5p33	5p34	5p35	5p36	5p37	5p38	5p39	5p40

The Arts

5a1	5a2	5a3	5a4	5a5	5a6	5a7	5a8	5a9	5a10
5a11	5a12	5a13	5a14	5a15	5a16	5a17	5a18	5a19	5a20
5a21	5a22	5a23	5a24	5a25	5a26	5a27	5a28	5a29	5a30
5a31	5a32	5a33	5a34	5a35	5a36	5a37	5a38	5a39	5a40
5a41	5a42	5a43	5a44	5a45	5a46	5a47	5a48	5a49	5a50
5a51	5a52	5a53	5a54	5a55	5a56	5a57	5a58	5a59	5a60
5a61	5a62	5a63	5a64	5a65	5a66	5a67	5a68	5a69	



How Do They Measure Up?

Mathematics A Unit for Grade 5

Analysis Of Unit Components

- 7 Subtasks
- 41 Expectations
- 35 Resources
- 60 Strategies & Groupings
- Unique Expectations --
- 24 Mathematics Expectations

Resource Types

- 1 Rubrics
- 3 Blackline Masters
- 0 Licensed Software
- 1 Print Resources
- 0 Media Resources
- 0 Websites
- 20 Material Resources
- 10 Equipment / Manipulatives
- 0 Sample Graphics
- 0 Other Resources
- 0 Parent / Community
- 0 Companion Bookmarks

Groupings

- 7 Students Working As A Whole Class
- 2 Students Working In Pairs
- 6 Students Working In Small Groups
- 7 Students Working Individually

Teaching / Learning Strategies

- 2 Brainstorming
- 1 Decision-making Models
- 1 Demonstration
- 3 Discussion
- 1 Estimating
- 3 Graphing
- 1 Homework
- 3 Inquiry
- 1 Learning Log/ Journal
- 3 Oral Explanation
- 1 Problem-solving Strategies
- 1 Response Journal
- 1 Review

Assessment Recording Devices

- 1 Rubric

Assessment Strategies

- 1 Interview
- 6 Learning Log
- 5 Observation
- 2 Performance Task
- 1 Quizzes, Tests, Examinations