

Mathematics

Integrated Project

Quilting and Math

Presented to Professor Jarvis

Thursday, January 29, 2009

By Stephanie Ratz and Julie Nash

P/J Section 2

What students need to know before they start this project:

Here are the grade 2 expectations that correspond to the expectations for this integrated project. Students should be able to fulfill these expectations. The teacher could use pre assessment to determine whether the students have fulfilled the expectations. Pre assessment might be a quiz for math and a quiz for social studies, brainstorming everything the students know about each of the subjects, completing a KWL chart etc.

2m63 Grade 2SQC2005 Mathematics Patterning and Algebra Patterns and Relationships
– identify repeating, growing, and shrinking patterns found in real-life contexts (e.g., a geometric pattern on wallpaper, a rhythm pattern in music, a number pattern when counting dimes);

2m65 Grade 2SQC2005 Mathematics Patterning and Algebra Patterns and Relationships
– create growing or shrinking patterns (Sample problem: Create a shrinking pattern using cut-outs of pennies and/or nickels, starting with 20 cents.);

2m66 Grade 2SQC2005 Mathematics Patterning and Algebra Patterns and Relationships
– create a repeating pattern by combining two attributes (e.g., colour and shape; colour and size) (Sample problem: Use attribute blocks to make a train that shows a repeating pattern involving two attributes.);

2m67 Grade 2SQC2005 Mathematics Patterning and Algebra Patterns and Relationships
– demonstrate, through investigation, an understanding that a pattern results from repeating an operation (e.g., addition, subtraction) or making a repeated change to an attribute (e.g., colour, orientation).

2z5 Grade 2SQC2004 Social Studies HC: Traditions and Celebrations Knowledge and Understanding – outline traditions of various cultures that are passed down from earlier generations (e.g., celebrations, names);

2z6 Grade 2SQC2004 Social Studies HC: Traditions and Celebrations Knowledge and Understanding – identify ways in which heritage and traditions are passed on (e.g., stories; community celebrations; special days such as Remembrance Day, Canada Day, Aboriginal Solidarity Day, and religious holidays; the Canadian flag; music, crafts, dance, food, recreation, clothing);

2z13 Grade 2SQC2004 Social Studies HC: Traditions and Celebrations Inquiry/Research and Communication Skills – use appropriate vocabulary (e.g., culture, celebrations, heritage, traditions) to communicate the results of inquiries and observations about family traditions and celebrations.



Mathematics- Knowledge and Understanding

Define the following terms: (0.5 MARKS EACH)

/5

TURN:

FLIP:

SLIDE:

ATTRIBUTE:

QUILT:

STITCH:

SEAM:

PATTERN:

NINE PATCH:

BINDING:

Mathematics- Thinking, Inquiry, and Problem Solving

Solve or complete the following questions:

/12

Students would research using books about settlers/first nations of upper Canada (this is part of the grade 3 social studies curriculum)

1. Research the answers to these questions (6 MARKS TOTAL)

a) Who made quilts? (1 mark)

b) What did people use to make quilts? How have the materials changed from the pioneer days to present day? (2 marks)

c) What role did quilts play in the early settlements of Upper Canada? (2 marks)

2. Emma has scraps of 5 different fabrics that she wants to make into a baby quilt for her niece, Grace. She has decided to make 10 cm-squares. She has enough yellow material to make 22 squares, enough white material to make 19 squares, enough pink material for 25 squares, enough dark blue material for 24 squares and enough light blue material for 18 squares. How many squares does Emma have in total? (1 mark) How might Emma arrange all of the squares so that they form a complete rectangle? (2 marks) 6 MARKS TOTAL

Plan your own nine-patch block, using the colours identified above. (3 marks)
Repeat it below:

Find an example of at least one transformational pattern (flips, turns, slides) somewhere in your home. Bring in the object (ask your parents) or take a picture of it and bring it in. (1 mark)

Mathematics- Application of Concepts

8 MARKS TOTAL

/8

Collect rectangles and squares of different fabrics at the front of the class. (10cmX10cm and 20cmX10cm). Your task is to create four blocks that measure 20cmX 20cm within a larger block. (Use your ruler to measure). Use the transformations that we have learned about in class. (ex: Flip, Slide, Turn) to create patterns in your block.

Draw a picture of your quilt design before you start!

Mathematics- Communication of Concepts

/10

1. As a class, we will be participating in the Flat Stanley Project. For this project, each student will write a letter to a pen pal at a different school (location to be decided). In the letter, you will talk about what we have been learning about pioneers in class. For example, what were the functions of quilts in the days of the pioneers? How were their daily lives similar to and different from our lives in present day? We will send all of the letters with Flat Stanley, as well as pictures of each student's quilt block. The letter should include the date, a greeting, and a few paragraphs as well as a closing. (5 marks)

2. With a partner, prepare an interview to explain to the class how you designed your quilt, what materials you used, what transformations you used, and one reason why you like your quilt. Each partner talks about their quilt for five minutes. (10 minutes total) Feel free to use costumes, accents, props etc to pretend you are a pioneer, talk show host... (5 marks)

Mathematics and Quilting

Grade 3

Mathematics Ontario Curriculum expectations:

Patterning and Algebra

3m65 Grade 3SQC2005 Mathematics Patterning and Algebra Patterns and Relationships
– identify, extend, and create a repeating pattern involving two attributes (e.g., size, colour, orientation, number), using a variety of tools (e.g., pattern blocks, attribute blocks, drawings) (Sample problem: Create a repeating pattern using three colours and two shapes.);

3m63 Grade 3SQC2005 Mathematics Patterning and Algebra Overall Expectations •
describe, extend, and create a variety of numeric patterns and geometric patterns;

3m70 Grade 3SQC2005 Mathematics Patterning and Algebra Patterns and Relationships
– demonstrate, through investigation, an understanding that a pattern results from repeating an action (e.g., clapping, taking a step forward every second), repeating an operation (e.g., addition, subtraction), using a transformation (e.g., slide, flip, turn), or making some other repeated change to an attribute (e.g., colour, orientation).

Social Studies Ontario Curriculum expectations:

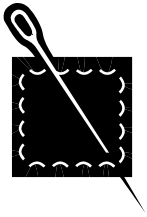
Early Settlements in Upper Canada

3z17 Grade 3SQC2004 Social Studies HC: Early Settlements in Upper Canada
Inquiry/Research and Communication Skills – use appropriate vocabulary (e.g., pioneer, settlers, grist mill, settlement, general store, blacksmith, First Nation peoples) to describe their inquiries and observations.

3z18 Grade 3SQC2004 Social Studies HC: Early Settlements in Upper Canada Application
– compare and contrast aspects of daily life for early settler and/or First Nation children in Upper Canada and children in present-day Ontario (e.g., food, education, work and play);

3z22 Grade 3SQC2004 Social Studies HC: Early Settlements in Upper Canada Application
– re-create some social activities or celebrations of early settler and/or First Nation communities in Upper Canada.

Solutions:



Mathematics- Knowledge and Understanding

Define the following terms: (0.5 MARKS EACH)

/5

TURN: a transformation that turns a shape about a fixed point to form a congruent shape. The rotation image is the result of a rotation

FLIP: a transformation that flips a shape over an axis to form a congruent shape. A reflection image is the mirror image that results from a reflection

SLIDE: A transformation that moves every point on a shape the same distance, in the same direction, to form a congruent shape. A translation image is the result of a translation.

ATTRIBUTE: A quantitative or qualitative characteristic of shape, an object, or an occurrence; for example, colour, size, thickness, or number of sides. An attribute may not be a property.

QUILT: a coverlet for a bed, made of two layers of fabric with some soft substance, as wool or down, between them and stitched in patterns or tufted through all thicknesses in order to prevent the filling from shifting.

STITCH: one complete movement of a threaded needle through a fabric or material such as to leave behind it a single loop or portion of thread, as in sewing, embroidery, or the surgical closing of wounds.

SEAM: the line formed by sewing together pieces of cloth, leather, or the like.

PATTERN: The repetition of any thing- shapes, lines, colours.

NINE PATCH: The repetition of alternating colours of square blocks. Looks like a checker board.

BINDING: the fabric that is used to cover the unfinished edges of the quilt after it is quilted.

Mathematics- Thinking, Inquiry, and Problem Solving

Solve or complete the following questions:

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1. Research the answers to these questions (6 MARKS TOTAL)

a) Who made quilts? (1 mark)

(from <http://www.womenfolk.com/historyofquilts/>)

During colonial times, women had a tough life and had lots of work to do. There was not much time to participate in quilt making. Wealthy families who could afford to hire help for household chores could afford the time to make quilts.

b) What did people use to make quilts? How have the materials changed from the pioneer days to present day? (2 marks)

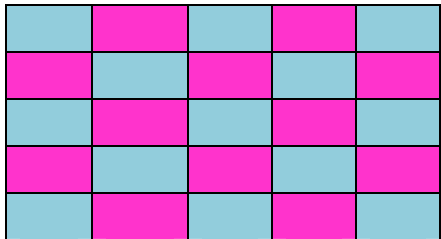
(from http://canadian-settlement.suite101.com/article.cfm/quilting_history_in_canada)

The materials used were a reflection of how well off the family was, and changed over time. The average person would use pieces of old, worn-out clothing and filled them with feathers and cattail down (to make a patchwork quilt). Native people knew how to dye fabric and so when dyemaking skills were taught, the materials became much brighter.

Now we have sewing machines and factories that can dye fabrics for us, so quilts are now a luxury more than a necessity. Cotton in quilts is now flat and ready for quilting and factory made.

c) What role did quilts play in the early settlements of Upper Canada? (2 marks)

Plan your own nine-patch block, using the colours identified above. (3 marks)
Repeat it below:



Find an example of at least one transformational pattern (flips, turns, slides) somewhere in your home. Bring in the object (ask your parents) or take a picture of it and bring it in. (1 mark)

Mathematics- Application of Concepts

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Expectations	Categories	Level 4	Level 3	Level 2	Level 1
3m70	Knowledge of transformational vocabulary	Able to define the terminology with a high degree of clarity	Able to define the terminology with clarity	Able to define some of the terminology	Limited ability to define the terminology
3Z17	Knowledge of quilting vocabulary	Able to define the terminology with a high degree of clarity	Able to define the terminology with clarity	Able to define some of the terminology	Limited ability to define the terminology
3m63	Thinking/inquiry: creating a repeating pattern in a quilt block	Masterfully plans design with a repeating pattern in a quilt block using transformations and two attributes	Thoughtfully plans design with a repeating pattern in a quilt block using transformations and two attributes	Plans design with a partially repeating pattern in a quilt block using unclear transformations and two attributes	Design lacks a repeating pattern
3Z18	Thinking/inquiry: similarities and differences between the lives of early settlers and lives of students	Able to explain various aspects of quilt-making, including how materials have changed with a high degree of clarity	Able to explain various aspects of quilt-making, including how materials have changed, with considerable clarity	Able to explain some aspects of quilt-making, and how materials have changed	A few aspects of quilt-making are poorly explained
3m65 3m70	Application of knowledge about transformations to create patterns	Applies knowledge about transformations to create a repeating pattern involving the attributes of shape and colour with a high degree of creativity and effectiveness	Applies knowledge about transformations to create a repeating pattern involving the attributes of shape and colour with a considerable degree of creativity and effectiveness	Applies knowledge about transformations to create a repeating pattern involving the attributes of shape and colour with some degree of creativity and effectiveness	Applies knowledge about transformations to create a repeating pattern involving the attributes of shape and colour with limited effectiveness
3Z22	Application: re-creating social activities or celebrations	Masterfully applies quilting techniques	Applies quilting techniques with considerable skill	Applies quilting techniques with some skill	Quilting lacks proper technique
3m70	Communication about the mathematical	Orally communicates clearly and	Orally communicates with	Orally communicates some of the	Communication of mathematical properties behind

	properties of student's quilt design	succinctly the mathematical properties behind the quilt design	considerable clarity the mathematical properties behind the quilt design	mathematical properties behind the quilt design	the quilt design lacks clarity and coherence
3Z22	Communication: writing about re-creating social activities and celebrations	Able to write an exemplary letter which includes the date, a greeting, a closing, and a few paragraphs which are based on student's own inquiry	Able to write a fully developed letter which includes the date, a greeting, a closing, and a few paragraphs which are based on student's own inquiry	Able to write a letter that addresses some of the expectations outlined in the question	Letter lacks coherence and clarity and research is limited

Reflections-Stephanie Ratz and Julie Nash

Stephanie:

I learned so much from this project! I have always found quilts intriguing and interesting. I learned how quilts are made, the components of quilt making, and quilt-making techniques, and the role of quilts in Upper Canada. Basically, all of the information about quilting in this project was 'new learning' for me.

I knew that quilts had patterns, but from doing this project I learned that transformations can be found in the patterns in quilts. Flips, Slides, and Turns can be easily found in many patterns around the house and the city. I learned that students can learn about transformations and measurement and area while also learning about quilts.

While making this project, I have become more aware of how mathematics is a part of daily life and it is everywhere! I think it is important for teachers to get students motivated to learn about mathematics. Some students may think mathematics is boring so a way to get students interested in what they are learning is to connect mathematics with a topic that appeals to them. For example, Nintendo is very popular and new, so connecting mathematics and the topic of Nintendo would spark the interest of the students.

I have learned that Mathematics can connect easily with a subject. On our case, transformations were connected to quilting (and the early settlers of Upper Canada). Making an integrated project for students would be a great way to do a culminating task for a two units at once. Our project could be a culminating task for the Heritage and Citizenship unit from Grade 3 Social Studies and the unit on Patterning and Algebra from Grade 3 Mathematics.

I will definitely have my students complete an integrated project when I teach as it is a useful tool for assessment at the end of the unit, it motivates students and introduces them to the idea of math being connected to other subjects and everyday life. I am glad I now know how to organize an integrated project!

Initially, I intended to do the mathematics and literature assignment, because the integrated mathematics project sounded too daunting. Then Stephanie approached me with the idea of doing a project incorporating quilting and math in some way, and being an avid quilter, I quickly caught her enthusiasm for the assignment. I found it a challenging and fun task to create relevant questions that would tie the two curriculum areas together in a way that would engage students. Coming up with a thoughtful rubric that combined expectations for both the social studies and math curriculums was the most challenging task, but in the end it came together too. We got into it so much that we went above and beyond submitting exemplars just of the application task, and created exemplars of the entire project from start to finish.