Grade 7

Alternate Activity Menus for Math

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Lambton Kent District School Board

Alternate Activity Menus for Math
Grade 7

Contents

Purpose and Organization

The purpose of this package is to give classroom teachers another means to differentiate math instruction for the students in their classrooms. The package includes an alternate activity menu for each of the units of math that are covered each term. The menus are organized to align with the *Nelson Math* program, as delivered using the LKDSB Math Framework. The menus have been adapted from those found in *Differentiating Instruction in with Menus: Math*, by Laurie E. Westphal.

How to use this package

There are different ways of using these menus in the classroom. One or two tasks could be chosen by the teacher as additional practice for students as part of the regular math program. They could be used for students who tend to complete learning tasks in math quickly. Because all of the activities offer choice, and many have a creative element, students may find this an enjoyable way to extend their mathematical learning. The activities also encourage students to find connections between math and the real world, as well as require them to solve meaningful mathematical problems.

The other use of the package, and the one for which it is intended, is as alternate math activities for students who are particularly strong in math or in a particular area of math. In this case, it is important that an assessment of prior knowledge is done at the beginning of a unit of instruction. Through pre-tests, the teacher can determine which students in the class have already mastered particular concepts that will be taught during the upcoming unit. Students who achieve mastery of

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Pre-tests can be easily created by taking the end of unit test and changing the numbers in each question. This allows a teacher to accurately determine the areas of the unit where groups of students need the most instruction. This also provides a study guide for students to help them to prepare for an end of unit test or chapter task. The pre-test then because a useful tool for both assessment of prior learning and for letting students know what to expect for the culminating task.

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all expectations can work through the activity menu as an alternative to completing the regularly assigned tasks. Those students who have mastered many of the concepts, but still need instruction in some areas, can work through the menu during the lessons they have previously learned, and join the class during lessons where they need further instruction. In this case, the student could attempt the most difficult problems in that lesson first, and once they have demonstrated understanding, return to work on their alternate activity menu.

Guidelines for Products

To ensure that each student has equal opportunity to create a quality product, the $1 Rule should be followed. That is, if the product requires materials from a student, they should spend no more than $1 to create that final product. This also encourages students to problem-solve and often results in a more creative product. A $1 Rule Contract is provided at the back of this package.

Most of the menus have a Free Choice option. Before beginning work on a Free Choice activity, students should consult with the teacher to ensure that the project they want to create meets the expectations of the curriculum. A Free Choice Proposal Form is included at the back of this package as a framework for students in designing their own project.

The descriptions of projects used in this package follow. These are intended only as a guide for teachers and students. Teachers should alter the expectations for each product to suit the needs of particular classrooms and students, and students should be encouraged to be creative in their presentation for assignments. The following pages are taken from *Differentiating Instruction with Menus: Math* by Laurie E. Westphal.

Grade 7 Math

Number Relationships I

Guidelines: Choose 3 in a row (vertical, horizontal, or diagonal) to complete. Creativity in presentation is encouraged!

<table>
<tr>
<td>If the second Tuesday of a month falls on a one-digit multiple of 2, what will be the date of the fourth Thursday of the month? Create three more calendar math problems that use multiples. Include solutions.</td>
<td>Create a visually appealing poster (print or digital) that defines the terms: factor, multiple, square, square root, prime, and divisible. Choose one number. Use this number in an example for each definition.</td>
<td>Create a slideshow using SmartNotebook, PowerPoint, or a website such as animoto.com or smilebox.com showing situations and sample problems where the square root of a number is needed in our daily lives.</td>
</tr>
<tr>
<td>Your class is having a BBQ to celebrate the beginning of a new school year. Survey the members of your class to determine how many hotdogs, hamburgers, and veggie burgers you will need. Then create a shopping list showing how many packages of each item you will need to buy in order to have as few leftovers as possible. Include an explanation of what you would do with any leftovers so they didn't go to waste. Assume that your teacher is a vegetarian.
<table>
<tr><td>Item</td><td># per pkg</td></tr>
<tr><td>Hamburgers</td><td>10</td></tr>
<tr><td>Hot dogs</td><td>12</td></tr>
<tr><td>Veggie Burgers</td><td>8</td></tr>
<tr><td>Hot dog rolls</td><td>6</td></tr>
<tr><td>Burger rolls</td><td>8</td></tr>
</table>
</td>
<td>Free Choice: Must be outlined on a proposal form and approved before beginning work.</td>
<td>List all two-digit positive integers with the following property: Both the original number and the different new two-digit number obtained by interchanging the digits has a common factor other than 1. Show, using the format of your choice, the method you used to arrive at your solution.</td>
</tr>
<tr>
<td>If you put two pennies in a piggy bank on day one, and double the amount you save each day, how much money would you have after one month? Present this information in the format of your choice.</td>
<td>Create a video or piece of writing explaining why the order of operations is important. Use examples.</td>
<td>Create a hands-on lesson to teach your class how to find factors using at least two different methods.</td>
</tr>
</table>

Number Relationships I	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding *The student:* - generate multiples and factors using a variety of tools and strategies - represent perfect squares and square roots using a variety of tools and strategies	Limited **T1** □ **T2** □ **T3** □ Limited **T1** □ **T2** □ **T3** □	Some **T1** □ **T2** □ **T3** □ Some **T1** □ **T2** □ **T3** □	Considerable **T1** □ **T2** □ **T3** □ Considerable **T1** □ **T2** □ **T3** □	High Degree **T1** □ **T2** □ **T3** □ High Degree **T1** □ **T2** □ **T3** □
Problem Solving/Thinking *The student:* - solve multi-step problems arising from real life contexts and involving whole numbers and decimals using a variety of tools and strategies	Limited **T1** □ **T2** □ **T3** □	Some **T1** □ **T2** □ **T3** □	Considerable **T1** □ **T2** □ **T3** □	High Degree **T1** □ **T2** □ **T3** □
Communication *The student:* -explains mathematical thinking clearly using a variety of modes -uses appropriate vocabulary and terminology in oral, visual, and/or written forms	Limited **T1** □ **T2** □ **T3** □ Limited **T1** □ **T2** □ **T3** □	Some **T1** □ **T2** □ **T3** □ Some **T1** □ **T2** □ **T3** □	Considerable **T1** □ **T2** □ **T3** □ Considerable **T1** □ **T2** □ **T3** □	High Degree **T1** □ **T2** □ **T3** □ High Degree **T1** □ **T2** □ **T3** □
Application of Learning *The student:* -transfers knowledge and skills to new contexts -makes connections between mathematics and the real world	Limited **T1** □ **T2** □ **T3** □ Limited **T1** □ **T2** □ **T3** □	Some **T1** □ **T2** □ **T3** □ Some **T1** □ **T2** □ **T3** □	Considerable **T1** □ **T2** □ **T3** □ Considerable **T1** □ **T2** □ **T3** □	High Degree **T1** □ **T2** □ **T3** □ High Degree **T1** □ **T2** □ **T3** □

Task 1: _____

Task 2: _____

Task 3: _____

Grade 7 Math

Data Cafe Menu

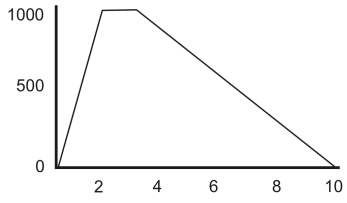
Choose one Appetizer, one Main Course, and one Dessert

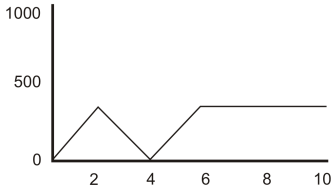
Appetizers

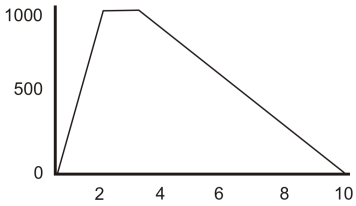
Experiment with a spreadsheet program (e.g. Microsoft Office Excel). Create a "How To" instruction guide for your classmates explaining the basics of how to use this type of software.

Create the perfect computer keyboard, based upon the frequency of use for each letter. You will have to gather data about which letters appear most frequently in print. Create a proposal you could send to Microsoft or Apple, explaining how your keyboard is more practical based on this information. Be sure to include your data in your proposal.

Write a short narrative story that would fit the information in one of the line graphs below.







Main Course

You have been asked to plan the music for an upcoming school dance. You must base the playlist on the preferences of the grade 6 - 8 students at your school. Design a survey that will accurately determine the preferences of the students. Create a proposal for the student council that includes a 25 song playlist, an appropriate graph displaying your data, and an explanation of how you know the methods you used to collect and display your data are representative of student opinion.

A movie production company wants to film a new movie based upon a book. Their target audience is 11-14 year olds. Design a survey that will accurately determine which book would be the most popular choice for adaptation to film. Create a proposal for the movie production company that includes your suggestion, an appropriate graph displaying your data, and an explanation of how you know the methods you used to collect and display your data are representative of 11-14 year olds.

Dessert

Find one graph that a company has published that presents data either in its favour or against its competition. Write a paragraph explaining how the company may have used bias to encourage the public to purchase its product. In a second paragraph, explain how one could gather data that would be more accurate.

Your teacher has asked you to create a survey to help him or her decide where the class should go on a field trip. Create two surveys – one designed to ensure the class trip was to your chosen location, and one that would most accurately determine the most popular choice for a field trip. Explain how you know one survey would be biased and one would be more accurate.

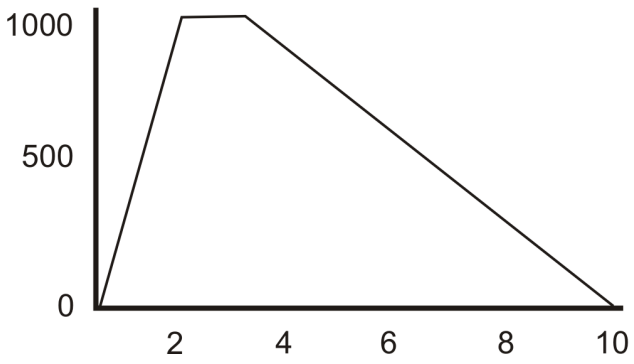
Design a survey question for your classmates about their preferences about a product (e.g. snack foods) that you know will create a bias for one particular item. Create an advertisement (print, radio, internet, or television) that uses this biased data to convince people to buy the product. Hand in the advertisement, completed survey, and a short explanation of how you ensured the result would be what you expected.

PATTERNING AND ALGEBRA	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding *The student:* -identifies bias in data collection methods - collects data by conducting a survey or an experiment and records observations or measurements	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Problem Solving/Thinking *The student:* - reads, interprets and draws conclusions from primary and secondary data presented in charts, tables, and graphs -selects an appropriate type of graph to represent a set of data and justifies the choice of graph	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Communication *The student:* -organizes data using charts, tables, and graphs that have appropriate titles, labels, and scales -uses appropriate vocabulary and terminology in oral, visual, and/or written forms	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Application of Learning *The student:* -transfers knowledge and skills to new contexts and makes connections between concepts	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐

Task 1: _____

Task 2: _____

Task 3: _____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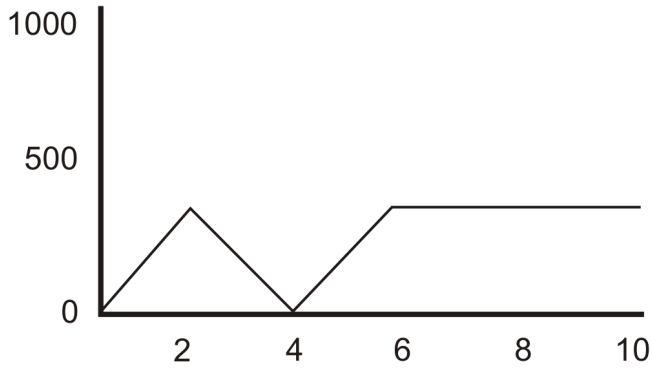
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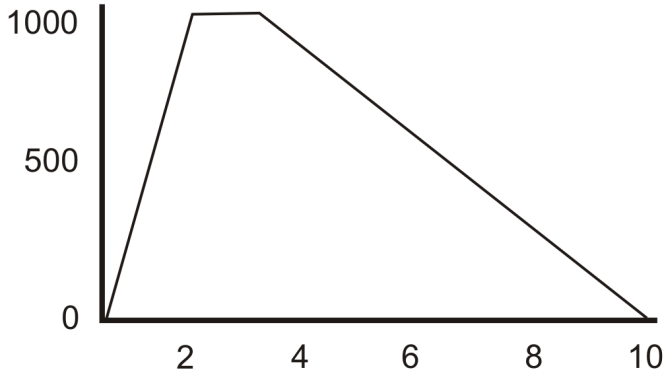
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Grade 7 Math

Probability

Guidelines: Choose 3 in a row (vertical, horizontal, or diagonal) to complete. Creativity in presentation is encouraged!

Backgammon is a game of probability. If you do not know how to play, learn how. How can knowing about probability help you to win the game? Create a pamphlet called "How to win at Backgammon" to show what you have learned.	You have been asked to choose a site for a three day outdoor concert in June. You can choose Toronto, Vancouver, Montreal, or Calgary. If it rains, the concert will be cancelled. Use the "Statistics" area for each city on www.weathernetwork.com to determine the best location. Create a report justifying your choice of city, using what you know about probability to make your case.	Your favourite movie has been nominated for the Academy Awards for Best Picture, Best Screenplay, and Best Director. What is the theoretical probability that your movie will win all three awards? Use this website to find the experimental probability for this event over the course of Oscar history: http://www.filmsite.org/oscars.html Create a slideshow in Powerpoint or Smart Notebook that explains how you got your results.
Research to find out if it is true that there is a 50/50 chance of a baby being a boy or a girl if you live in Canada. What about the rest of the world? What are the possible outcomes for the gender of twins? What is the probability of each outcome? Explain your findings using any method you choose.	**Free Choice: Must be outlined on a proposal form and approved before beginning work.**	Design a maze course for a robot with many "gates" for the robot to go through. Label your gates with letters. Include an exit and an entrance. If the robot chooses its direction at each gate randomly, what is the probability of the robot reaching the exit? Show how you organized your work.
Design and conduct an experiment that demonstrates the relationship between theoretical and experimental probability, and how the number of trials impacts experimental probability. Use graphs to display your findings.	Research how statistics are calculated for a particular sport. Create a short video or presentation explaining the system. Give examples using real-life players.	Create a Carnival game of chance where players score points. You may use a dart board, spinner, numbered balls, etc. Decide on different prizes for scores in the game. Which scores should get the biggest prizes? Use probability to show how you decided which prizes to award for which scores. Test your game using at least 25 trials and record your results. Would your game be profitable at a Carnival?

PROBABILITY	1	2	3	4
Knowledge and Understanding *The student:* - demonstrates understanding of concepts	**Limited** **T1** ☐ **T2** ☐ **T3** ☐	**Some** **T1** ☐ **T2** ☐ **T3** ☐	**Considerable** **T1** ☐ **T2** ☐ **T3** ☐	**High Degree** **T1** ☐ **T2** ☐ **T3** ☐
Problem Solving/Thinking *The student:* -solves problems related to probability -uses problem solving strategies effectively	**Limited** **T1** ☐ **T2** ☐ **T3** ☐ **Limited** **T1** ☐ **T2** ☐ **T3** ☐	**Some** **T1** ☐ **T2** ☐ **T3** ☐ **Some** **T1** ☐ **T2** ☐ **T3** ☐	**Considerable** **T1** ☐ **T2** ☐ **T3** ☐ **Considerable** **T1** ☐ **T2** ☐ **T3** ☐	**High Degree** **T1** ☐ **T2** ☐ **T3** ☐ **High Degree** **T1** ☐ **T2** ☐ **T3** ☐
Application of Learning *The student:* - makes connections within and between various contexts	**Limited** **T1** ☐ **T2** ☐ **T3** ☐	**Some** **T1** ☐ **T2** ☐ **T3** ☐	**Considerable** **T1** ☐ **T2** ☐ **T3** ☐	**High Degree** **T1** ☐ **T2** ☐ **T3** ☐
Communication *The student:* -Explains and justifies mathematical concepts, procedures, and problem solving	**Limited** **T1** ☐ **T2** ☐ **T3** ☐	**Some** **T1** ☐ **T2** ☐ **T3** ☐	**Considerable** **T1** ☐ **T2** ☐ **T3** ☐	**High Degree** **T1** ☐ **T2** ☐ **T3** ☐

Task 1: _____

Task 2: _____

Task 3: _____

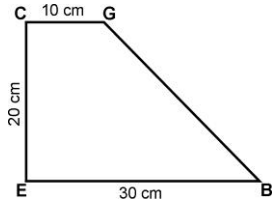
Grade 7 Math

Measurement

Directions: Choose activities from the menu below to total 10 points. Place a checkmark in each box to show which activities you will complete.

2 Points:

- ☐ Create a complex shape that contains part of a circle, a trapezoid, and at least one triangle. Show two different ways of finding the area of the shape.
- ☐ Design a decorative tile that uses triangles, trapezoids, and parallelograms in the design. You must use at least 4 shapes of different sizes. Calculate the area of each shape and the total area of the tile.
- ☐ Two students want to share a cake they purchased at the school bake sale. How should they cut the cake to ensure their pieces are of equal size (even if they are a different shape)? If a third student also wanted to share the cake, how could the cake be cut so each student got an equal sized piece?



5 Points:

- ☐ Create an advertisement for a parallelogram-shaped product whose area is its main selling point. Be sure to prove to the audience that the parallelogram has the area you are advertising.
- ☐ Create a Smart Notebook presentation that demonstrates the relationship between the area of a parallelogram, the area of a trapezoid, and the area of a triangle. Use visual aids to show your ideas.
- ☐ Find a real-life example of where finding the area of an irregular complex polygon is important to someone's job. Photograph the polygon, measure the sides of the real-life object, and create a brochure called "Math at Work" showing both how to find the area of the shape and how this skill is used in a profession.

8 Points:

- ☐ Create an entertaining video about finding the area of an irregularly shaped object. In the video, the main character should demonstrate the best ways to find the area of the shape. Your shape should include at least one trapezoid or parallelogram within the irregular shape. Your video should also contain at least two short math-related advertisements.
- ☐ You have been asked to design an extension for a local zoo. Your exhibit must include five animal enclosures, two snack shops or restaurants, walking paths, an area with picnic tables, and a children's playground. Your design must include at least two of each of the following shapes: triangles, parallelograms, trapezoids, and complex polygons. Create a display board that could be used to present your proposal to the Zoo owner that includes a scale diagram of the extension, the area and perimeter of each of the zoo attractions, and the total amount of land you will need to build the zoo extension.
- ☐ Free choice – Prepare a proposal form and submit it to your teacher for approval.

MEASUREMENT	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding *The student:* - determines the relationship for calculating the area of a trapezoid -solve problems that require conversion between metric units of measure	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Problem Solving/Thinking *The student:* -solves problems involving the calculation of the area of a trapezoid -solves problems involving calculation of the area of composite two-dimensional shapes	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Communication *The student:* -explains mathematical thinking clearly using a variety of modes -uses appropriate vocabulary and terminology in oral, visual, and/or written forms	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Application of Learning *The student:* -researches and reports on real-life applications of area measurement	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐

Task 1: _____

Task 2: _____

Task 3: _____

Grade 7 Math

2D Geometry

Guidelines:

1. You may complete as many of the activities as you like in the given time period.
2. You must complete activities totalling at least 100 points.
3. You may be as creative as you like within the guidelines listed below.

Plan to Do	Activity to Complete:	Point Value
	Find an M.C. Escher print that uses tessellations. Prepare a step by step procedure for recreating the design. Be sure to use correct mathematical language in your description.	20
	If two triangles have the same area, are they always congruent? Justify your reasoning, using mathematical language and diagrams to help support your argument.	15
	Take photographs of at least ten real-life examples of patterns that use 2D shapes. Include translations, reflections, rotations, congruent shapes, and similar shapes. Create a scrapbook or virtual scrapbook (using Smart Notebook, PowerPoint, www.animoto.com, or another program of your choice) showing your photographs. Include captions that explain the translation used for each example.	25
	Use dynamic geometry software such as Geometer's Sketchpad to create your own tessellated design.	20
	Find a set of directions (including diagrams) for an origami design. Rewrite the directions and re-label the diagram using mathematical terminology such as symmetry, angles, side, parallel, perpendicular, bisector, etc). Submit both the original instructions and your mathematical version.	25
	Create an artistic design that includes the following: similar shapes, congruent shapes, translations, reflections, and rotations. Write a procedure for recreating your design and give it to a friend to try. Then write a short explanation of how you could clarify your instructions to help your friend to more easily follow your directions. Submit your design, the procedure, your friend's attempt at recreating the design, and your explanation for how to clarify your instructions.	30
	Create a picture on a Cartesian coordinate plane that includes at least 10 points in each quadrant. Turn it into a worksheet for your classmates to use to practice plotting points on the Cartesian coordinate plane. Include both a blank copy of the worksheet and the completed solution.	20
	Create a lesson to present to your class that shows how enlarging or reducing two-dimensional shapes creates similar shapes.	25
	Take a photo from a magazine or a picture from a colouring book. Using either grid paper or a program such as Geometer's Sketchpad, enlarge or reduce the picture so it is either twice as large or half as large.	30
	Create a video in the style of Bill Nye the Science Guy that discusses 2D shapes, transformations, tessellations, reflections, rotations, congruence and similarity, Cartesian coordinate planes, and angles. Be sure to use mathematical language, examples, and real life situations in your video. Include at least one commercial for a mathematical product related to 2D shapes.	50
	Write a song or poem that discuses the difference between congruent and similar shapes.	20
	Explain how to sort and classify triangles and quadrilaterals by geometric properties (symmetry, angles, side, etc). Present the information in the format of your choice.	20
	Free Choice: Must be outlined on a proposal form and approved before beginning work.	10 to 30

I plan to do _____ activities totalling _____ points.

_____ _____

Student's Signature Teacher's Initials

2D Geometry	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding *The student:* -identifies, performs, and describes dilatations through investigation using a variety of tools	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
-demonstrates an understanding that enlarging or reducing two-dimensional shapes creates similar shapes	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
-sort and classify triangles and quadrilaterals by geometric properties using a variety of tools and strategies	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Problem Solving/Thinking *The student:* -creates and analyses designs involving translations, reflections, dilatations, and/or simple rotations of two-dimensional shapes	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Communication *The student:* -explains mathematical thinking clearly using a variety of modes	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
-uses appropriate vocabulary and terminology in oral, visual, and/or written forms	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Application of Learning *The student:* -makes connections between math concepts and daily life	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐

Task 1: _____

Task 2: _____

Task 3: _____

Grade 7 Math

Proportional Relationships Cafe Menu

Choose one Appetizer, one Main Course, and one Dessert

Appetizers

Write a paragraph explaining how your knowledge of rates and ratios can help save money in the grocery store.

Create three problems that use different real-world applications of ratio. Include detailed solutions for each.

Explain how you could use rate to estimate how long it would take to drive from your school to Vancouver, BC. What factors would influence how closely your estimate might be to the actual driving time?

Create a short lesson for your class showing two different strategies for dividing decimals by decimals.

Find a recipe that you think most people in the school would enjoy. Use ratios to determine how much of each ingredient you would need to make the recipe for your class, every student in your grade, and your school.

Main Course

Calculate how you spend one 24 hour day in minutes. Use this information to create a circle graph (either by hand or using a computer program) showing how you spend your time. Create two problems involving ratios or rate that use the information from your graph. Include solutions.

Model makers for movies use ratios to determine the measurements for each model. Imagine you are the model maker for an upcoming disaster film. You have been asked to create a model of a famous landmark that will be destroyed in the movie. Explain how you would determine the measurements of the model so it would be realistic, and show your calculations for the landmark model you have chosen. Create either a scale drawing of your model or build the model.

Dessert

Design a board game for practicing the conversions between ratios, fractions, and percentages. Include an answer key so players can double check their responses.

Choose your favourite professional sports team (or athlete) and research its statistics. Prepare a Smart Board presentation about the statistics and how they can be expressed as ratios and percents. Include a precise prediction about the team's performance in its next game.

Research rates that interest you (for example, fuel efficiency of various cars, speeds of different animals, etc). Create a bulletin board display of your findings, being sure to use your knowledge of rates.

Design and perform an experiment that ranks objects by comparing one thing (e.g. height) to another (e.g. length of stride). Write a detailed report explaining your findings.

Write a short story (or picture book) where the main characters use ratio and rate to solve the conflict in the story.

PROPORTIONAL RELATIONSHIPS	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding *The student:* -represents, compares, and orders decimals to hundredths	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
-uses a variety of strategies to solve problems involving multiplication and division of decimal numbers	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
-demonstrates an understanding of rate as a comparison, or ratio, of two measurements with different units	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Problem Solving/Thinking *The student:* -solves multi-step problems arising from real-life contexts	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Communication *The student:* -explains mathematical thinking clearly using a variety of modes	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
-uses appropriate vocabulary and terminology in oral, visual, and/or written forms	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Application of Learning *The student:* -makes connections between math concepts and daily life	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐

Task 1: _____

Task 2: _____

Task 3: _____

Grade 7 Math

Integers

Guidelines:

4. You may complete as many of the activities as you like in the given time period.
5. You must complete activities totalling at least 100 points.
6. You may be as creative as you like within the guidelines listed below.

Plan to Do	Activity to Complete:	Point Value
	A, B, C, D, and E correspond to points on a thermometer. Use these clues to plot the points: ▪ B and D are negative ▪ D is warmer than C ▪ B is warmer than C ▪ E and D are the same distance from zero ▪ E is colder than A Compose your own thermometer problem and include your answer.	20
	Design a poster that explains the rules for adding and subtracting integers. Be sure to include examples of each.	20
	Identify three real-life situations where integers could be used to convey information. Create one problem using each situation. Include your answers.	30
	Create a 4x4 Magic Square where each row, column, and diagonal adds to -7.	25
	Design four different learning centre activities that your classmates could use to practice adding and subtracting integers. Remember to include answers where appropriate.	25
	Create an entertaining presentation of your choice that will help students remember how to add and subtract integers.	20
	Use the newspaper or internet news sites to locate at least three stories that can be used to create a total of six integer word problems. Create a bulletin board display that shows the stories, word problems, and solutions. Include both positive and negative integers and show both addition and subtraction problems.	25
	Create a collage for the number 42 with at least 25 different integer calculations, including addition and subtraction, that have 42 as their answer. Be creative with your integer equations!	25
	Write a narrative story that uses addition and subtraction of integers as part of the plot.	30
	Write a procedure that explains how to use a number line to add integers and counters to subtract integers. Include diagrams and examples.	30
	Free Choice: Must be outlined on a proposal form and approved before beginning work.	10 To 30

I plan to do _____ activities totalling _____ points.

_____ _____

Student's Signature Teacher's Initials

NUMBER SENSE AND NUMERATION	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding *The student:* -identifies and compares integers found in real-life contexts -represents and orders integers using a variety of tools -adds and subtracts integers, using a variety of tools	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Problem Solving/Thinking *The student:* -creates and carries out a plan to solve problems involving integers	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Communication *The student:* -explains mathematical thinking clearly using a variety of modes -uses appropriate vocabulary and terminology in oral, visual, and/or written forms	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Application of Learning *The student:* -makes connections between math concepts and the real world	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐

Task 1: _____

Task 2: _____

Task 3: _____

Grade 7 Math

Patterns

Guidelines: Choose 3 in a row (vertical, horizontal, or diagonal) to complete. Creativity in presentation is encouraged!

Research the Fibonacci sequence. Create either a written report or a documentary video about the Fibonacci sequence. Include real-life examples of the sequence, patterns within the sequence, as well as information about Fibonacci himself.	Create your own pattern using the material of your choice. Develop three questions about your pattern that a classmate could answer using a table of values. Include full solutions.	Music and art both frequently use complex patterns in their creation. Find five examples of patterns in music and/or visual arts and create a virtual art gallery of the works using Smart Notebook. A paragraph explaining the pattern should accompany each work.
Word of mouth is one of the ways that movies become popular. If one person who enjoyed a movie tells three of their friends, and each of those three friends sees the movie and tells three of their friends, and so on, the news will spread to a lot of people very quickly. Create a table of values that shows this information. Write an explanation of how word of mouth advertising works using your table of values to support your ideas.	**Free Choice: Must be outlined on a proposal form and approved before beginning work.**	Create a new board game modelled after an existing game (e.g. Trivial Pursuit, Monopoly etc) that would help students practise developing mathematical patterns.
If a square-based pyramid has 100 cans on the bottom layer and one can at the tip of the pyramid, how many cans would you need to construct the whole pyramid? Include a table of values and a diagram in your solution.	Create a Venn Diagram that compares the Fibonacci sequence to Pascal's Triangle.	Create a table of values that show how a family of tree works. To start, you have two parents. Each of them has two parents which gives you 4 grandparents, and so on. If you go back 25 generations, how many great-great-great (etc, etc) grandparents do you have? By this logic, the farther back in time we go, the more people there had to have been. Therefore the population of the world must be getting smaller as time goes on. Explain whether the above statement is true or false, giving reasons for your answer.

PATTERNING and ALGEBRA Term 1 Strand 1	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding *The student:* -identifies, describes, and represents geometric and numeric patterns -makes tables of values for growing patterns and plots the points on a graph	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Problem Solving/Thinking *The student:* -creates a plan of action for extending numeric and geometric patterns -carries out a plan effectively using appropriate strategies	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Communication *The student:* -explains mathematical thinking clearly using a variety of modes -uses appropriate vocabulary and terminology in oral, visual, and/or written forms	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Application of Learning *The student:* -transfers knowledge and skills to new contexts -makes connections between mathematics and the real world	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐

Task 1: _____

Task 2: _____

Task 3: _____

Grade 7 Math

Algebra

Directions: Choose activities from the menu below to total 10 points. Place a checkmark in each box to show which activities you will complete.

2 Points:

- ☐ Create a concentration game with at least 20 cards. Half of the cards should have an algebraic expression. The other half should have real-life examples that match these expressions. Have at least two friends try your game. Include an answer key.
- ☐ Go through a newspaper or online news site. Find three examples of news stories talking about real-life relationships involving constant rates. Using the information in the news items, create six problems for a friend to solve. Submit the news stories, the problems, and full solutions.

5 Points:

- ☐ Sometimes, "Guess and Check" is a good method for solving linear equations such as $3x + 6 = 24$. Explain how you would use "Guess and Check" to solve this equation and give reasons why using "Guess and Check" isn't always the best way to solve equations using examples to support your answer. Present the information in the format of your choice.
- ☐ Find your heart rate, as well as the heart rate of a friend. Using this information and what you know about pattern rules and algebraic equations, explain why figuring out how many times your heart beats in 24 hours is not any more difficult than figuring out how many times it beats in one hours. Present this information in the format of your choice.
- ☐ For the pattern 1, 4, 7, 10, 13... compare two different ways of finding the 50^{th} term. Which method do you think is easier? Explain why. Present this information in the format of your choice.

8 Points:

- ☐ Write a children's picture book or create a six-frame comic on Bitstrips that shows the situation behind the expression $2(x+4) – 3$.
- ☐ The job of a variable is to stand in for a value. It probably would be very frustrating not having an identity of your own. Write and perform a play (live or on video) about the job of a particular variable and the numbers (s)he has replaced recently.
- ☐ Free choice – Prepare a proposal form and submit it to your teacher for approval.

ALGEBRA	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding *The student:* - translates phrases describing simple mathematical relationships into algebraic expressions -solves linear equations using a variety of methods	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Problem Solving/Thinking *The student:* -solves problems involving constant rates using algebraic equations	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Communication *The student:* -explains mathematical thinking clearly using a variety of modes -uses appropriate vocabulary and terminology in oral, visual, and/or written forms	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Application of Learning *The student:* -models real-life relationships involving constant rates using algebraic equations with variables to represent the changing quantities in the relationship	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐

Task 1: _____

Task 2: _____

Task 3: _____

Grade 7 Math

Fraction Operations Baseball

Look through the following choices and decide how you want to make your game add up to 100 points. Singles are worth 10 points, Doubles are worth 30 points, Triples are worth 50 points, and Homeruns are worth 100 points. Choose any combination you want. Your points must equal (or go over) 100.

Singles – 10 Points Each

☐ Create six problems that use addition or subtraction of fractions using real-life examples about the number of students in your class that share particular traits. Submit the problems and solutions showing your work.

☐ Create a mathematical crossword puzzle in which the clues are problems that use addition and subtraction of fractions, and the answers are fractions written in words.

☐ Design an instructional poster that shows the steps for adding and subtracting fractions with mixed numbers.

☐ Create one problem that uses addition of mixed numbers and one problem that uses subtraction of mixed numbers. Show three different ways of solving each problem.

☐ Create a set of concentration cards. One of each pair should have an addition or subtraction question and the other card in the pair should have the answer. Do not repeat answers.

Doubles – 30 Points Each

☐ Create a brochure explaining how we use addition and subtraction of fraction in our lives.

☐ Develop a board game to reinforce addition and subtraction of fractions skills.

☐ Create a Power Point or Smart Notebook slide show that shows students how to add and subtract fractions. Use images from the gallery as manipulatives to illustrate your examples.

☐ Create an illustrated children's book that shows the importance of learning how to add and subtract fractions.

☐ Create a collage that shows many ways that we use fractions in our every day lives.

☐ Create a Venn Diagram that compares fractions to decimals. Include examples of when each should be used in real-world situations.

Triples – 50 Points Each

☐ You have been given the task of planning meals for an entire weekend for a family of eight. You must include three dinners, two lunches, two breakfasts, and two snacks. Your food plan must cover all of the food groups, and you must use a recipe to create each item. Remember to check how many people the recipe serves and adjust it accordingly! Using your knowledge of fractions, calculate how much of each ingredient you will require when you shop for your items. Submit a weekend meal plan showing your recipes and the total amounts of the required ingredients.

☐ Create an advertisement (tv, radio, or print) for a new machine that will complete a student's fraction problems for them. Explain how the machine works using your knowledge of addition and subtraction of fractions.

☐ Develop four hands-on centre activities for your classmates that teach them how to solve fraction problems using addition, subtraction, multiplication of fractions by a whole number, equivalent fractions, and mixed numbers. You may use Smart Notebook for one of the centre activities if you wish.

☐ Free Choice – prepare a proposal form and submit it for approval.

Homeruns – 100 Points Each

☐ Create an entertaining Math video in which you teach viewers about adding and subtracting fractions. Your video must teach viewers how to find equivalent fractions, addition and subtraction of fractions, how to multiply fractions by a whole number, show examples of how manipulatives can be used to solve problems with fractions, and show real-world situations where addition and subtraction of fractions is used. Your video should also include at least three commercials for math-based products. Be creative and have fun!

I chose:

_____ Singles (10 points each)
_____ Doubles (30 points each)
_____ Triples (50 points each)
_____ Homeruns (100 points)

FRACTIONS	1	2	3	4
Knowledge and Understanding *The student:* -represents, compares, and orders fractions using a variety of tools	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Problem Solving/Thinking *The student:* Solves problems involving the addition and subtraction of fractions	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Application of Learning *The student:* Makes connections between mathematics and the real world	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Communication *The student:* Provides clear and logical explanations Uses appropriate mathematical language	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐

Task 1: _____

Task 2: _____

Task 3: _____

Grade 7 Math

3D Geometry

Guidelines: Choose 3 in a row (vertical, horizontal, or diagonal) to complete. Creativity in presentation is encouraged!

Photograph ten 3D objects. Create a net for each one. Create an interesting bulletin board display showing each object with its net.	Create a Smart Notebook game that asks players to match a 3D object shown from one angle to the same object shown from a different perspective (i.e. top, front, back, left, and right). Show at least ten different objects.	Write instructions to explain how to use Geometer's Sketchpad (or other dynamic geometry software) to create different views of 3D shapes.
Architects use different views to create blueprints for the construction team to follow. Find an example of a blueprint that shows two or more views. Explain why it is important for them to use at least two different views instead of just one.	**Free Choice: Must be outlined on a proposal form and approved before beginning work.**	Create a three dimensional object using at least 20 snap cubes. Sketch the object from the top, front, back, left, and right.
Create a diagram of your bedroom furnishings showing a view from the top and from one side. Use this diagram to create an approximate model of the room and furnishings using snap cubes.	Sometimes two 3D shapes look the same from the top but different from the side. Create three pairs of 3D structures made using at least ten snap cubes that have this trait. Include sketches to show how you can determine which object is with when you can see them from two different views.	Create a kit that another student could use to create a mobile of 3D objects. In your kit, include the nets to create at least six different 3D shapes and instructions for constructing the mobile. Include a photograph of what the finished mobile should look like.

3D GEOMETRY	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding *The student:* - investigates the angles between the faces of a prism - identifies right prisms	Limited **T1** □ **T2** □ **T3** □ Limited **T1** □ **T2** □ **T3** □	Some **T1** □ **T2** □ **T3** □ Some **T1** □ **T2** □ **T3** □	Considerable **T1** □ **T2** □ **T3** □ Considerable **T1** □ **T2** □ **T3** □	High Degree **T1** □ **T2** □ **T3** □ High Degree **T1** □ **T2** □ **T3** □
Problem Solving/Thinking *The student:* - solves problems related to 3D shapes	Limited **T1** □ **T2** □ **T3** □	Some **T1** □ **T2** □ **T3** □	Considerable **T1** □ **T2** □ **T3** □	High Degree **T1** □ **T2** □ **T3** □
Communication *The student:* -explains mathematical thinking clearly using a variety of modes	Limited **T1** □ **T2** □ **T3** □	Some **T1** □ **T2** □ **T3** □	Considerable **T1** □ **T2** □ **T3** □	High Degree **T1** □ **T2** □ **T3** □
Application of Learning *The student:* -makes connections between mathematics and the real world	Limited **T1** □ **T2** □ **T3** □	Some **T1** □ **T2** □ **T3** □	Considerable **T1** □ **T2** □ **T3** □	High Degree **T1** □ **T2** □ **T3** □

Task 1: _____

Task 2: _____

Task 3: _____

Grade 7 Math

Surface Area and Volume

Guidelines:

1. You may complete as many of the activities as you like in the given time period.
2. You must complete activities totalling at least 100 points.
3. You may be as creative as you like within the guidelines listed below.

Plan to Do	Activity to Complete:	Point Value
	A container with a larger surface area always has a greater volume. Explain whether or not this statement is true using several examples to support your argument.	20
	Create a short, entertaining presentation for your class that explains why area is expressed in square units (units^2) and volume is expressed in cubic units (units^3).	20
	How many juice boxes could you fit in your classroom if the classroom was completely empty and you stacked the boxes from wall to wall and floor to ceiling? Create a poster (electronic or paper) to show how you arrived at your answer.	25
	Collect at least six regular containers of different sizes. Use a dynamic geometry program such as Geometer's Sketchpad to create diagrams of each container and to show both the surface area and volume of each container.	25
	A bottled water company wants to redesign its packaging so it is easier to ship, creates as little waste as possible, and takes up as little space as possible in a truck. They also want the design to appeal to teenagers. Each water bottle holds 500mL. Design three possible containers to present to the company. Explain the pros and cons of each container and choose one to recommend above the others.	25
	Research four geometric monuments or buildings from around the world. Create a presentation that gives students an idea of their relative sizes by explaining how much paint it would take to cover each monument and how many of a common object would fit inside.	30
	Create a hands on activity to help your classmates understand how to convert between metric measures of capacity and volume (eg. Millilitres to cubic centimetres).	20
	Create a sculpture using at least eight found objects. Find the surface area and volume of the sculpture. If you changed the way you arranged the objects, would the surface area change? Would the volume change? Explain how you know.	30
	Create a six sided cube that shows examples of different solids and explains how to calculate the surface area and volume of each.	15
	The surface area of a lake affects how quickly the water from the lake evaporates. Investigate this phenomenon and create a news report to explain it. In your report, share calculations about one of the Great Lakes.	30
	Find three real life examples of rectangular prisms. Create a chart with a sketch of the original prism, its surface area and its volume. Then double the length of all sides of the prism and find the surface area and volume of each prism again. Write a paragraph explaining the relationship you see between surface area and volume.	20
	Free Choice: Must be outlined on a proposal form and approved before beginning work.	10 to 30

I plan to do _____ activities totalling _____ points.

_____ _____

Student's Signature Teacher's Initials

Surface Area and Volume	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding *The student:* -determines the surface area and volume of prisms -applies the formula for volume of prisms -understands the relationship between metric units of volume and capacity	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Problem Solving/Thinking *The student:* -solves problems involving the surface area of prisms	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐
Communication *The student:* -explains mathematical thinking clearly using a variety of modes -uses appropriate vocabulary and terminology in oral, visual, and/or written forms	Limited **T1** ☐ **T2** ☐ **T3** ☐ Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐ Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐ Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐ High Degree **T1** ☐ **T2** ☐ **T3** ☐
Application of Learning *The student:* -makes connections between math concepts and daily life	Limited **T1** ☐ **T2** ☐ **T3** ☐	Some **T1** ☐ **T2** ☐ **T3** ☐	Considerable **T1** ☐ **T2** ☐ **T3** ☐	High Degree **T1** ☐ **T2** ☐ **T3** ☐

Task 1: _____

Task 2: _____

Task 3: _____

Name: _____Teacher Approval: ___

Free-Choice Proposal Form

Points Requested: _____Points Approved: _____

Proposal Outline:

1. What specific topic or idea will you learn about?

2. What criteria should be used to grade it? (Content? Creativity? Knowledge? Application?)

3. What will your product look like?

4. What materials will you need from the teacher to create this product?

Name: _____Teacher's Approval: ___

Free-Choice Proposal Form

Points Requested: _____Points Approved: _____

Proposal Outline:

1. What specific topic or idea will you learn about?

2. What criteria should be used to grade it? (Content? Creativity? Knowledge? Application?)

3. What will your product look like?

4. What materials will you need from the teacher to create this product?

$1 Contract

I did not spend more than $1.00 on my _____.

_____ _____

Student Signature Date

My child, _____, did not spend more than $1.00 on the product he/she created.

_____ _____

Parent Signature Date

$1 Contract

I did not spend more than $1.00 on my _____.

_____ _____

Student Signature Date

My child, _____, did not spend more than $1.00 on the product he/she created.

_____ _____

Parent Signature Date

Name: _____

Resources

Kelleher, et al. (2004). *Nelson Mathematics 7*. Nelson Education Ltd.

Ontario Ministry of Education. (2005). *The Ontario Curriculum Grades 1-8 : Math (Revised).* Queen's Printer for Ontario.

Westphal, L. E. (2007). *Differentiating Instruction with Menus: Math.* Waco, TX: Profrock Press, Inc.

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