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# **A Garden of Patterns!**

## **A Unit For Grade Three**

### **Including:**

**Patterns Around Us - Prior Knowledge**  
**Plan the Garden - The Culminating Task**  
**Hundreds Chart - Design a Patio**  
**Rose, Rose, Tulip - Repeating Patterns**  
**How Does Your Garden Grow?**  
**Planting In Groups**  
**Water, Water, Weed**  
**The Garden Creation - Culminating Task**  
**Culminating Task - Celebrating!**

**An Integrated Unit for Grade 3**

**Written by:**

**Susan Crowder, Dawn Fewer, Tammy Clune (Project Manager)**

**Length of Unit: approximately: 16 hours**

**August 2001**

# **A Garden of Patterns!**

## **A Unit For Grade Three An Integrated Unit for Grade 3**

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### **An Integrated Unit for Grade 3**

#### **Written by:**

**Susan Crowder, Dawn Fewer, Tammy Clune (Project Manager)**

J.L. Jordan

(613)342-7711

Catholic District School Board of Eastern Ontario

dawnfewe@enoreo.on.ca

#### **Based on a unit by:**

Susan Crowder, Dawn Fewer, Tammy Clune (Project Manager)

J.L. Jordan

(613)342-7711

Catholic District School Board of Eastern Ontario

dawnfewe@enoreo.on.ca

This unit was written using the Curriculum Unit Planner, 1999-2001, which Planner was developed in the province of Ontario by the Ministry of Education. The Planner provides electronic templates and resources to develop and share units to help implement the new Ontario curriculum. This unit reflects the views of the developers of the unit and is not necessarily those of the Ministry of Education. Permission is given to reproduce this unit for any non-profit educational purpose. Teachers are encouraged to copy, edit, and adapt this unit for educational purposes. Any reference in this unit to particular commercial resources, learning materials, equipment, or technology does not reflect any official endorsements by the Ministry of Education, school boards, or associations that supported the production of this unit.

## A Garden of Patterns!

### A Unit For Grade Three An Integrated Unit for Grade 3

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## Task Context

Within the context of this unit, students learn all Patterning and Algebra learning expectations, as well as several Number Sense and Numeration expectations, as outlined in the Ontario Mathematics Curriculum document. The learning expectations have been clustered into groups, and each group addresses an essential question that the student should grasp. The collection of essential questions are organized in a logical sequence which supports a natural progression of learning. The learning activities and culminating task for this unit have been designed to support this natural progression in a manner which engages students, and allows for individual expression of the essential understandings.

Within the unit, entitled "A Garden of Patterns", the overall expectations of recognizing, describing, and generalizing patterns are addressed with a purpose of building a mathematical model of a garden. The garden is constructed using physical material, and pictorial displays. Working through the subtasks, students explore a variety of number, geometric, and environmental patterns. Students use their prior knowledge of patterning as a basis for further development of patterning skills and knowledge. Through a succession of whole class, small group, and individual learning activities, students recognize and create patterns, and explore pattern relationships. Use of concrete manipulatives comprises an important part of the learning process. Upon completion of each subtask, students are expected to apply these new skills and understandings to complete the final task. An oral presentation of the final project allows for further assessment of the student's knowledge. Students then apply their understanding to a new context as they design a proposal of a garden. The final celebration allows for students to reflect on their success, and display their garden for others to see.

### **Catholic Graduate Expectations:**

CGE 2a - listens actively and critically to understand and learn in light of gospel values.

CGE 2b - reads, understands and uses written materials effectively.

CGE 3e - adopts a holistic approach to life by integrating learning from various subject areas and experience.

CGE 4 - applies effective communication, decision-making, problem-solving, time and resource management skills.

CGE 4f - applies effective communication, decision-making, problem-solving, time and resource management skills.

CGE 5c - develops one's God-given potential and makes a meaningful contribution to society.

CGE 5g - achieves excellence, originality, and integrity in one's own work and supports these qualities in the work of others.

CGE 7d - promotes the sacredness of life.

CGE 7i - respects the environment and uses resources wisely.

CGE 7j - respects the environment and uses resources wisely.

## Task Summary

A garden offers a perfect environment for connecting patterns found in the real world, to the patterns that are an essential part of mathematical procedures. Students learn of the many patterns which can be found within a garden, whether they be patterns inherently found within nature, such as the arrangement of petals on a flower, or expressed through human creativity as beautiful gardens are designed. As students make the connection of understanding, students also develop a respect for the environment, and the sacredness of life. They come to appreciate their own gifts of creativity as they work towards developing a garden of their own.

The activities in the subtasks focus on the knowledge and skills in mathematics: understanding the concepts, applying the mathematical procedures, communicating findings, and problem solving. Students participate in activities in the areas of number patterns and environmental patterns. In each area, the students are identifying, creating, and extending patterns using a variety of manipulatives. They identify relationships between and among various patterns, and create charts to display their findings. Finally, students communicate their understanding in a written format, as well as orally.

The subtasks have been developed to allow for a natural progression of learning, by clustering expectations into specific areas of learning. Students first learn to identify number patterns as they explore patterns in the

100's chart, repeating patterns, and growing patterns. Students then identify relationships between addition, subtraction, and multiplication as they explore with arrays. Finally, students use environmental data, to create models of patterns, and display them in chart form.

The final task is set up as an ongoing project that is developed during each subtask. Students create a model of a garden in a box (a diorama) using two and three dimensional shapes. As each skill is taught, students apply their understanding directly within their project. Each subtask is set up to allow for whole group learning, and then small group practise of the concept. This gives students ample opportunity to practise each skill before they apply their understanding individually within their own gardens. Students use a "Garden Journal" to communicate understanding of the concept. Rating scales are used to measure students' understanding at each stage of the project, and a rubric is provided for an overall assessment of students' understanding. At each stage of their project, students assess their own progress using a rating scale. As the culminating task, an oral presentation allows for further assessment as students explain the patterns that they used in their gardens. Their knowledge is then applied in a new context as they create a proposal for a new garden.

## Culminating Task Assessment

This subtask requires students to complete their well developed, detailed, three dimensional model (Diorama) of a garden. The project has evolved over the period of the unit, with time given for each pattern to be developed. Each subtask has prepared students to apply their learning to a life context; their garden. Students are assessed on how they apply their patterning skills to their finished product. For further assessment, students provide detailed explanations of each of the 5 patterns used in their model, in their daily Garden Journal. The culminating activity of an oral presentation to the class provides for further assessment in a related context. Students then apply their understanding of patterning, as they continue to assume the role of a garden designer. They design a draft of a new garden plot for a neighbour. They explain their various patterns which are part of their proposal. Students are encouraged to see the spiritual connection with their role as "gardeners." In caring for their gardens, they are promoting the sacredness of life.

### **Catholic Graduate Expectations:**

CGE 4f - applies effective communication, decision-making, problem- solving, time and resource management skills.

CGE 5g - achieves excellence, originality, and integrity in one's own work and supports these qualities in the work of others.

## Links to Prior Knowledge

Students require a basic understanding of the following math concepts before beginning the unit: identify patterns in addition and subtraction sentences, and identify, create and extend a pattern using two attributes, such as size and colour. During the initial assessment, described in subtask one, students have an opportunity to demonstrate their understanding of these two key areas.

## Considerations

### Notes to Teacher

This unit has a direct link to the expectations listed in the Ontario Science Document (Growth and Changes in Plants). It also works well with Unit 7 of "In the Spirit We Belong", the grade three religion program.

It is recommended that this unit be taught towards the end of grade three (spring if possible), as there are many expectations in the number sense and numeration strand that require extra time. It also happens to be the best time of year in Ontario for beginning a unit on plants, gardening, and Lent. Most of the teaching and learning strategies used in this unit can be adapted and/or accommodated to meet the specific needs of any classroom. The main methods of assessment throughout the unit are observation, individual work on the garden, written explanations of students' understanding in their "Garden Journal," and rubrics. The culminating project, which is a diorama of a garden, allows for individual evaluation of how students apply their understanding of the main concepts taught within the various subtasks.

### Things to Do Before Beginning the Unit

**Materials:** This unit is set up so that the culminating task is visited throughout the unit. Decide on the materials that are best suited for your students.

1) Box - a shoe box is suggested; however, a larger box may be easier for students who have difficulty manipulating small objects.

2) Paint or paper to cover the box

3) Modelling clay is recommended for creating the flowers and vegetables. The flowers and vegetables can simply be small balls of clay if there is a concern about time, or if students find it too difficult to create miniature size replicas. It is also possible to send home the clay, and have students form their replicas as a homework assignment. If it is impossible to use modelling clay, coloured paper can also be used. Ensure a variety of colours are made available to inspire colourful patterns and realistic replicas.

4) Glue may be required to secure the objects in the diorama. Modelling clay can be pressed down and seems to hold on its own.

5) A variety of crayons, markers, pencil crayons, or paint should be offered to students throughout the subtasks.

**Pictures:** Have a selection of pictures available of gardens and patios. Go to the Internet, or gardening books to acquire a file of suitable pictures. Look for evident patterns in pictures.

**Soft Cover Binder:** Set up a learning log in a soft cover binder to assist with the management of paper. This is referred to as the "Garden Journal" throughout the unit.

**Copy:** To ease preparation for the various subtasks, note that Blackline Master 2.3 called "Garden Journal" needs to be copied for tasks 2, 3, 4, 5, 6, and 7.

If possible, it is recommended that the teacher does a video recording or takes pictures throughout the unit. It can be of assistance when assessing the unit, or simply be a collection of memories to be used in the celebration at the end.

**A Garden of Patterns!****A Unit For Grade Three An Integrated Unit for Grade 3**

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**1 Patterns Around Us - Prior Knowledge**

Students create growing and shrinking patterns as they relate to addition and subtraction using manipulatives. Students are expected to articulate verbally and in written forms their understanding of the patterns they create. Students are encouraged to integrate learning about patterns from any other subject area or past personal experience. A similar procedure is used to identify, create, and extend a pattern using two or more attributes. The initial assessment, in the form of a quiz, is used as a reference to gauge students' knowledge of patterning.

**Catholic Graduate Expectations:**

CGE 2a - listens actively and critically to understand and learn in light of gospel values.

CGE 3e - adopts a holistic approach to life by integrating learning from various subject areas and experience.

**2 Plan the Garden - The Culminating Task**

Students are introduced to the task of designing a three dimensional garden over the period of the unit. The culminating task requires students to present an oral presentation of their garden. To establish a real world connection to the patterns that can be found in a natural environment, students listen to a story which contains a gardening theme, and then they examine pictures of gardens from various media sources. Students work individually to design a proposal of what their garden will look like. They are given a mapped floor plan of the garden as it appears in the diorama. Students design the flower beds by drawing and colouring in flowers and vegetables, applying their current understanding of patterns found within gardens. This plan is their first draft, which they refer to during later stages of the project. They then prepare their boxes to begin the development of the actual garden.

**Catholic Graduate Expectations:**

CGE 5c - develops one's God-given potential and makes a meaningful contribution to society.

CGE 7d - promotes the sacredness of life.

**3 Hundreds Chart - Design a Patio**

Students use number facts to generate simple non-linear patterns in a hundreds chart. Learning is reinforced using various auditory and visual games. To consolidate their understanding, students use a hundreds chart as a template to create a patio for their garden, which is comprised of "stones" arranged in a pattern.

**Catholic Graduate Expectations:**

CGE 2b - reads, understands and uses written materials effectively.

**4 Rose, Rose, Tulip - Repeating Patterns**

Students explore repeated patterns where multiple changes are made to attributes. Through discussion, examples, and exploration students begin to develop an understanding of the patterns found in natural environments, such as gardens. This skill is then applied to the culminating task of designing a garden. Individually, students begin to design a repeating pattern of flowers and a fence to go around their garden plot. Students are encouraged to use their individuality and creativity when designing, and to encourage the work of others through positive, Christian comments.

**Catholic Graduate Expectations:**

CGE 2b - reads, understands and uses written materials effectively.

CGE 5g - achieves excellence, originality, and integrity in one's own work and supports these qualities in the work of others.

**A Garden of Patterns!****A Unit For Grade Three An Integrated Unit for Grade 3**

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**5 How Does Your Garden Grow?**

The problem-solving model is used to explore non-linear patterns. Working in small groups, students use problem-solving skills as they identify, extend, and create growing and shrinking patterns, and then describe the patterns using mathematical language. Several of the problems explore the connection between geometric patterns and numerical patterns. Students then apply their understanding of non-linear patterns as they design a growing pattern for the corner of their garden, and explain the pattern rule which is used.

**Catholic Graduate Expectations:**

CGE 2b - reads, understands and uses written materials effectively.

CGE 4f - applies effective communication, decision-making, problem-solving, time and resource management skills.

**6 Planting In Groups**

Children are fascinated by growth, both their own and that of other living things around them. Students apply their knowledge of multiplication and repeating patterns to construct a vegetable plot for their garden, using the physical layout of an array. The Problem-Solving Model is used allowing for a variety of strategies to be utilized as students go through the complete process of buying trays of vegetables and designing the most effective plan for planting the vegetable garden. Through caring for a garden, the children show respect for the environment and promote the sacredness of God's creations.

**Catholic Graduate Expectations:**

CGE 5 - works effectively as an interdependent team member.

**7 Water, Water, Weed**

Using the story "Mrs. Rose's Garden" by Elaine Greenstein, students begin to develop an awareness of the responsibility that comes with owning a garden. Gardens are used for many different reasons: for food, exercise, income, play, and entertainment. As one of God's creations, a garden is an expression of beauty in nature and we must respect it and use it wisely. Students assume the role of a "gardener" as they develop a schedule for taking care of the garden. Using a calendar to display data, students create a repeating pattern of watering and weeding their garden. Students use this environmental data to explain their pattern rule, extend the pattern and describe it using informal math language.

**Catholic Graduate Expectations:**

CGE 7i - A responsible citizen who respects the environment and uses resources wisely.

**A Garden of Patterns!****A Unit For Grade Three An Integrated Unit for Grade 3**

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**8 The Garden Creation - Culminating Task**

This subtask requires students to complete their well developed, detailed, three dimensional model (Diorama) of a garden. The project has evolved over the period of the unit, with time given for each pattern to be developed. Each subtask has prepared students to apply their learning to a life context; their garden. Students are assessed on how they apply their patterning skills to their finished product. For further assessment, students provide detailed explanations of each of the 5 patterns used in their model, in their daily Garden Journal. The culminating activity of an oral presentation to the class provides for further assessment in a related context. Students then apply their understanding of patterning, as they continue to assume the role of a garden designer. They design a draft of a new garden plot for a neighbour. They explain their various patterns which are part of their proposal. Students are encouraged to see the spiritual connection with their role as "gardeners." In caring for their gardens, they are promoting the sacredness of life.

**Catholic Graduate Expectations:**

CGE 4f - applies effective communication, decision-making, problem- solving, time and resource management skills.

CGE 5g - achieves excellence, originality, and integrity in one's own work and supports these qualities in the work of others.

**9 Culminating Task - Celebrating!**

Students have a class discussion reflecting on the unit, stressing God's role as Creator, and focusing on the many gifts that are a part of each student. Students then record their reflections on a petal of a flower. These become part of a display to be used during a prayer celebration. Students celebrate the gifts from God which they have for observing and creating patterns that are found in the beautiful world around them. The celebration is concluded with a "garden show" to share their creations with others.

**Catholic Graduate Expectations:**

CGE 7d - promotes the sacredness of life.

CGE 7j - a responsible citizen who respects the environment and uses resources wisely.



## Description

Students create growing and shrinking patterns as they relate to addition and subtraction using manipulatives. Students are expected to articulate verbally and in written forms their understanding of the patterns they create. Students are encouraged to integrate learning about patterns from any other subject area or past personal experience. A similar procedure is used to identify, create, and extend a pattern using two or more attributes. The initial assessment, in the form of a quiz, is used as a reference to gauge students' knowledge of patterning.

### Catholic Graduate Expectations:

CGE 2a - listens actively and critically to understand and learn in light of gospel values.

CGE 3e - adopts a holistic approach to life by integrating learning from various subject areas and experience.

## Expectations

- 2m85 A – recognize that patterning results from repeating an operation (e.g., addition), using a transformation (slide, flip, turn), or making some other change to an attribute (e.g., position, colour);
- 2m88 A – combine two attributes in creating a pattern (e.g., size and position);
- 2m92 A – relate growing and shrinking patterns to addition and subtraction;
- 2m93 A – explain a pattern rule;

### Groupings

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

### Teaching / Learning Strategies

- Collaborative/cooperative Learning
- Discussion
- Mini-lesson
- Oral Explanation

### Assessment

During the whole class instruction part of the lesson, the teacher is able to make a mental note of who is volunteering answers when working up at the board. During the small group part of the lesson, the teacher should be circulating around and observing the children in their groups, attempting the growing and shrinking pattern questions. As students complete the individual assessment, the teacher has a good understanding of students' understanding of patterns from grade 2 and decide if more teaching of these skills are necessary before moving on with the rest of the unit. Use the rating scale provided to assist with this initial assessment.

### Level 1

The student demonstrates a **very limited** understanding of growing and shrinking patterns and creating and extending a pattern using two attributes. The student provides justifications that are **unclear** and **rarely** incorporate math terminology.

# Patterns Around Us - Prior Knowledge

## A Garden of Patterns!

Subtask 1

A Unit For Grade Three An Integrated Unit for Grade 3

60 mins

### Level 2

The student demonstrates a **limited** understanding of growing and shrinking patterns and creating and extending a pattern using two attributes. The student provides justifications that are **appropriate but incomplete**, that incorporate **some** math terminology.

### Level 3

The student demonstrates a **general** understanding of growing and shrinking patterns and creating and extending a pattern using two attributes. The student provides justifications that are **appropriate and complete** and **consistently** uses math terminology.

### Level 4

The student demonstrates a **thorough** understanding of growing and shrinking patterns and creating and extending a pattern using two attributes. The student provides justifications that are **appropriate and complete** using a **variety** of math terminology.

### **Assessment Strategies**

Observation  
Quizzes, Tests, Examinations

## Teaching / Learning

### 1. Whole Class - Learn ( 20 minutes)

As a review from grade 2, students work on investigating the growing and shrinking patterns found when adding and subtracting. This activity helps review addition facts and helps students to see the relationships and patterns among the facts.

**A) Review of terminology - Growing Patterns:** On the board, write a number pattern. An example could be **0, 3, 6, 9, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_**. Ask students what number comes next? Continue with this pattern until all of the spaces are filled. What would the related addition sentence be? Ask "what is the pattern rule? What is the pattern counting by?" Use the terminology "growing pattern" with students.

Discuss the pattern rule, using math language as a whole class. Example: This pattern is growing by 3 each time. Start at 0 and continue adding 3 each time. The number sentence would be  $0+3+3+3+3+3+3$ . Continue with a couple of other examples on the board, counting by 2's, 5's or 10's. Make note of students who are responding to the questions, and note students who are having difficulty.

**B) Review of terminology - Shrinking Patterns:** Now demonstrate a shrinking pattern using a subtraction pattern as your start. Follow the same steps as above. An example might be **44, 42, 40, 38, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_**. What is the related subtraction sentence? Again have students discuss the pattern rule, using math language. Example: Start at 44 and subtract 2 each time. The number sentence would be  $44-2-2-2$ . Have students work through several patterns that are using subtraction. Use the terminology "shrinking pattern" with students.

### 2. Small Group - Practise (20 minutes)

## Patterns Around Us - Prior Knowledge

Subtask 1

### A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

60 mins

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Students use their prior knowledge of growing and shrinking patterns to complete a worksheet, in a small group setting. In this setting, students demonstrate a positive sense of self and respect for others in the group by helping each other with difficult questions.

**A)** Divide the class into 5-6 small learning groups, with each group having no more than 6 people in it. Using the handout "Growing and Shrinking Patterns" (BLM 1.1) students work to complete each pattern, telling whether it is a growing or shrinking pattern and writing down the pattern rule. There are 6 questions, so each student should be able to answer one question on their own, with help from the group if need be. Students should print their names beside the question they were responsible for. The teacher may use this information to gauge the student's understanding of growing and shrinking patterns.

**B)** The groups are then given an answer sheet in which they are able to correct their answers. Instruct students that this is not a time to copy down the right answer, but rather to see where it is they might have made a mistake.

#### 3. Whole Class - Learn ( 20 minutes)

Now concentration is on the expectation of identifying, creating, and extending a pattern using two or more attributes, and manipulatives.

**A) Identifying, creating, and extending patterns:** The teacher begins by telling students that now they are concentrating on identifying, creating, and extending a pattern using pattern blocks. On the board the teacher draws a pattern using shapes. An example might be large square, small circle, small triangle, large square, small circle, small triangle. These are hollow shapes (no colour) and the teacher then asks for a volunteer to continue the pattern. At this point, ask if they remember the word **attribute** from earlier this year or from grade 2. Remind students that **shape and size** are the only attributes in this pattern, right now. These attributes continue as you add the third attribute of colour. Fill in the shapes using a pattern of colour. It might be red, blue, green, red, blue, green. Tell students that the third **attribute** in this pattern is colour. Stress that students need to maintain past attributes already established as they attempt to add new attributes. Do a couple more examples on the board, depending on the students' level of understanding at this point.

#### 4. Partner/Individual Pattern Making Activity (20 minutes)

Students have the opportunity to create and extend a pattern, using geometric shapes on BLM 1.2.

**A) Creating a pattern:** Students use the handout "Geometric Shapes" (BLM 1.2) to make their pattern. Note: These shapes are also required for the quiz. Ensure they are kept in a safe place. Use this as a template for students to trace as many shapes as they need for creating a pattern or make multiple photocopies. Let students colour the shapes first and then cut them out. Give students time to manipulate the shapes, coming up with a variety of patterns using the attributes discussed in class. After a bit of time has passed, let students know they need to create a pattern using the cutout shapes. Their pattern must have at least two attributes that change. Instruct students to place their pattern on their desktop.

**B) Presenting their pattern:** Allow time for students to present their pattern orally to others in the class. It is up to the teacher whether this is to be done in front of the class, or in partners, and the teacher circulates to assess. They should be able to articulate their patterning rule using math language and stating which attributes are changing in their pattern. Students should remember that an effective communicator presents ideas and information clearly, and with a sensitivity to others.

#### 5. Individual Task - Demonstrate Knowledge of Patterns Reviewed (20 minutes)

Students now complete a small quiz to assist the teacher in assessing students and the extent of patterning knowledge at this point. Use the shapes from the last activity.

**A)** In order to gauge the students' understanding of the patterning concepts reviewed to date, students complete a small quiz. This must be done individually and in the time frame given. Use the handout "Patterning Quiz" (BLM 1.3) to assist with this task. This quiz covers both shrinking and growing patterns, as well as combining two attributes in creating and extending a pattern.



# Plan the Garden - The Culminating Task

Subtask 2

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

90 mins

### Description

Students are introduced to the task of designing a three dimensional garden over the period of the unit. The culminating task requires students to present an oral presentation of their garden. To establish a real world connection to the patterns that can be found in a natural environment, students listen to a story which contains a gardening theme, and then they examine pictures of gardens from various media sources. Students work individually to design a proposal of what their garden will look like. They are given a mapped floor plan of the garden as it appears in the diorama. Students design the flower beds by drawing and colouring in flowers and vegetables, applying their current understanding of patterns found within gardens. This plan is their first draft, which they refer to during later stages of the project. They then prepare their boxes to begin the development of the actual garden.

### Catholic Graduate Expectations:

CGE 5c - develops one's God-given potential and makes a meaningful contribution to society.

CGE 7d - promotes the sacredness of life.

### Expectations

- 3m77 A • recognize that patterning results from repetition;
- 3m78 A • identify, extend, and create linear and non-linear geometric patterns, number and measurement patterns, and patterns in their environment;
- 3m80 A • identify relationships between and among patterns.
- 3e32 A • express clear responses to written materials, relating the ideas in them to their own knowledge and experience and to ideas in other materials that they have read;
- 3e51 • listen to discussions and ask questions to clarify meaning;
- 3e60 - speak on a variety of topics in classroom discussions using some specialized language (e.g., metres in measurement), and select words carefully to convey their intended meaning;
- 3e63 – contribute ideas appropriate to the topic in group discussion and listen to the ideas of others;
- 3a32 – use art tools, materials, and techniques correctly to create different effects (e.g., paint with a sponge to create an open, airy feeling in a work; apply paint thickly with a brush to suggest heaviness).
- 3e53 • talk about characters and situations in stories, and information and ideas in non-fiction materials;
- 3e54 • apply the rules for working with others;

### Groupings

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

### Teaching / Learning Strategies

Brainstorming  
Collaborative/co-operative Learning  
Model Making

### Assessment

Use "Floor Plan For My Garden" (BLM 2.1). When students are completing the floor plans, see whether they are making an attempt to apply some of the patterns which they have just seen in the pictures. Some students may find it difficult to see the connection between the draft and the floor of the diorama. Point out how the paper fits in the box. Expect to see some sense of pattern in the choice of flowers, and in the colours that are chosen.

**Rating scale - use the Garden Journal and the draft of the garden to assess.**

**Level 4** The student has used many different types of patterns throughout the garden. The patterns vary in type (e.g., colour and size changes). The explanation is very descriptive using all of the proper terminology.

**Level 3** The student has used some different types of patterns throughout the garden. Some of the patterns vary in type (e.g., colour and size changes). The

## Plan the Garden - The Culminating Task

### A Garden of Patterns!

Subtask 2

A Unit For Grade Three An Integrated Unit for Grade 3

90 mins

explanation is descriptive using some of the proper terminology.

**Level 2** The student has used a few different types of patterns in the garden. The patterns are repetitive in type (e.g., only colour changes in a repeat pattern). The explanation has some relevant description using a few examples of the proper terminology.

**Level 1** The student has very little evidence of pattern in the garden. The explanation relates very poorly to the pattern, using almost none of the proper terminology.

#### Assessment Strategies

Observation  
Learning Log

#### Assessment Recording Devices

Anecdotal Record  
Rating Scale

### Teaching / Learning

To complement the launching of the unit, it is suggested that a real gardener be invited into the classroom to share his or her experience with gardening.

#### 1. Whole Class Lesson - Launch the Unit (20 minutes)

Students are presented with a piece of literature that focuses on gardening, in order to provide the context for the unit. It also prepares students for their roles as "gardeners," and allows them to make the spiritual connection that is an inherent part of the unit.

**A) Read a Story:** Begin the unit with a story that has a theme about gardening. We suggest the story *Pettranella* by Betty Waterton. See the resource list at the end of the unit for other suggestions.

**B) Reflect on Story:** Discuss with the class the significance of gardening as it relates to the story, and to their personal experience with gardens. Make the spiritual connection between God's role as the creator and their role which is to promote the sacredness of life. Consider all the reasons why we garden and the significance of the role of "gardener." For example, gardens are used to grow the food that nourishes our body; working in the garden is both a form of exercise and relaxation; the garden is a place that offers visual enjoyment as people admire the beautiful plants that are a part of God's creation.

**C) Brainstorm:** Tell students that they are going to begin a math unit that focuses on patterning. They will be playing the role of "Gardener" and will be expected to consider the many patterns that naturally exist in gardens, as well as the patterns that gardeners use to show creativity. Brainstorm with students to get the thinking going. The richer this discussion is, the better students are able to relate this unit to the environment of gardens outside the classroom. Record the ideas on chart paper for students to reflect back on throughout the unit.

**Consider:** What do they know about gardens? What exactly do "gardeners" do? What is the difference between the gardener who does it as a hobby versus the professional gardener? What kind of gardens are

# Plan the Garden - The Culminating Task

Subtask 2

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

90 mins

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there? Do they know anything about gardens from other cultures and how do they differ? What about community gardens? Is there a garden in their school yard? Are there patterns that can be found in gardens?

### 2. Small Group Practise - Finding Patterns in Gardens (20 minutes)

Students are expected to explore their understanding of gardens from the perspective of patterns. This provides the mathematical connection to the real environment found in the garden.

**A) Divide students into small groups and distribute pictures of real gardens and paper for recording.** Pictures can be from stories, magazines, seed packages, photographs, or websites. Have one student record the patterns that they find within the pictures. It may be necessary to do one picture together as a group to get the thinking going. (*Possible answers: the flowers are in a repeating pattern that is red then white, red then white; the flowers change the attribute of size from big, to bigger, to biggest; the flower petals make up a pattern*) Have groups share their findings with the other groups. Key terminology to listen for: repeating pattern, growing and shrinking pattern, and attribute.

### 3. Individual Application of Understanding - Planning the Draft of Their Garden (50 minutes)

Students apply their current understanding of patterning to a draft of their garden. The purpose of this is to provide some prior thinking for students regarding their understanding of how patterns are part of a garden. They use whatever prior knowledge they have about patterns to develop their plan. This plan is not to be used as a baseline, but is simply an introductory activity. Students are encouraged to use their imagination, and creativity to produce a colourful garden that is full of various patterns.

**A) Introduce Garden Journal:** Hand out soft cover binders and introduce this as the "Garden Journal." Hand out BLM 2.1. This is a tracking device for students as each part of the garden is completed. This sheet should be discussed at this point, but not filled out until subtask 8, once their gardens are being reviewed for completion.

**B) Make a Draft:** Get out the boxes that will be used for creating the dioramas. Cut off the top and one end (the shorter end). Explain that the box represents a backyard, and inside the box there will be a model of a garden. In preparation for developing the diorama, students are expected to make a floor plan of how their garden could possibly look when it is full of flowers. Hand out "Draft - Floor Plan For My Garden" (BLM 2.2). Ask students to apply their understanding of patterning to create a visually appealing plan. Point out how the floor plan is a model of the floor in the box, even though it may not fit inside exactly. Recall the gardens that they viewed and discussed in the previous activity. Students are to draw flowers and vegetables on the floor plan of their gardens and make them colourful. When complete, have students keep their drafts in their soft cover binders. They will refer to them in a later subtask.

**C) Garden Journal:** Hand out "My Garden Journal" (BLM 2.3). Students explain the various patterns in the plan using words, pictures, and numbers to explain their thinking.

**D) Prepare the Box:** This activity can take place after the draft is complete, or a painting centre can be set up and used on a rotational basis while the drafts are being prepared. Supply students with green paint (the colour of grass). Have them paint the whole floor of the box to ensure no cardboard shows through when the project is complete. Discuss how various techniques can be used to simulate grass.

## Adaptations

- encourage the student to use the soft covered binder with every subtask to organize notes for class;

# Plan the Garden - The Culminating Task

Subtask 2












## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

90 mins

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### Resources

	BLM 2.1 Checklist	BLM_2.1.cwk
	BLM 2.2 Floor Plan For My Garden	BLM_2.2.cwk
	Various Garden Pamphlets/Fence Plans	
	Pictures of gardens	3 or 4
	paper for recording	1
	Crayons	1 pack
	green paint	
	cardboard shoe box	class set
	A real gardener	
	Learning Log	
	Observation	

### Notes to Teacher

1. Provide a soft cover binder, referred to as the "Garden Journal," to keep students' work as it is completed. Ensure that BLM 2.1 is inserted in the front of the soft cover binder. It is a tracking checklist to help organize the various tasks required of students.
2. For the small group activity, prepare a collection of pictures of gardens and patios. These can be from seed catalogues, seed packages, gardening books, the Internet, etc. Please see the resource section for examples of gardens that contain many patterns.
3. Students will be building their dioramas on a daily basis, so put them aside in a safe spot until the next subtask.
- 4 **Guest/Field trip:** Invite a gardener in if possible, or visit a garden centre. Have them prepared to discuss the various reasons for gardening, the different types of gardens, and the stages involved in planning a garden that are directly related to patterning.

### Teacher Reflections



## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

### Description

Students use number facts to generate simple non-linear patterns in a hundreds chart. Learning is reinforced using various auditory and visual games. To consolidate their understanding, students use a hundreds chart as a template to create a patio for their garden, which is comprised of "stones" arranged in a pattern.

### Catholic Graduate Expectations:

CGE 2b - reads, understands and uses written materials effectively.

### Expectations

- 3m22 – use a calculator to examine number relationships and the effect of repeated operations on numbers (e.g., explore the pattern created in the units column when 9 is repeatedly added to a number);
- 3m78 A • identify, extend, and create linear and non-linear geometric patterns, number and measurement patterns, and patterns in their environment;
- 3m80 • identify relationships between and among patterns.
- 3m81 A – understand patterns in which operations are repeated (e.g., multiplication), transformations are repeated, or multiple changes are made to attributes;
- 3m83 – create a pattern in which two or more attributes change (e.g., size, colour, position);
- 3m86 A – use addition and subtraction facts to generate simple patterns in a hundreds chart;
- 3m87 – use environmental data to create models of patterns (e.g., Monday – sunny, Tuesday – rainy) and display the patterns on a chart;
- 3a23 • identify the elements of design (colour, line, shape, form, space, texture), and use them in ways appropriate for this grade when producing and responding to works of art;
- 3a35 – identify and explain the specific choices they made in planning, producing, and displaying their own art work (e.g., the choices of subject matter, colours, location for display);
- 3a34 – produce two- and three-dimensional works of art (i.e., works involving media and techniques used in drawing, painting, sculpting, printmaking) that communicate their thoughts and feelings about specific topics or themes (e.g., produce a mural in a group interpreting a Native legend through colour, shape, and line);
- 3m13 A – count by 1's, 2's, 5's, 10's, and 100's to 1000 using various starting points and by 25's to 1000 using multiples of 25 as starting points;
- 3m77 A • recognize that patterning results from repetition;
- 3m84 A – discuss the choice of a pattern rule;
- 3e54 • apply the rules for working with others;
- 3m9 A • justify in oral or written expression the method chosen for addition and subtraction, estimation, mental computation, concrete materials, algorithms,

### Groupings

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

### Teaching / Learning Strategies

Peer Practice  
 Rehearsal / Repetition / Practice  
 Learning Log/ Journal

### Assessment

**A) Teacher Rubric** - Use the rubric to assess the student's Garden Journal and how it relates to the patio design on the hundreds chart (BLM 3.4).

### B) "Student Assessment: Patio on the Hundred Chart"

### Assessment Strategies

Learning Log  
 Self Assessment

### Assessment Recording Devices

Rubric

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

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3m89 calculators;  
– use a calculator and a computer application to explore patterns.

### Teaching / Learning

#### 1. Whole Class Lesson - Introducing Pattern Through the Senses (20 minutes)

Children need a variety of experiences when being introduced to pattern including visual, verbal, and physical.

**A) Identifying Rhythmic Patterns and Translating to Materials:** Using an overhead projector, display a hundreds chart with the numbers printed on it (make an overhead of "Hundred Chart With Numbers" (BLM 3.1). Use see through coloured disks, or an overhead marker to mark off a pattern. Begin with something simple such as multiples of three. One coloured disk (e.g., red) would go on numbers that are not multiples of three, while another coloured disk (e.g., blue) would be placed on all multiples of three. Encourage students to verbalize the pattern in many different ways, adding body motions as well. For example, the red numbers might be blips and the blue numbers might be tops. .."blip, blip, top, blip, blip, top, etc." Once students are comfortable with verbal interpretation, add in a motion. For every multiple of three, students could clap their hands, stand up, or snap their fingers. Change the multiple several times and have students come up with new ways to verbalize and physically represent the pattern.

Change the game by identifying a pattern by sound and physical movement, and see if students can represent it on the chart using the disks. They would have to state the pattern rule. Example: snap, snap, snap, stomp, snap, snap, snap, stomp, etc. Students would put red disks for each snap and blue for each stomp. They would say, "The pattern counts by fours."

Mix easy patterns with more complicated ones. Introduce labelling with A's, B's, and C's as a way to analyse patterns and categorize similar ones.

For example: **clap, clap, stamp, clap, clap, stamp** is labelled **aab, aab**.

#### 2. Small Group Practice - Making Patterns (20 minutes)

**A)** The following activity can be done with small groups, or individually. Hand out copies of the hundreds chart with numbers. Divide students into groups and challenge them to come up with a pattern on their own. They display it on the hundreds chart and, as a team they decide on sounds and actions that match the pattern. The groups then present it to the class to see if the class can repeat the pattern out loud, and then represent it through the materials.

\*\*The teacher must gauge how students have grasped the concepts covered in this subtask. Look in the resource section for further practise work in existing math programs.

#### 3. Individual Application of Understanding - Designing a Patio for Their Garden (80 minutes)

**A) Create Patio:** Look at designs of patios that have been cut out of magazines. Point out the various patterns that exist in stone shape, colour, and design. Point out the "speciality" stones that are a typical part of the modern patio. Often they have pictures etched in them, such as a sun or moon. Point out the fact that special stones can be placed on multiples such as 4. This means that on every fourth square, a special stone appears. Recall the term multiple, and how it relates to multiplication.

Hand each student a copy of the "Blank Hundreds Chart" (BLM3.2). The student assessment can also be handed out, or referred to so students have the expectations ahead of time. The chart serves as a patio for their garden, with the squares representing patio stones. Allow students to have access to square

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

manipulatives to help them organize the pattern on their sheet.

Explain to students that they are to design a patio that follows a pattern which they choose. Challenge students to design one "specially stone" and decide upon a multiple where each specialty stone appears. The stones in between should also have a pattern, as would the bricks used in a real patio. The following is an example of one possibility: (R = Red, W = White, S = Special stone)

```

R W S R W S R W S R
W S R W S R W S R W
S R W S R W S R W S
    
```

Make sure that students can articulate what is happening in their own pattern. Allow students to use a calculator if it helps them create a pattern. Encourage students to use their creativity whenever possible. For example, some students may choose to colour every 4th stone in with a symbol, such as a flower, or a sun. The other stones are filled in using solid colours that hold true to a pattern.

It is recommended that the patios be glued onto poster board in order to keep it laying flat. If there is access to a laminator, this also helps to preserve the patio.

**B) Garden Journal:** When students are finished colouring, have them fill in the "Garden Journal" sheet (BLM 2.3). Encourage students to explain their patterns using words, pictures, and numbers. Encourage the use of mathematical terminology such as pattern, multiple, and repeating









**C) Self Assessment:** When students finish A and B, have them self assess their efforts using BLM 3.3.

Put the finished patio and the description into the Gardening Journal. The patio will be attached to the garden towards the end of the unit. This is to prevent it from getting banged up as students continue working on their gardens.

## Adaptations

During the group activity, ensure that the student understands the expectations. It may require role-playing situations; use a variety of actions, songs, and manipulatives in order to accommodate the multi-sensory learners.

## Resources

	<b>BLM 3.4 100 Chart Assessment</b>	
	<b>BLM 2.3 My Garden Journal</b>	BLM_2.3.cwk
	<b>BLM 3.1 Hundreds Chart With Numbers</b>	BLM_3.1.cwk
	<b>BLM 3.2 Blank Hundreds Chart</b>	BLM_3.2.cwk
	<b>BLM 3.3 Student Assessment: Patio on the Hundreds Chart</b>	BLM_3.3.cwk
	<b>markers - range of colours</b>	
	<b>poster board or stiff paper</b>	1
	<b>square coloured tiles (optional)</b>	1 bin

## Hundreds Chart - Design a Patio

Subtask 3

### A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

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Overhead Markers

1 pack

### Notes to Teacher

Laminating the finished patios helps to preserve them.

Leave out pictures of patios to remind students what they are making a model of.

### Teacher Reflections

# Rose, Rose, Tulip - Repeating Patterns

Subtask 4

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

90 mins

### Description

Students explore repeated patterns where multiple changes are made to attributes. Through discussion, examples, and exploration students begin to develop an understanding of the patterns found in natural environments, such as gardens. This skill is then applied to the culminating task of designing a garden. Individually, students begin to design a repeating pattern of flowers and a fence to go around their garden plot. Students are encouraged to use their individuality and creativity when designing, and to encourage the work of others through positive, Christian comments.

### Catholic Graduate Expectations:

CGE 2b - reads, understands and uses written materials effectively.

CGE 5g - achieves excellence, originality, and integrity in one's own work and supports these qualities in the work of others.

### Expectations

- 3m82 – identify patterns in which at least two attributes change (e.g., size, colour);
- 3m83 A – create a pattern in which two or more attributes change (e.g., size, colour, position);
- 3m84 A – discuss the choice of a pattern rule;
- 3m85 A – given a rule, extend a pattern and describe it in informal mathematical language (e.g., starting at 3, add 3 to each number to create a pattern);
- 3m87 – use environmental data to create models of patterns (e.g., Monday – sunny, Tuesday – rainy) and display the patterns on a chart;
- 3m78 A
  - identify, extend, and create linear and non-linear geometric patterns, number and measurement patterns, and patterns in their environment;
  - identify relationships between and among patterns.
- 3m80 A
  - identify relationships between and among patterns.
- 3e54
  - apply the rules for working with others;

### Groupings

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

### Teaching / Learning Strategies

- Discussion
- Learning Log/ Journal
- Oral Explanation
- Problem Posing
- Sketching To Learn
- Working With Manipulatives

### Assessment

#### A) Teacher

#### Rating Scale For Repeating Flower Pattern and The Fence

**Level 4** The student demonstrates a **thorough understanding** of repeating patterns by identifying, creating, and extending a pattern with **3 or more** attributes changing.

**Level 3** The student demonstrates a **general understanding** of repeating patterns by identifying, creating, and extending a pattern with **2 or more** attributes changing.

**Level 2** The student demonstrates a **limited understanding** of repeating patterns by identifying, creating, and extending a pattern with **2 attributes changing, with some assistance.**

**Level 1** The student demonstrates a **very limited understanding** of repeating patterns by identifying, creating, and extending a pattern with only **1**

# Rose, Rose, Tulip - Repeating Patterns

Subtask 4

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

90 mins

attribute that changes, with assistance.

### B) Student Assessment: Repeating Patterns For Fence and Garden

#### Assessment Strategies

Self Assessment  
Learning Log  
Performance Task

#### Assessment Recording Devices

Anecdotal Record  
Checklist

## Teaching / Learning

### 1. Whole Class Lesson - Patterns in Flowers (20 minutes)

**A. Attributes of Gardens:** In order to prepare students for their role as gardeners, they view pictures of real flower gardens and discuss the patterns found. A list is formed of the different attributes that can change with respect to flowers. The list should include size, shape, colour, and number of petals/leaves. Discuss how God created each flower to be unique, each flower having its own set of characteristics, just like humans.

**B. Example Pattern:** Walk students through the steps of creating a repeated pattern using flowers as examples. You could do this on an overhead or on the board. As each attribute is changed, remember to maintain the previous attribute as well. Begin with 1 attribute changing (type of flower), then move to a second attribute (colour of flower), and finally a third (size/number of petals). Use the letter patterns learned in grade 1 and 2 for this. The "set ABC" repeats where A = type of flower, B = colour of flower, C = size/number of petals. Discuss with the class what your pattern rule would be and which attribute is changing each time and which attribute is staying the same. Use math language when describing your pattern. Example: My pattern is repeating rose, tulip, rose, tulip. It also is repeating red, yellow, red, yellow. The third repeating pattern is big, small, big, small. Altogether the pattern is big, red rose, small yellow tulip, big, red rose, small yellow tulip. Next, try a harder pattern, clarifying the use of attributes within patterns. An example might be red rose, yellow rose, yellow tulip, red tulip. There is shape and colour and students must identify which attribute is changing each time.

### 2. Partner Activity -Guess the pattern rule (30 minutes)

**A) Create a repeating pattern:** Using coloured tiles as manipulatives, students work individually to design a repeating pattern. Students need to change at least two attributes when designing their pattern. They must identify which attributes are changing each time. Their pattern is displayed on their desk when finished. Note: the possible attributes to look for are change in shape, change in size, and change in colour.

**B) Guessing the Pattern Rule:** Students are asked to find a partner and view their partner's pattern. They must try to guess their partner's pattern rule, by using appropriate math language (as outlined above) and tell which attributes are changing. When the student has guessed and articulated it correctly, they move to their partner's pattern. During this time the teacher moves around the room to listen in on students' descriptions of the patterns they see. Encourage students to use positive words when viewing someone else's work, respecting their contribution to the class.

# Rose, Rose, Tulip - Repeating Patterns

Subtask 4

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

90 mins

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\*\*The teacher must gauge how students have grasped the concepts covered in this subtask. Look in the resource section for further practice work in existing math programs.

### 3. Individual Activity - Designing a repeating pattern of flowers for the garden and a fence /border around it. (40 minutes)

The individual task for this subtask is in 2 parts. The first part is designing a repeating flower pattern for a section of their garden. The second part is creating a repeating pattern on the fence that will be glued into the box. The student self-assessment sheet (BLM 4.2) can be shown to students at this time.

**A) Create Flower Pattern:** Students develop a repeating flower pattern. The size of the plot is an individual choice, remembering that students must create a flower pattern with at least two attributes, and they must articulate which attribute is changing each time. Remind students of the attributes that can change on flowers. Choose any of the materials listed in the material section for students to design their flowers. It is recommended that the teacher provide a copy of 2 cm grid paper which can be obtained from most math programmes. Students cut out a garden plot from the paper and use it as a guide when creating their pattern. The teacher may wish to use coloured paper to serve as the base (green for grass/ brown for dirt). After completing the pattern, students must place their repeating pattern into the box to ensure it fits, and do whatever is necessary to make it stable.

**B) Garden Journal:** Students then get out their "Garden Journal" and complete an entry about their flower pattern. Remind them to use math language when explaining their pattern rule for the repeating flower plot.

### 4. Mini lesson and Individual Fence Creation

**A) Class Discussion:** Have a small class discussion on what attributes can change with regards to a fence. Students should come up with some of the same attributes discussed earlier; height, colour, shape, and design (picket) are a few common ones. If needed, the teacher may use the handout "The Garden Fence" (BLM 4.1) to demonstrate an example of a repeating pattern on a fence. If the teacher has examples of fence plans, they could be shown to the students at this time.

**B) Creating The Fence:** Tell students that now they are creating a repeating pattern of a fence to glue to the inside of the box. Give each child 3-4 sheets of the handout "The Garden Fence" (BLM 4.1) to design their pattern. They need enough of the fence to go around all three sides. Students must design a repeating pattern where at least two attributes change. The teacher must check the pattern before it is glued in the box. When gluing in the pattern, students may overlap the paper to ensure its proper fitting. This may break the pattern rule for the fence, and that is why we suggest the teacher see and assess the pattern before it goes in the box.

**C) Garden Journal:** Students then write a description of their repeating fence pattern in their garden journal. Using the handout "My Garden Journal" (BLM 2.3), encourage students to use math language when describing their pattern rule.

## Adaptations

Using some materials can be tricky for children with fine motor difficulty. We suggest using clay or as it is easy to roll and shape into a flower. The amount of detail isn't as important as the concept of a repeating pattern. The children may also colour in photocopied pictures of flowers to develop their repeating pattern. Use the wide list of materials to assist students with their pattern.

## Resources

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# Rose, Rose, Tulip - Repeating Patterns








Subtask 4

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

90 mins

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-  **BLM 4.1 The Garden Fence** BLM\_4.1.cwk
-  **BLM 4.2 Student Assessment: Repeating Patterns For Fence and Garden** BLM\_4.2.cwk
-  **modelling clay**
-  **glue**
-  **pattern blocks**
-  **coloured construction paper**
-  **coloured tiles**

### Notes to Teacher

Use whatever materials are available for your students. Try to have each of the patterns completed using a different material. The fence can be tricky to glue in. The teacher should assess the repeating pattern before it goes into their box. The pattern may become disrupted once it is glued in. This is not a concern. Please refer to the picture of our example of the garden for a visual clue of what the fence will look like when glued in the box. Also, for extra practise, please see the resource list.

### Teacher Reflections



## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

### Description

The problem-solving model is used to explore non-linear patterns. Working in small groups, students use problem-solving skills as they identify, extend, and create growing and shrinking patterns, and then describe the patterns using mathematical language. Several of the problems explore the connection between geometric patterns and numerical patterns. Students then apply their understanding of non-linear patterns as they design a growing pattern for the corner of their garden, and explain the pattern rule which is used.

### Catholic Graduate Expectations:

CGE 2b - reads, understands and uses written materials effectively.

CGE 4f - applies effective communication, decision-making, problem-solving, time and resource management skills.

### Expectations

- 3m78 A • identify, extend, and create linear and non-linear geometric patterns, number and measurement patterns, and patterns in their environment;
- 3m80 A • identify relationships between and among patterns.
- 3m84 A – discuss the choice of a pattern rule;
- 3m85 – given a rule, extend a pattern and describe it in informal mathematical language (e.g., starting at 3, add 3 to each number to create a pattern);
- 3m51 A – measure the perimeter of two-dimensional shapes using standard units (centimetre and metre), and compare the perimeters;
- 3e1 A • communicate ideas and information for specific purposes and to specific audiences (e.g., write a notice for a community newspaper advertising an upcoming school event);
- 3e51 A • listen to discussions and ask questions to clarify meaning;
- 3e54 A • apply the rules for working with others;
- 3a35 A – identify and explain the specific choices they made in planning, producing, and displaying their own art work (e.g., the choices of subject matter, colours, location for display);
- 3a32 A – use art tools, materials, and techniques correctly to create different effects (e.g., paint with a sponge to create an open, airy feeling in a work; apply paint thickly with a brush to suggest heaviness).
- 3a22 A • produce two- and three-dimensional works of art that communicate ideas (thoughts, feelings, experiences) for specific purposes and to familiar audiences;
- 3m8 A • solve problems and describe and explain the variety of strategies used;

### Groupings

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

### Teaching / Learning Strategies

Mini-lesson  
 Problem-solving Strategies  
 Working With Manipulatives

### Assessment

#### A) Teacher:

#### Observation of small group answers

**Problem 1:** Listen for students who notice that carrots grow 2 cm every day. The T-table shows the days increasing by one on the left side of the chart, while the carrots length increases by two on the right side of the chart.

**Problem 2:** Listen for students who can deduce a generalization for the T-table. Can they use the chart to predict what happens to the area of the garden as it grows every year? Do they understand that the perimeter is sides of the garden and not the edges that touch?

**Problem 3:** Look for proper terminology such as growing, rotating, 1/4 turn, proper names of shapes etc..

**Problem 4:** Can students relate the T-table and the patterns to the pictures? Are they able to articulate the growing and shrinking patterns.

#### B) "Student Assessment: Growing pattern"

# How Does Your Garden Grow?

Subtask 5

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

### Assessment Strategies

Exhibition/demonstration  
Learning Log  
Self Assessment

### Assessment Recording Devices

Anecdotal Record

## Teaching / Learning

### 1. Whole Class Lesson - Review Terminology (20 minutes)

**A)** This subtask requires students to use the problem-solving model. Review this model using the "Problem Solving Strategies" (BLM 5.7).

**B)** Ensure students have a basic understanding of perimeter to prepare them for one of the problem-solving situations. Systematic changes to the perimeter of an object is an excellent application of how growing and shrinking patterns can be observed.

**Definition of perimeter:** *The distance around the outside edge of a figure.*

Put a list of appropriate terminology on the board for students to refer to when they do the small group activity.

Terminology: repeat pattern, growing pattern, shrinking pattern.

**C)** Show students how to use a T-Table to help them organize their information. Tables are an excellent tool for students use when attempting to see how numbers are changing.

# of people / # of eyes

1 / 2

2 / 4

3 / 6

4 / 8

5 / ?

The rule is the # of eyes is always double the number of people.

If one flower has 5 petals, how many petals are there when there are 2 flowers, 3 flowers, 4 flowers

# of flowers / # of petals

1 / 5

2 / 10

3 / 15

4 / 20

The rule is the petals increase by 5 everytime

### 2. Small Group Practice - 60 minutes

Small groups are recommended, however, these problem solving sheets can be administered individually. Photocopy the required number of problems, depending on how the class is set up.

**A)** Review the rules of working in groups. To help manage groups, assign roles to each student such as recorder, time keeper, presenter, etc. It is recommended that the problems are addressed one at a time with each group. If there are 4 groups, assign each group the responsibility of demonstrating one of the four questions to the rest of the class.

**Problem #1 (BLM 5.1)** Hand out square tiles to use as a model. Students use manipulatives to calculate the

## How Does Your Garden Grow?

Subtask 5

### A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

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perimeter of a garden which increases in size every year. Give students a variety of tools for measuring perimeter. A string and a ruler can be used for standardized measurement. Some students may choose to count the sides of the tiles that make up the perimeter. This is a non standard form of measurement. Have the next group of students present their answer on the board.

**Problem #2 (BLM 5.2)** Hand out pattern blocks. Students use pattern blocks to continue growth patterns and record their understanding on the sheet using proper mathematical language. The relationship between number and geometric shapes is reinforced as students use the blocks to extend the various patterns. Have the next group of students present the answer on the board.

**Problem #3 (BLM 5.3)** Students use a T-table to figure out how long it will take carrots to grow to a given length. Allow 10 minutes for students to solve the problem. Have one group take up the answer on the board.

**Problem #4 (BLM 5.4)** Students use T-tables to help solve a problem that demonstrates both growing and shrinking patterns.

\*\*The teacher must gauge how students have grasped the concepts covered in this subtask. Look in the resource section for further practise work in existing math programs.

**3. Individual Application of Understanding (40 Minutes)** The student self-assessment sheet (BLM 5.6) can be shown to students at this time.  
(see subtask notes before beginning this task)

**A) Preparing the Box:** Students apply their understanding of growing patterns to their own gardens. Students use BLM 5.5 as a guide for the space needed to create the repeating pattern. Students cut out the shape and glue it into one of the corners of their box.

**B) Explain Task:** Explain to students that they will create a plot of flowers that will be in the corner of the garden where they glued the outline. The flowers are "planted" in the corner, coming out in a pattern one row at a time. Each row must increase by a certain number and there must be a rule that explains this growing pattern. Brainstorm a series of possible answers. An example is that the first row has 1 flower, the second row has 3 flowers, the third row has 5 flowers and the fourth row has 7 flowers - the rule is increasing by 2. Give students access to the clay (or other preferred material) in a variety of colours. Students then make up the flowers and put them in the garden. Show the teacher before recording the rule.

**C) Garden Journal:** Hand out BLM 2.3. Have students explain the pattern in the response journals. Use words, pictures and numbers to demonstrate understanding of the pattern. Remind them to use proper terminology whenever possible.

**D) Student Assessment:** Hand out BLM 5.6. Complete this task.

### Adaptations

Before beginning any group work, develop and implement consistent behavioural expectations and consequences that are appropriate for group work.











Students that have difficulty with problem solving will benefit from good role models as partners. Have the accommodated student take on a role that is suitable for his or her skills.

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

### Resources

	<b>BLM 2.3 My Garden Journal</b>	BLM_2.3.cwk
	<b>BLM 5.1 Problem Solving Sheet #1</b>	BLM_5.1.cwk
	<b>BLM 5.2 Problem Solving Sheet #2</b>	BLM_5.2.cwk
	<b>BLM 5.3 Problem Solving Sheet #3</b>	BLM_5.3.cwk
	<b>BLM 5.4 Problem Solving Sheet #4</b>	BLM_5.4.cwk
	<b>BLM 5.5 Template for Growing Pattern</b>	BLM_5.5.cwk
	<b>BLM 5.6 Student Assessment For Growing Pattern</b>	BLM_5.6.cwk
	<b>BLM 5.7 Problem Solving Strategies</b>	BLM_5.7.cwk
	<b>square tiles</b>	8
	<b>Pattern Blocks</b>	

### Notes to Teacher

This subtask allows students to practise skills associated with growing and shrinking patterns. These are aligned with the curriculum expectations and have appeared on the provincial assessments.

#### Regarding Individual Activity:

When copying the corner pattern of the garden (BLM 5.5) use brown paper to simulate the earth, or green paper to complement the colour of the grass. Some students may not need this guide for their growing pattern. Brown clay can also be used in place of the paper. The clay flowers stick very well to a clay base.

Modelling clay is only one suggestion for materials. It is also possible to use small pieces of construction paper, or simply colour on the paper directly. If using clay, the details in the flowers do not have to be a priority. Stress to students that this is a model of a garden, and a small ball can be a symbol of a flower. Some students may have more time than others to add details such as petals.

### Teacher Reflections

**A Garden of Patterns!**

A Unit For Grade Three An Integrated Unit for Grade 3

90 mins

**Description**

Children are fascinated by growth, both their own and that of other living things around them. Students apply their knowledge of multiplication and repeating patterns to construct a vegetable plot for their garden, using the physical layout of an array. The Problem-Solving Model is used allowing for a variety of strategies to be utilized as students go through the complete process of buying trays of vegetables and designing the most effective plan for planting the vegetable garden. Through caring for a garden, the children show respect for the environment and promote the sacredness of God's creations.

**Catholic Graduate Expectations:**

CGE 5 - works effectively as an interdependent team member.

**Expectations**

- 3m78 • identify, extend, and create linear and non-linear geometric patterns, number and measurement patterns, and patterns in their environment;
- 3m80 A • identify relationships between and among patterns.
- 3m81 – understand patterns in which operations are repeated (e.g., multiplication), transformations are repeated, or multiple changes are made to attributes;
- 3m84 – discuss the choice of a pattern rule;
- 3m83 – create a pattern in which two or more attributes change (e.g., size, colour, position);
- 3m88 – identify relationships between addition, subtraction, multiplication, and division;
- 3m23 A – interpret multiplication and division sentences in a variety of ways (e.g., using base ten materials, arrays);
- 3m32 A – use appropriate strategies (e.g., pencil and paper, calculator, estimation, concrete materials) to solve number problems involving whole numbers;
- 3m27 – demonstrate and recall multiplication facts to  $7 \times 7$  and division facts to  $49 \div 7$  using concrete materials;
- 3m30 A – add and subtract money amounts and represent the answer in decimal notation (e.g., 5 dollars and 75 cents plus 10 cents is 5 dollars and 85 cents, which is \$5.85);
- 3m31 A – pose and solve number problems involving more than one operation (e.g., if there are 24 students in our class and 5 boys and 9 girls wore boots, how many students did not wear boots?);
- 3e54 • apply the rules for working with others;
- 3m9 A • justify in oral or written expression the method chosen for addition and subtraction, estimation, mental computation, concrete materials, algorithms, calculators;

**Groupings**

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

**Teaching / Learning Strategies**

- Direct Teaching
- Problem-solving Strategies

**Assessment**

**A) Teacher**

The teacher should collect the handout "Shopping For Vegetables" (BLM 6.2) for assessment. Use the rating scale below to assist you in levelling the student's understanding of concepts and application of procedures through problem solving.

**Level 1**

The student demonstrates a **very limited** understanding of problems by choosing and carrying out a **few simple strategies** that **rarely** lead to accurate solutions.

**Level 2**

The student demonstrates a **limited** understanding of problems by choosing and carrying out **some appropriate strategies** that **sometimes** lead to accurate solutions.

**Level 3**

The student demonstrates a **general** understanding of problems by **consistently** choosing and carrying out **appropriate strategies** that **usually** lead to accurate solutions.

**Level 4**

The student demonstrates a **thorough** understanding of problems by choosing and carrying out **innovative and appropriate strategies** that **almost always** lead to accurate solutions.

**B) "Student Assessment: Array of Vegetables"**

**Assessment Strategies**

- Performance Task
- Observation
- Learning Log

**Assessment Recording Devices**

- Anecdotal Record
- Rating Scale

**Teaching / Learning**

**1. Whole Class - Arrays Using Real World Examples (20 minutes)**

Before this lesson begins, the teacher would have a display set up at the front of the room, showing different products that are packaged in arrays. Some of the items could be stamps, egg cartons, muffin tins, drink boxes, wieners, hot dog buns, cereal, or tomatoes.

**A. Arrays and Multiplication Sentences:** Having already taught the multiplication unit, students should be familiar with the term "array." Write the word on the chalkboard to see how many students can describe an array using math language. After a few suggestions, draw an example of an array on the board with its corresponding multiplication sentence. An example could be:

\$\$\$\$\$	3x5=15		\$\$\$\$	
\$\$\$\$\$	or	<b>YES</b>	\$\$\$	<b>NO</b>
\$\$\$\$\$	5x3=15		\$\$\$\$\$\$	

At this point you may want to have a discussion about what an array is and what it is not (no remainders, nothing out of alignment).

**B. Arrays in Products:** The teacher should start by holding up a package and asking, "Why do companies sell products in packages like these?" A discussion should take place around the idea of products being sold in arrays. The teacher should then hold up a product and ask the children to come up with a multiplication sentence that demonstrates the array of the product. Remember that 2 different arrays are possible, depending on how students look at the object. An example for an egg carton would be 2x6=12 and 6x2=12. Continue this with a few of the products. Then do the reverse. Write a multiplication sentence on the board and have students guess which product the sentence represents.

**2. Small Group Problem Solving ( 30 minutes)**

Before this lesson occurs, the teacher should have selected an item that can be sold in 2 different array forms. Examples could be hot dog buns, stamps, or drink boxes. For the purpose of writing this unit,

**A Garden of Patterns!****A Unit For Grade Three An Integrated Unit for Grade 3****90 mins**

packages of donuts are used, as they are sold in packs of 6 and 12. There are templates for students to use when problem solving that are designed for the packs of 6 and 12.

**A. Problem Solving Involving Arrays:** Students are divided up into 5-6 small groups and each group is given "Packages of Donuts" (BLM 6.4) and "Problem Solving Using Arrays" (BLM 6.1). Read the problems together with the class. Go through each step the group must follow, using the **Problem-Solving Strategies** sheet from Subtask #5. This should be up in the room for reference. Remind students that they need to show all work in the boxes and they should use numbers, pictures, and words to assist them. The teacher circulates during this time to see if all students are working together to solve the problems and being kind and considerate members of a group.

**B. Solution:** After approximately 20 minutes, begin to take the solution up on the board. Encourage students to give their solutions. Of extreme importance is the way they arrive at their answers. Be sure to show a variety of ways to answer each question (level 4 answers).

\*\*The teacher should gauge how students have grasped the concepts covered in this subtask. Look in the resource section for further practise work in existing math programs.

**3. Individual Arrays ( 40 minutes)**

**A. Discussion/ Questions:** Begin by discussing with students that now they will be following the same steps as they did in the small group setting, with their own individual garden plot. Hand out "Shopping For Vegetables" (BLM 6.2) and read through the scenario. Remind the students that they must follow the **Vegetable Packaging Chart** at the top of the page to complete this activity. It is also good to note that this plot of the garden does not have to have a repeating pattern, but it may, depending on how you buy the vegetables and place them in the array.

**B. Planning and Cost of Vegetable Plot:** Using Vegetable Trays of 3 and 6 (BLM 6.5 and BLM 6.6) the students will plan out their trays. Students are given time to manipulate their trays and fill in the appropriate vegetables. They need to plan out how many of each type of tray is needed to complete the array of 18. When the array is completed, students place it in the corner of their desk and discard any extra trays they will not be using. The next step is taking out "Shopping for Vegetables" (BLM 6.2) to calculate the cost of the array, (check the chart from page one for the prices). The teacher should collect these sheets when the children are finished with them and assess their understanding of the concepts and problem-solving skills. (See assessment section for description of levels.)

**C. Designing the Array:** Now students use their plan to design the vegetable plot in their box. Be sure to use whatever materials are available, to create a visually appealing vegetable array. Remember to use colours that are appropriate for vegetables. Two centimetre grid paper can be used as a guide for students to create their array. The colour of the paper can be green or brown.

**D. Garden Journal:** Students are required to complete an entry in their "Garden Journal" (BLM 2.3). Students must describe their array using math language and give the addition and/or multiplication sentence that goes with it.

**Adaptations**

For those students who have organization difficulties, use the BLM of the plot with the sections already drawn for you. It may be easier for students to draw in their vegetables in the squares provided, in groups of 3 and 6.

Extension:











It is suggested as a "homework" assignment that children try to find as many arrays at home as they can. They could possibly bring in a picture or advertisement of these arrays to display on a class bulletin board.

**A Garden of Patterns!**

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**Resources**

	<b>BLM 6.1 Problem Solving Using Arrays</b>	BLM_6.1.cwk
	<b>BLM 6.2A Shopping For Vegetables - A</b>	BLM_6.2A.cwk
	<b>BLM 6.2B Shopping For Vegetables - B</b>	BLM_6.2B.cwk
	<b>BLM 6.3 Self Assessment: Array For Vegetable Garden</b>	BLM_6.3.cwk
	<b>BLM 6.4 Packages of Donuts</b>	BLM_6.4.cwk
	<b>BLM 6.5 Trays of 3</b>	BLM_6.5.cwk
	<b>BLM 6.6 Trays of 6</b>	BLM_6.6.cwk
	<b>Quest 2000 Extra Practise and Testing Masters</b>	Addison - Wesley
	<b>Quest 2000 - Unit #2</b>	
	<b>Sample items sold in arrays: stamps, hot dogs, drink boxes, muffin tins, egg</b>	

**Notes to Teacher**

This subtask was designed with this in mind. It is very important that students are able to demonstrate their knowledge of arrays through a variety of methods.

The teacher may need to go over the rules for developing an array at the beginning of the unit. Look at several examples and non examples.

**Teacher Reflections**



**A Garden of Patterns!**

A Unit For Grade Three An Integrated Unit for Grade 3

90 mins

**Description**

Using the story "Mrs. Rose's Garden" by Elaine Greenstein, students begin to develop an awareness of the responsibility that comes with owning a garden. Gardens are used for many different reasons: for food, exercise, income, play, and entertainment. As one of God's creations, a garden is an expression of beauty in nature and we must respect it and use it wisely. Students assume the role of a "gardener" as they develop a schedule for taking care of the garden. Using a calendar to display data, students create a repeating pattern of watering and weeding their garden. Students use this environmental data to explain their pattern rule, extend the pattern and describe it using informal math language.

**Catholic Graduate Expectations:**

CGE 7i - A responsible citizen who respects the environment and uses resources wisely.

**Expectations**

- 3m84 – discuss the choice of a pattern rule;
- 3m87 A – use environmental data to create models of patterns (e.g., Monday – sunny, Tuesday – rainy) and display the patterns on a chart;
- 3m34 • demonstrate an understanding of and ability to apply measurement terms: centimetre, metre, kilometre; millilitre, litre; gram, kilogram; degree Celsius; week, month, year;
- 3e29 • read a variety of fiction and non-fiction materials (e.g., chapter books, children's reference books) for different purposes;
- 3e32 • express clear responses to written materials, relating the ideas in them to their own knowledge and experience and to ideas in other materials that they have read;
- 3e27 A – select and correctly use the format suited to their purpose for writing (e.g., letter, e-mail, chart);
- 3s22 – describe various settings in which plant crops are grown (e.g., farms, orchards, home gardens);
- 3s24 – compare the requirements of some plants and animals, and identify the requirements that are common to all living things (e.g., the need for water and minerals);
- 3s25 – demonstrate awareness of ways of caring for plants properly (e.g., ensure that a plant has sufficient light and water);
- 3e53 • talk about characters and situations in stories, and information and ideas in non-fiction materials;
- 3e54 • apply the rules for working with others;

**Groupings**

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

**Teaching / Learning Strategies**

- Collaborative/cooperative Learning
- Discussion
- Model Making
- Oral Explanation
- Read Aloud
- Reading Response
- Problem-solving Strategies

**Assessment**

The teacher may use the checklist provided (BLM 7.2) to gauge students' understanding of this expectation. It is also possible for the teacher to conference individually with each child and have the child explain their environmental pattern using math language. This would also be a good time to bring in the spiritual connection of being a caring and responsible citizen.

The following is a brief description of an environmental pattern at each of the 4 levels.

**Level 1**

The student demonstrates a **very limited** understanding of using environmental data to create a model of a pattern and needs **significant assistance** to explain, both orally and in writing, their patterns.

**Level 2**

The student demonstrates a **limited**

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90 mins

understanding of using environmental data to create a model of a pattern and needs **some assistance** to explain, both orally and in writing, their patterns.

**Level 3**

The student demonstrates a **general** understanding of using environmental data to create a model of a pattern and **independently** explains their patterns, orally and in written form.

**Level 4**

The student demonstrates a **thorough** understanding of using environmental data to create a model of a pattern and explains these patterns, **in a variety of ways**.

**Assessment Strategies**

Learning Log  
Performance Task  
Observation

**Assessment Recording Devices**

Anecdotal Record  
Checklist

**Teaching / Learning****1. Whole Class Lesson - Taking Care of a Garden (20 minutes)**

Students are presented with a piece of literature that focuses on taking care of a garden in order to provide the context for this activity. It also allows them to see the connection between God and taking care of what has been created.

**A) Read/Reflect on the Story:** After reading the story "Mrs. Rose's Garden" by Elaine Greenstein, discuss with students some of the different tasks that had to be done in order to take care of the garden. Write them on a chart or on the board. Ask students how these jobs could all be done in a systematic way so that the garden is taken care of, as God intended.

**B) Connect the Story to Students:** As a class, come up with a list of jobs that need to be done in a class in order for it to be taken care of. List these on the board or on a chart. Discuss how often each job would need to be done. Is it a task that is done daily? Weekly? Two times a week? Every other day? Some jobs might be cleaning out desks, wiping down the boards, stacking chairs, straightening boots, etc.

**2. Small Group Activity - Making a Schedule (30 minutes)**

In this section, students work as a group to develop a schedule for 5 classroom responsibilities to be done in a month. Divide the class into 5-6 small groups, with no more than 5 in a group.

**A) Calendar Work:** Hand out the "Blank Calendar" (BLM 7.1) and tell students that each member must select one of the responsibilities of the classroom from the chart. Each student designs a symbol to be used on the calendar (an example is stacking chairs **SC**). They must also include a legend in the bottom right hand corner of the paper, outlining what the symbols mean in words. Each student must come up with a repeating pattern of completing their task as often as they feel is necessary. Students are responsible for putting their pattern on the group calendar for the whole month. Students are asked to try not to have two of the same patterns on their chart, in order to

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have a variety. Do an example on an overhead if students need more guidance with this.

**B) Presentation:** Groups are then responsible for presenting their calendar to the class. Each student must describe his/her responsibility and articulate the pattern on the calendar using math language. (An example might be: stack chairs, stack chairs, stack chairs, stack chairs, stack chairs, off, off ). During the presentation, the teacher keeps note of how each student describes their task and the pattern they developed.

\*\*The teacher should gauge how students have grasped the concepts covered in this subtask. Look in the resource section for further practise work in existing math programs.

**3. Individual Calendars (40 minutes)**

Now students demonstrate their understanding of patterns using environmental data. They create a model of a pattern and display it on a calendar.

**A) Gardener's Responsibility Discussion:** Begin a discussion involving the many responsibilities a "gardener" has when taking care of a garden. Refer to the chart made in response to the story (1b).

**B) Completing the Calendar:** Students now develop their own schedule of gardening jobs for their garden. They must choose two or more jobs and create symbols which represent their choices. Students include these in a legend in the bottom right hand corner of the page. They then place these in the calendar in a repeating pattern, using the handout entitled "Blank Calendar" (BLM 7.1). The teacher must also read over the expectations for the task, found on the "Calendar Checklist" (BLM 7.2) so that students know the expectations before they begin the task.

**C) Garden Journal:** When students are finished, they need to place the calendar in their Garden Journal to keep it safe. They need to pull it out again to display it during the culminating task and "Garden Show." Students must then complete an entry in their Garden Journal (BLM 2.3) outlining the environmental pattern designed for the calendar.

**Adaptations**

This is a good hands-on activity for visual learners. When presenting, students may come up with their calendars and read a list of the repeating patterns they have in their calendar, rather than do it off by heart.

**Resources****BLM 7.1 Blank Calendar**

BLM\_7.1.cwk

**BLM 7.2 Calendar Checklist**

BLM\_7.2.cwk

**Interactions Blackline Masters (Gr.3)**

Ginn Publishing Canada

**Horticulturalist**

**A Garden of Patterns!****A Unit For Grade Three An Integrated Unit for Grade 3****90 mins**

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**Notes to Teacher**

For students who are finished early, challenge them to continue the pattern into the next month. How many days will you water the garden in 1 month? 2 months? How many days will you weed the garden in 1 month? 2 months? Also the teacher may want to have a horticulturalist come in to talk to students about taking care of a garden and the schedule it takes. Another idea is to visit a market or a green house and speak to the people who do this job daily for a living. This ties in nicely with the "Rural Communities" strand of the social studies curriculum.

**Teacher Reflections**

# The Garden Creation - Culminating Task

Subtask 8

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

180 mins

### Description

This subtask requires students to complete their well developed, detailed, three dimensional model (Diorama) of a garden. The project has evolved over the period of the unit, with time given for each pattern to be developed. Each subtask has prepared students to apply their learning to a life context; their garden. Students are assessed on how they apply their patterning skills to their finished product. For further assessment, students provide detailed explanations of each of the 5 patterns used in their model, in their daily Garden Journal. The culminating activity of an oral presentation to the class provides for further assessment in a related context. Students then apply their understanding of patterning, as they continue to assume the role of a garden designer. They design a draft of a new garden plot for a neighbour. They explain their various patterns which are part of their proposal. Students are encouraged to see the spiritual connection with their role as "gardeners." In caring for their gardens, they are promoting the sacredness of life.

### Catholic Graduate Expectations:

CGE 4f - applies effective communication, decision-making, problem- solving, time and resource management skills.

CGE 5g - achieves excellence, originality, and integrity in one's own work and supports these qualities in the work of others.

### Expectations

- 3m79 • create charts to display patterns;
- 3m83 – create a pattern in which two or more attributes change (e.g., size, colour, position);
- 3m84 – discuss the choice of a pattern rule;
- 3m77 • recognize that patterning results from repetition;
- 3m23 – interpret multiplication and division sentences in a variety of ways (e.g., using base ten materials, arrays);
- 3m78 A • identify, extend, and create linear and non-linear geometric patterns, number and measurement patterns, and patterns in their environment;
- 3a23 • identify the elements of design (colour, line, shape, form, space, texture), and use them in ways appropriate for this grade when producing and responding to works of art;
- 3a32 A – use art tools, materials, and techniques correctly to create different effects (e.g., paint with a sponge to create an open, airy feeling in a work; apply paint thickly with a brush to suggest heaviness).
- 3e2 • write materials that show a growing ability to express their points of view and to reflect on their own experiences (e.g., journal notes);
- 3a36 – identify strengths and areas for improvement in their own and others' art work (e.g., the need to have better control in using paints).
- 3e57 A • use the conventions (e.g., sentence structure) of oral language, and of the various media, that are appropriate to the grade (see below);
- 3e60 A - speak on a variety of topics in classroom discussions using some specialized language (e.g., metres in measurement), and select words carefully to convey their intended meaning;
- 3e61 A – use appropriate volume, tone of voice, gestures, and stance when speaking, making a presentation, or reading aloud;

### Groupings

Students Working As A Whole Class  
Students Working In Pairs  
Students Working Individually

### Teaching / Learning Strategies

Model Making  
Working With Manipulatives

### Assessment

**Diorama:** The teacher may choose to assess the model of the garden at the end of the culminating task, or daily as each student is finished their type of pattern. It is suggested that it be done at the end to allow time for students to add detail to his/her garden.

### Oral Presentation - Refer to Rubric

**(BLM#8.1):** Under the category "Communication," the teacher assesses the oral presentation using these expectations.

### Assessment Strategies

Self Assessment  
Performance Task  
Classroom Presentation

### Assessment Recording Devices

Checklist  
Rubric

# The Garden Creation - Culminating Task

## A Garden of Patterns!

Subtask 8

A Unit For Grade Three An Integrated Unit for Grade 3

180 mins

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### Teaching / Learning

Allow 3 hours to complete the dioramas.

#### 1. Whole Class - Overview of Checklist for Garden

The teacher asks students to take out their **Garden Checklist** (BLM 2.1), which should be in their Gardening soft cover binder. Review the expectations for a completed model of their garden. Instruct students that they have the next couple of periods to complete all subtasks and garden journal entries. As well, they need a sign for their garden. A blackline master has been provided. Encourage students to fill in the border using their new knowledge of patterning. Students may add any detail to the inside or outside of their garden, if time permits.

#### 2. Self Assessment/Peer Assessment

When students are satisfied that they have completed all subtasks in their model, they use their **Garden Checklist** for a self-assessment. In the column under **self check** the student must place a check mark beside each task, if completed. When finished, the student then gets a partner to do the **peer check**. The partner places a check mark in the appropriate column, after checking that the task is completed. The partner then fills out the comment section. Discuss with the class what "constructive criticism" means.

#### 3. Individual Detail Time

If a student has completed the self- and peer assessment, they take whatever time is left over to add detail. This detail could be in their garden, on the outside of the box, or to the sign they created. Encourage students to be as creative as possible and to support the creativity of others in their comments about other people's gardens.

#### 4. Comparing Your Draft to the Finished Product

Students are encouraged to take some time to compare their finished product to that of their initial proposal of their garden (BLM 2.2). Have students get their proposal from their soft cover binder. Use the following questions as a guide to a class discussion of comparing the two.

1. Is the model of the garden similar to the proposal made at the beginning of the unit? If not, what is different about it? What is the same?
2. What is different about the flower patterns done in the proposal and the flowers in the model?
3. Did the subtasks prepare you for completing the garden? Did you learn enough new information about patterning that it made a difference in your end product, or could you have built this model without going through the subtasks?

#### 5. Culminating Task - A) Oral Presentation

Each student is expected to present his or her garden to the class for the culminating activity. They are to point out the pattern on the hundreds chart, the repeating pattern used in both the fence and the flower plot, the growing pattern, and the array. Have the student explain his or her plan for taking care of the garden as described in subtask 7. It is expected that mathematical terminology is used when explaining their pattern rules.

This oral presentation allows the student to apply his or her learning of patterns in a related context. The

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# The Garden Creation - Culminating Task

Subtask 8

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

180 mins

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student should be expected to complete this activity with very little assistance. Use the rubric provided to assess the student's communication during his or her oral presentation.

### **Culminating Task - B) Written Component**

As a written component, students apply their learning of patterning in a new context. Assuming the role of "gardener", students are to design a garden plot for a neighbour's yard. Students apply their knowledge of patterning to design a draft of a new garden plot. Discuss with students the scenario of how their neighbour admired the garden which they developed. They want a similar design, but with different patterns. Include a growing pattern, repeating pattern, a patio with a pattern, and an array. Stress that it must be different from their own. The new garden is drawn on the outline provided (BLM 2.2) and then they must describe each pattern that they included on BLM 8.3.

### **Adaptations**

The culminating task allows students with varying degrees of difficulties to still complete it, using a range of materials. Reminders are given to select an appropriate size of box for your individual learners and to use materials that are easy to manipulate.

### **Resources**



**BLM 8.1 A Garden Of Patterns**



**BLM 8.2 Garden Sign**

BLM\_8.2.cwk



**BLM 8.3 Culminating Task - Written Component**

BLM\_8.3.cwk

### **Notes to Teacher**

NOTE: There is 3 hours allotted for this culminating task. It will vary depending on how quickly students work on the individual subtasks as they continue to develop the final product. Some students may have very little work to do at this stage, while others may need to use the time to finish up.

When adding detail, students may add other creations from God in their model (birds, animals, bugs, etc.) or other objects such as a water fountain, chair, watering can, etc. Encourage students to be as creative as they can.

### **Teacher Reflections**

## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

### Description

Students have a class discussion reflecting on the unit, stressing God's role as Creator, and focusing on the many gifts that are a part of each student. Students then record their reflections on a petal of a flower. These become part of a display to be used during a prayer celebration. Students celebrate the gifts from God which they have for observing and creating patterns that are found in the beautiful world around them. The celebration is concluded with a "garden show" to share their creations with others.

#### Catholic Graduate Expectations:

CGE 7d - promotes the sacredness of life.

CGE 7j - a responsible citizen who respects the environment and uses resources wisely.

### Expectations

- 3e1 • communicate ideas and information for specific purposes and to specific audiences (e.g., write a notice for a community newspaper advertising an upcoming school event);
- 3e2 • write materials that show a growing ability to express their points of view and to reflect on their own experiences (e.g., journal notes);
- 3e51 • listen to discussions and ask questions to clarify meaning;
- 3e54 • apply the rules for working with others;

#### Groupings

- Students Working Individually
- Students Working As A Whole Class

#### Teaching / Learning Strategies

- Discussion

#### Assessment

**Watch** for students who are able to make the connection between their work and the discussion when it comes time to write on the petals. Can they connect God to their own work and their role as "gardener."

#### Assessment Strategies

- Performance Task

#### Assessment Recording Devices

- Anecdotal Record

### Teaching / Learning

#### 1. Whole Class Lesson - Reflection (20 minutes)

**A)** Reflect on the unit with students. Ask them what they enjoyed making in their gardens, which parts they are proud of, and what they like in the gardens that belong to their peers. Point out that the models that students made are a wonderful starting place to actually plant a real garden in the spring. It serves as a plan. Place three questions on the board and discuss each of them:

**i) What role does God play in making the garden grow, and what is his role in the patterns that exist?**

Lead the discussion so that students become aware that God is the Creator; He provides us with this wonderful earth and all the things on it, including seeds. God makes each type of flower and plant unique, and some of His flowers have very unique patterns as they grow. We see patterns in how the leaves or petals are arranged, how the colours inside a flower are arranged, etc.

**ii) How does God help us make a beautiful garden full of pattern?**

Lead the discussion so that students are aware of their many gifts from God. He gives them the gift of creativity to design a beautiful garden that is pleasing to look at. God also gives them the the gift of sight to see the patterns in nature and appreciate them, and the gift of smell to enjoy the beautiful aromas of flowers.



## A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

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### iii) What is our role and responsibilities for helping God make our world beautiful?

Lead the discussion so that students are aware that by using our gifts of creativity to design a garden full of colour and pattern, we are helping to make this world a place of beauty. It is our responsibility to care of this garden by watering and weeding it. It is also our responsibility to protect our world from being destroyed. Working towards keeping our world pollution free is just one responsibility that every child can participate in.

### 2. Individual Application of Understanding - Reflect on Our Learning (10 minutes)

Design a large petal which will fit on the centre of the flower found on BLM 9.1. Use this as a tracer. Make the petal very large so that it fits proportionately on the centre. Each student receives one petal. Arrange for the petals to be traced in a few different colours so that students can put them together to make a pattern of colour as the flowers are assembled. The petals will become part of a display of flowers during the celebration. Have students cut out a petal and write a reflection of their unit, by answering one of the three questions above. They should only choose one sentence to represent their understanding.

**Sample answers are:** My responsibility is to care for a garden so that it does not die; God makes beautiful patterns with the leaves of a daisy; God makes pattern designs on the leaves of special plants; God gave me the gift of my eyes to look at the beautiful gardens in my world; God gave me the gift of my hands to plant and nurture the earth.

### 3. Whole Group - Celebrating God's Word (30 minutes)

**Preparation:** Assign Psalm 104 to several children and have them practise. Have the flowers assembled on the board or wall except for one flower. Choose several students to read their petals during the celebration and create the last flower during this process. Select four or five students to bring up their gardens during the procession.

#### **Gathering**

Everybody processes to a gathering space led by several children carrying the cross, a candle, a Bible, and four or five of the gardens that students have created. These are laid on the altar. Everyone sings the "Song of Creation" (No.18 In the Spirit We Belong) as they process in.

#### **Greeting**

*Leader:* The Lord be with you.

*All:* And also with you

*Leader:* We have gathered today to praise and bless God for creation.

#### **Opening Prayer**

*Leader:* Let us bow our heads and pray in silence.  
(silence)

Creator God, you have filled our world with beauty. Help us to appreciate this beauty and use our gifts wisely to help care for our world. Open our hearts to hear your word.

#### **Word of God**

Proclaim Psalm 104 as assigned to various students

#### **Homily (suggested)**

*Leader:* Recall the fun that we had while completing our projects. Let us think of our gardens as a reminder

## Culminating Task - Celebrating!

Subtask 9

### A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

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of our love and the need to be at peace with ourselves and with our world. Give thanks to God for the patterns in nature which help make our environment more balanced. Let us also give thanks for the gift of our senses that God has given each of us to help appreciate our world, and the gift of our creativity to help make it a place of beauty and harmony. Let us always remember our responsibilities in caring for God's earth.

#### **Give Thanks**

*Response:* "Thank You for Your many gifts!"

Invite selected students to share their responses on their petals with the class one at a time.

After reading the children place their petal on the wall to complete the last flower.

Repeat for each student: Read, Respond, Offer petal

#### **Closing**

*Leader:* Let us dance and sing "Two by Two" (No. 17 In the Spirit We Belong) as we go forth and give thanks for God's spirit which enriches our lives.





#### **4. Garden Party - 1 hour or less**

This is a time for sharing what has been accomplished. Tailor this activity to suit the needs of the class. The following is a list of suggested activities:

- i) Design invitations (computer generated "media works" is suggested)
- ii) Decide who to invite - parents, another class
- iii) Plan decorations for the party
- iv) Plan for food to be a part of the party. Have students bring in foods that come from the earth; healthy snacks such as raw vegetables, banana bread, raisin bread, fruit, juice, etc.
- v) Send invitations
- vi) Invite students to tour around the class and share each others' gardens.

### Adaptations

#### Resources

	<b>BLM 9.1 Flower pattern - centre</b>	BLM_9.1.cwk
	<b>Music cassette "In The Spirit We Belong"</b>	
	<b>tape</b>	2 peices
	<b>scissors</b>	1

## Culminating Task - Celebrating!

Subtask 9

### A Garden of Patterns!

A Unit For Grade Three An Integrated Unit for Grade 3

120 mins

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#### Notes to Teacher

Display the photographs or video if they were used as suggested in the teacher notes at the beginning of the unit.

Unit 7 "The Holy Spirit Fills the Whole Earth" found in the grade three Religion programme, "In the Spirit We Belong" complements this mathematics. This unit is to prepare students for Lent. It has been suggested in the teacher notes that the unit run in the later part of the year, which matches the timing of Lent and Easter. There are a variety of activities in Unit 7 which focus on God's creation, and the beauty of our world.

There is an activity on page 222 of Unit 7 which has students making Japanese gardens. This is a great extension activity to demonstrate how different cultures create various styles of gardens.

#### Teacher Reflections

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# **Appendices**

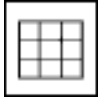
## **A Garden of Patterns!**

### **A Unit For Grade Three**

**Resource List:**  
**Black Line Masters:**  
**Rubrics:**  
**Unit Expectation List and Expectation Summary:**

## A Garden of Patterns!

### A Unit For Grade Three An Integrated Unit for Grade 3



#### Rubric



- BLM 3.4 100 Chart Assessment** ST 3  
3  
Use to assess student's understanding of nonlinear patterning.
- BLM 8.1 A Garden Of Patterns** ST 8  
2  
Use this rubric to assess the finished product of the model of the garden, the schedule for taking care of the garden and the Garden journal. This should be done after subtask #8



#### Blackline Master / File




- BLM 1.1 Growing and Shrinking Patterns** ST 1  
BLM\_1.1.cwk  
This worksheet is to be used in subtask #1 (prior knowledge)
- BLM 1.2 Geometric Shapes** ST 1  
BLM\_1.2.cwk  
Use with Subtask 1 as a template to make a series of shapes that students can use to create a pattern with changing attributes.
- BLM 1.3 Patterning Quiz** ST 1  
BLM\_1.3.cwk  
Use to assess the expectations required from grade two.
- BLM 2.1 Checklist** ST 2  
BLM\_2.1.cwk  
A checklist to be introduced in subtask 2, and filled in by student and a peer in subtask 8.
- BLM 2.2 Floor Plan For My Garden** ST 2  
BLM\_2.2.cwk  
A copy of the draft floor plan for the garden. This is to be used with subtask 2
- BLM 2.3 My Garden Journal** ST 3  
BLM\_2.3.cwk  
This is a worksheet used for assessing the student's understanding of the patterns within his/her patio. It is also used in subtasks 2, 3, 4, 5, 6, and 7
- BLM 2.3 My Garden Journal** ST 5  
BLM\_2.3.cwk  
This is a worksheet used for assessing the student's understanding of the patterns within his/her patio. It is also used in subtasks 2, 3, 4, 5, 6, and 7
- BLM 3.1 Hundreds Chart With Numbers** ST 3  
BLM\_3.1.cwk  
Use with small group activity in Subtask 3 activity 2A.
- BLM 3.2 Blank Hundreds Chart** ST 3  
BLM\_3.2.cwk  
Use as a template for creating the patio in Subtask 3, activity 3A.
- BLM 3.3 Student Assessment: Patio on the Hundreds Chart** ST 3  
BLM\_3.3.cwk  
Students use this to self assess their patio.
- BLM 4.1 The Garden Fence** ST 4  
BLM\_4.1.cwk  
Use this BLM when designing the repeating pattern of the fence in subtask #4
- BLM 4.2 Student Assessment: Repeating Patterns For Fence and Garden** ST 4  
BLM\_4.2.cwk  
Student uses this to assess the repeat pattern on their fence and in their garden.
- BLM 5.1 Problem Solving Sheet #1** ST 5  
BLM\_5.1.cwk  
Problem solving sheet for group work.
- BLM 5.2 Problem Solving Sheet #2** ST 5  
BLM\_5.2.cwk  
Problem solving sheet for groups or individuals. Focus is on growing and shrinking patterns.
- BLM 5.3 Problem Solving Sheet #3** ST 5  
BLM\_5.3.cwk  
For group work or individual assessment. Problem solving with growing patterns.
- BLM 5.4 Problem Solving Sheet #4** ST 5  
BLM\_5.4.cwk  
Problem solving sheet to be used with groups or individually. Growing patterns are explored.
- BLM 5.5 Template for Growing Pattern** ST 5  
BLM\_5.5.cwk  
This is a suggested template to use as a guide for making the growing pattern in the garden.
- BLM 5.6 Student Assessment For Growing Pattern** ST 5  
BLM\_5.6.cwk  
Students use this self assessment to check their growing pattern and "Garden Journal."
- BLM 5.7 Problem Solving Strategies** ST 5  
BLM\_5.7.cwk  
Post strategies in the class and refer to them in subtask 5 and 6
- BLM 6.1 Problem Solving Using Arrays** ST 6  
BLM\_6.1.cwk  
Worksheet for groupwork
- BLM 6.2A Shopping For Vegetables - A** ST 6  
BLM\_6.2A.cwk
- BLM 6.2B Shopping For Vegetables - B** ST 6  
BLM\_6.2B.cwk
- BLM 6.3 Self Assessment: Array For Vegetable Garden** ST 6  
BLM\_6.3.cwk  
Use to assess students when completing vegetable array in garden.
- BLM 6.4 Packages of Donuts** ST 6  
BLM\_6.4.cwk  
Use for small group problem solving.

**A Garden of Patterns!****A Unit For Grade Three An Integrated Unit for Grade 3**

<input type="checkbox"/> <b>BLM 6.5 Trays of 3</b> BLM_6.5.cwk Use as a planning sheet for the individual activity when designing an array of 18 vegetables. Use with BLM 6.6 Ttrays of 6.	ST 6		<b>Licensed Software</b>	
<input type="checkbox"/> <b>BLM 6.6 Trays of 6</b> BLM_6.6.cwk Use with activity 6 to help plan the vegetable plot. Use with BLM 6.5 Trays of 3.	ST 6	<input type="checkbox"/> <b>Math Circus Act 2</b>		Unit
		<input type="checkbox"/> <b>Math Trek</b>		Unit
<input type="checkbox"/> <b>BLM 7.1 Blank Calendar</b> BLM_7.1.cwk Use blank calendar with subtask 7	ST 7		<b>Print</b>	
<input type="checkbox"/> <b>BLM 7.2 Calendar Checklist</b> BLM_7.2.cwk The teacher may use this checklist with the individual student or on their own with subtask #7	ST 7	<input type="checkbox"/> <b>1-100 Activity Book</b> Dawn Hickman Bacarella Learning Resources, 1990 Full of activities and worksheets for the hundred board. Lots of patterning.		Unit
<input type="checkbox"/> <b>BLM 8.2 Garden Sign</b> BLM_8.2.cwk	ST 8	<input type="checkbox"/> <b>A Handful Of Seeds</b> Monica Hughes A story about a girl who plants a garden to provide food for her community. (Fiction)		Unit
<input type="checkbox"/> <b>BLM 8.3 Culminating Task - Written Component</b> BLM_8.3.cwk Use with subtask 8 for students to describe the proposal of the garden which is designed for a neighbour.	ST 8	<input type="checkbox"/> <b>Canadian Garden</b> magazine		Unit
<input type="checkbox"/> <b>BLM 9.1 Flower pattern - centre</b> BLM_9.1.cwk	ST 9	<input type="checkbox"/> <b>Deck and Patio</b> magazine		Unit
		<input type="checkbox"/> <b>Fine Gardening</b> Magazine		Unit
		<input type="checkbox"/> <b>Flowers</b> David Burnie Non-Fiction		Unit
		<input type="checkbox"/> <b>From One to One Hundred</b> Teri Sloat 0-525-44764-4		Unit
		<input type="checkbox"/> <b>How Do Octopi Eat Pizza Pie</b> By The Editors of Time Life for Children 0-8094-9950-9		Unit
		<input type="checkbox"/> <b>Interactions</b> Ginn Publishing, Canada 0-7702-2339-7 Math program for grade three.		Unit
		<input type="checkbox"/> <b>Interactions Blackline Masters (Gr.3)</b> Ginn Publishing Canada ISBN 0-7702-2348-6 Use this blank calendar form for both the small group and individual activity for subtask #7		Unit
		<input type="checkbox"/> <b>Interactions Blackline Masters (Gr.3)</b> Ginn Publishing Canada ISBN 0-7702-2348-6 Use this blank calendar form for both the small group and individual activity for subtask #7		ST 7
		<input type="checkbox"/> <b>Kids Gardening - A guide to messing around in the dirt</b> Kim Raftery and Kevin Raftery Non-Fiction		Unit

## A Garden of Patterns!

## A Unit For Grade Three An Integrated Unit for Grade 3

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|--|---|
| <p><input type="checkbox"/> <b>Marge's Diner</b><br/>Gail Gibbons<br/>0-690-04606-5<br/>This is a story of a small town diner who has to order food for the diner.</p> <p><input type="checkbox"/> <b>Mice Twice</b><br/>Joseph Low<br/>0-689-71060-7</p> <p><input type="checkbox"/> <b>Nelson Language Arts - Keepsakes and Treasures</b><br/>Several<br/>0-17-618560-7<br/>Unit 2 "Look and Discover" is all about plants and seeds. Refer to these during the unit.</p> <p><input type="checkbox"/> <b>Ontario Garden Magazine</b></p> <p><input type="checkbox"/> <b>Quest 2000 Exploring Mathematics</b><br/>Addison - Wesley<br/>0-201-83004-3<br/>Grade three math program.</p> <p><input type="checkbox"/> <b>Quest 2000 Extra Practise and Testing Masters</b><br/>Addison - Wesley<br/>ISBN 0-201-55268-X<br/>Page 21</p> <p><input type="checkbox"/> <b>Quest 2000 Extra Practise and Testing Masters</b><br/>Addison - Wesley<br/>ISBN 0-201-55268-X<br/>Page 21</p> <p><input type="checkbox"/> <b>Quest 2000 - Unit #2</b><br/>Array Game (Activity #3)</p> <p><input type="checkbox"/> <b>Roman Numerals</b><br/>David Adler<br/>0-690-01320-7<br/>This book talks about the patterns of roman numerals.</p> <p><input type="checkbox"/> <b>Science Everywhere</b><br/>Asselstine - Peturson<br/>0-7747-0556-6<br/>Unit 1 - Growing Greens is an good resource if a Science unit is taught at the same time as the patterning unit.</p> <p><input type="checkbox"/> <b>The Hundred Dresses</b><br/>Eleanor Estes<br/>0-15-642350-2</p> <p><input type="checkbox"/> <b>The Man Who Planted Trees</b><br/>Jean Giono<br/>0-88794-362-4<br/>This would be a good "Teacher Read" for the class as it is a bit difficult for grade 3.</p> <p><input type="checkbox"/> <b>Various Garden Pamphlets/Fence Plans</b><br/>These can be found at White Rose, Home Depot or any building or gardening centre.</p> | <p>Unit</p> <p> <b>Media</b></p> <hr/> <p>Unit <input type="checkbox"/> <b>Music cassette "In The Spirit We Belong"</b> <b>ST 9</b><br/>Grade Three Religion Programme - "Born of the Spirit"</p> <p>Unit  <b>Website</b></p> <hr/> <p>Unit <input type="checkbox"/> <b>A+ Math!</b> <b>Unit</b><br/><a href="http://www.aplusmath.com">http://www.aplusmath.com</a><br/>This web site was developed to help students improve their math skills interactively.</p> <p>Unit Visit the game room and play exciting games like Matho and Hidden Picture...Test your math skills with Flashcards! Try out the Math Word Find puzzle.</p> <p>Unit <input type="checkbox"/> <b>Student Link - Grade 3 Math</b> <b>Unit</b><br/><a href="http://llgmail/stulink2/primary/gr3/gr3_ma.html">http://llgmail/stulink2/primary/gr3/gr3_ma.html</a><br/>A collection of websites that will reinforce all area of learning in math, including patterning and algebra.</p> <p>ST 6  <b>Material</b></p> <hr/> <p>ST 6 <input type="checkbox"/> <b>cardboard shoe box</b> <b>ST 2</b><br/>class set<br/>per person<br/>Need a regular size shoe box for each student to be used for the diarama. A larger box will also work.</p> <p>Unit <input type="checkbox"/> <b>coloured construction paper</b> <b>ST 4</b></p> <p>Unit <input type="checkbox"/> <b>Crayons</b> <b>ST 2</b><br/>1 pack<br/>per person</p> <p>Unit <input type="checkbox"/> <b>glue</b> <b>ST 4</b></p> <p>Unit <input type="checkbox"/> <b>green paint</b> <b>ST 2</b></p> <p>Unit <input type="checkbox"/> <b>markers - range of colours</b> <b>ST 3</b></p> <p>Unit <input type="checkbox"/> <b>modelling clay</b> <b>ST 4</b></p> <p>Unit <input type="checkbox"/> <b>paper for recording</b> <b>ST 2</b><br/>1<br/>per group</p> <p>Unit <input type="checkbox"/> <b>pattern blocks</b> <b>ST 4</b></p> <p>Unit <input type="checkbox"/> <b>Pictures of gardens</b> <b>ST 2</b><br/>3 or 4<br/>per group<br/>Garden pictures can come from a variety of sources including magazines, photos, web sites, books, etc..</p> <p>Unit <input type="checkbox"/> <b>poster board or stiff paper</b> <b>ST 3</b><br/>1<br/>per person</p> |
|--|---|

# A Garden of Patterns!

## A Unit For Grade Three An Integrated Unit for Grade 3

- Sample items sold in arrays: stamps, hot dogs, drink boxes, muffin tins, egg cartons, cereal boxes etc.** ST 6  
per class  
Use as many of the materials as you can to show the "real world" examples of arrays.

- tape** ST 9  
2 peices  
per person



### Equipment / Manipulative

- coloured tiles** ST 4
- Overhead Markers** ST 3  
1 pack
- Pattern Blocks** ST 5
- scissors** ST 9  
1  
per person
- square coloured tiles (optional)** ST 3  
1 bin  
per class
- square tiles** ST 5  
8  
per group



### Parent Community

- A real gardener** ST 2  
a parent, or person from the local greenhouse, Any community member who is actively involved in gardening can come in and offer pictures and information to help the students understand the concept of planning a garden.

- Horticulturalist** ST 7  
Invite a person who works in the field to come in and speak to the children. Also you could visit a green house or amrket and talk to the people who do this job for a living.



### Companions Bookmark

- Learning Log** ST 2
- Observation** ST 2
- Rating Scale** ST 1



**“Growing and Shrinking” Patterns****Name of People in Group:** \_\_\_\_\_

Each group member completes one of the patterns below, circles whether it is a growing or shrinking pattern, and fills in the pattern rule. Remember to use math language !!

1. 1, 3, 5, 7, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

The pattern is a growing / shrinking pattern.

The pattern rule is \_\_\_\_\_

2. 50, 45, 40, 35, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

The pattern is a growing / shrinking pattern.

The pattern rule is \_\_\_\_\_

3. 28, 24, 20, 16, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

The pattern is a growing / shrinking pattern.

The pattern rule is \_\_\_\_\_

4. 7, 14, 21, 28, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

The pattern is a growing / shrinking pattern.

The pattern rule is \_\_\_\_\_

5. 100, 125, 150, 175, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

The pattern is a growing / shrinking pattern.

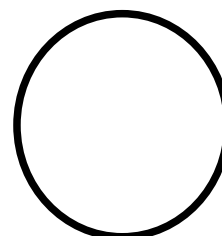
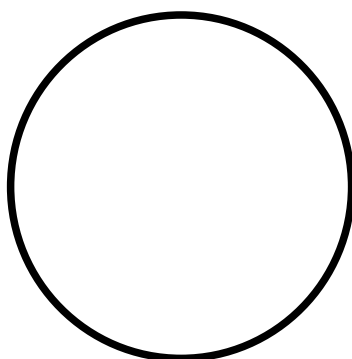
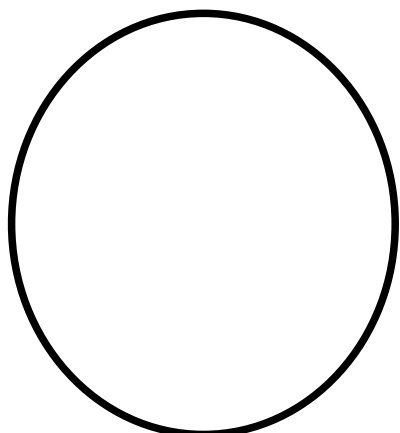
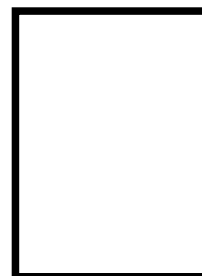
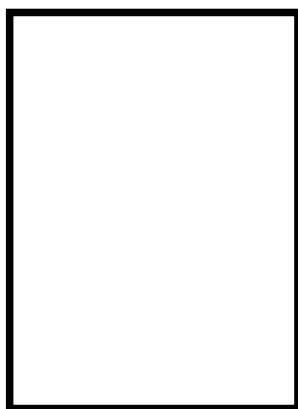
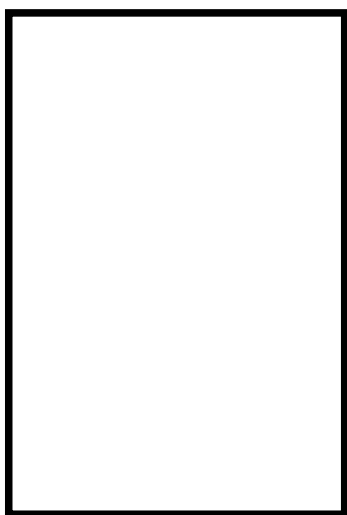
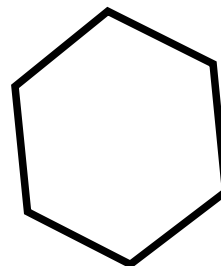
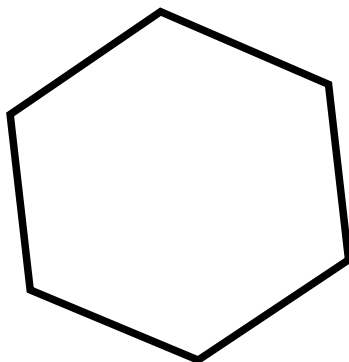
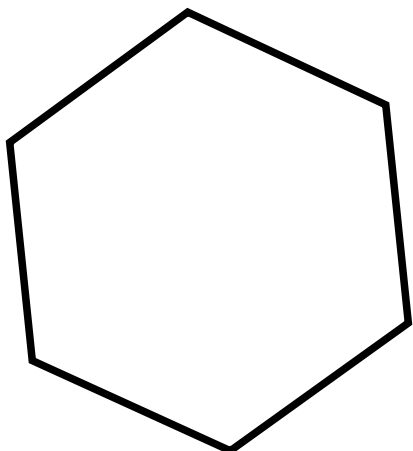
The pattern rule is \_\_\_\_\_

6. 69, 66, 63, 60, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

The pattern is a growing / shrinking pattern.

The pattern rule is \_\_\_\_\_

**Partner/individual Pattern  
Making Activity  
Geometric Shapes!**



## Patterning Quiz

BLM 1.3

1. **Complete** the number pattern.

**Circle** either growing or shrinking pattern.

**Explain** each number pattern using math language.

a) **9, 12, 15, 18,** \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Growing  
Shrinking

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b) **39, 37, 35, 33,** \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Growing  
Shrinking

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c) **4, 14, 24, 34,** \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Growing  
Shrinking

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d) **25, 21, 17, 13,** \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Growing  
Shrinking

---

2. Using the geometric shapes from the partner pattern making activity, create a pattern changing two or more attributes. Glue them on the back of this page. Explain the pattern rule.

Introduce this in Subtask 2 and fill it out in Subtask 8.

## Checklist For My Garden

	<b>Subtask 2:</b> 1. Draft is finished 2. Garden Journal is complete	<b>Subtask 3:</b> 1. Patio is finished 2. Garden Journal is complete	<b>Subtask 4:</b> 1. Repeat pattern is finished a) fence b) garden plot 2. Garden Journal is complete	<b>Subtask 5:</b> 1. Growing pattern is finished 2. Garden Journal is complete	<b>Subtask 6:</b> 1. Veggie garden is finished 2. Garden Journal is complete	<b>Subtask 7:</b> 1. Schedule is finished 2. Garden Journal is complete	<b>Subtask 8:</b> 1. Personal details are added to my garden
Self Check	1. 2.	1. 2.	1a) 1b) 2.	1. 2.	1. 2.	1. 2.	1. 2.
Peer Check	1. 2.	1. 2.	1a) 1b) 2.	1. 2.	1. 2.	1. 2.	1. 2.

Comments by: \_\_\_\_\_ (peer's name)

Two things that I really liked about your garden are:

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_

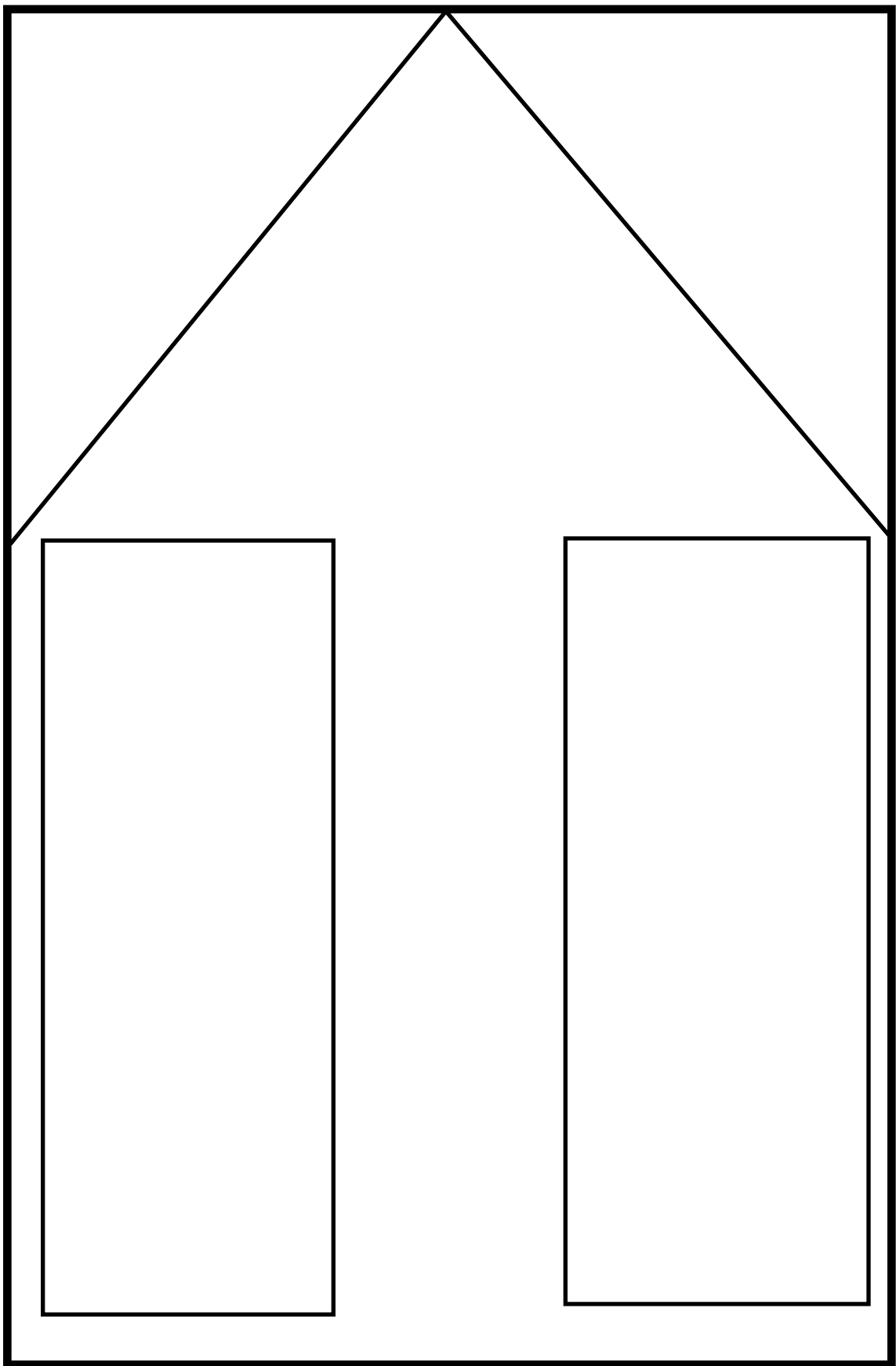
Two areas which I suggest for improvement are:

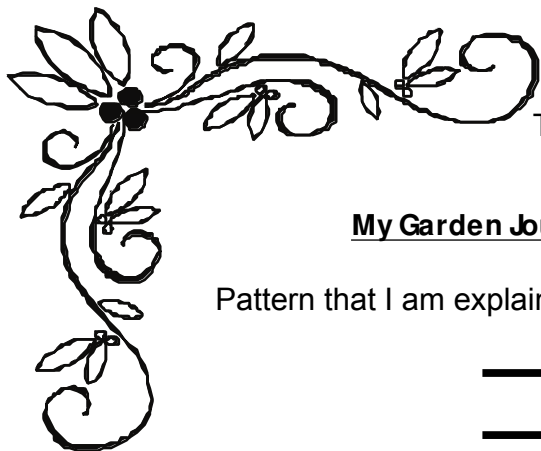
- 1) \_\_\_\_\_
- 2) \_\_\_\_\_

# Draft - Floor Plan For My Garden

Use with Subtask 2

Garden of Patterns  
BLM 2.2



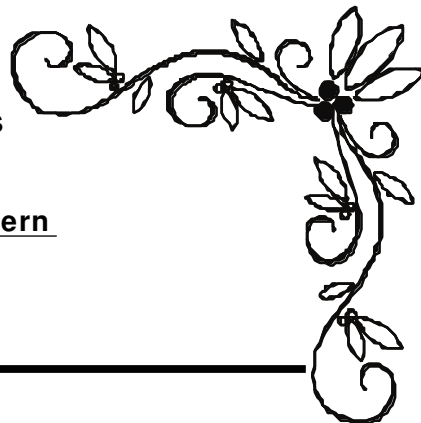


A Garden of Patterns

BLM 2.3

To be used with Subtasks

2, 3, 4, 5, 6, 7



**My Garden Journal - Explaining My Pattern**

Pattern that I am explaining:

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Use words, numbers, or pictures to show your work.

Write here!

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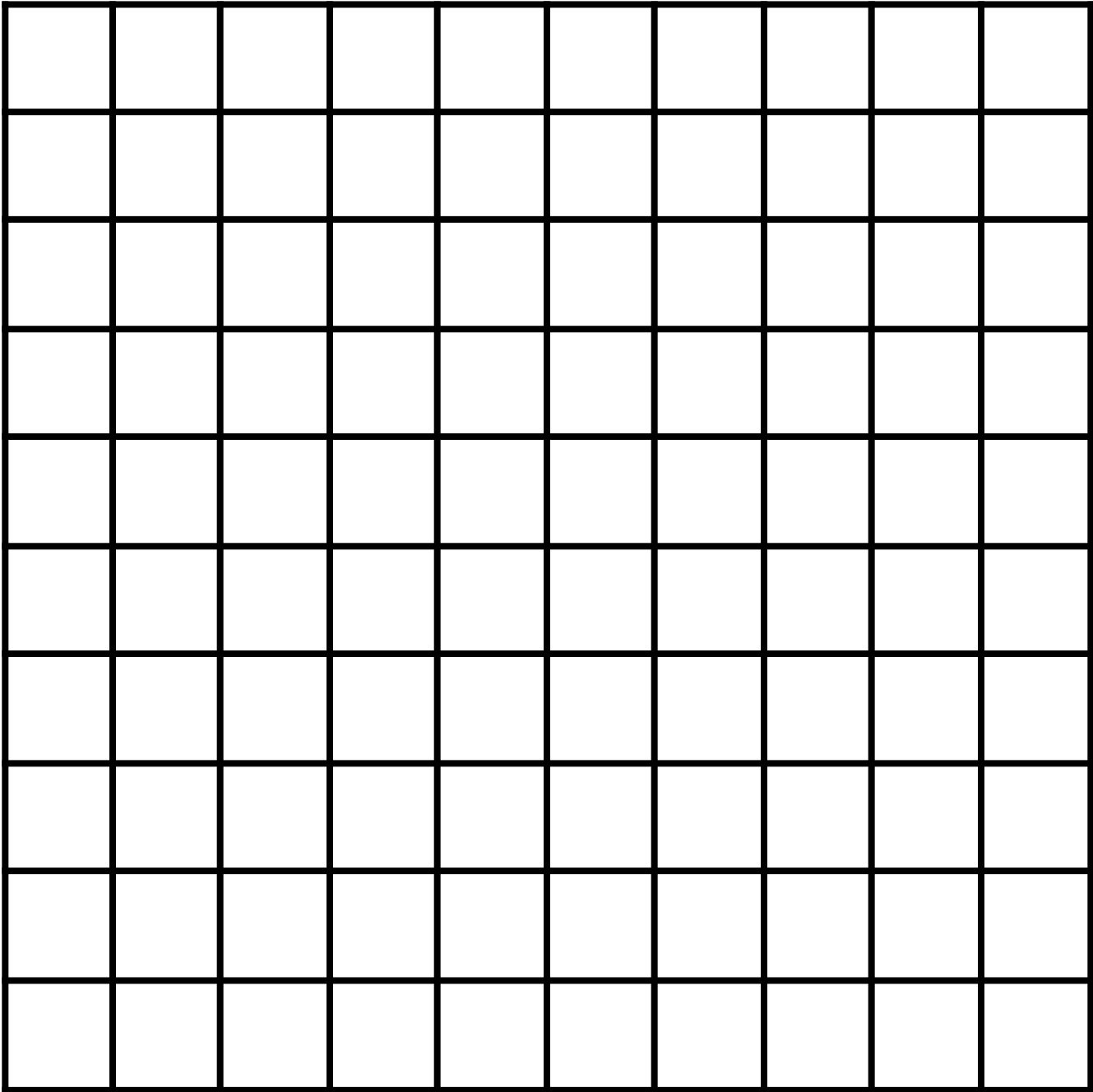
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1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Blank Hundred Chart - Use with subtask 3 as a template for making the patio. Increase the size if needed.

A Garden of Patterns  
BLM 3.2





**Student Assessment: Patio on the Hundreds Chart (Subtask #3)**

Garden of Patterns  
BLM 3.3

Task	Rate Myself 1 = Poor 5 = Excellent
On my patio I chose a special stone and used a multiple to place it on the patio. The stones in between have a pattern that I can describe.	1 2 3 4 5
On my patio I did my best to be creative. I did my neatest colouring.	1 2 3 4 5
I wrote a description in my "Garden Journal" using words, pictures and numbers to describe my patio.	1 2 3 4 5
I used math language to explain my patio.	1 2 3 4 5

To Be Used With  
Subtask #4  
The repeating  
pattern of a fence

A Garden Of Patterns  
BLM 4.1

**Student Assessment: Repeating Patterns For Fence and Garden (Subtask #4)**

A Garden of Patterns  
BLM 4.2

<b>Task</b>	<b>Rate Myself</b> <b>1 = Poor</b> <b>5 = Excellent</b>
I created a repeating flower pattern using 2 or more attributes. I put this in my garden.	1 2 3 4 5
I created a repeating pattern for my fence using 2 or more attributes.	1 2 3 4 5
In my "Garden Journal", I explained my repeat patterns in my garden using words, pictures and numbers.	1 2 3 4 5
I used math language in my "Garden Journal" when possible to explain my thinking.	1 2 3 4 5

# Growing Patterns

## Problem Solving Sheet # 1

(Perimeter and T-tables)

Names in Group:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

Farmer Jill has a huge garden, but it didn't start that way. The first year she planted a small garden, and the next year she doubled it. The year after that she tripled the size of her garden. If Farmer Jill continues to make her garden bigger at the same rate, how long will the perimeter of her garden be after 8 years? Use square tiles to help you figure this out.

\*\* Remember: the perimeter of a shape is the distance around a shape.

<u>Year</u>	<u>Perimeter (m)</u>			
<b>1</b>	<b>4</b>		Year One	
<b>2</b>	<b>6</b>		Year Two	
<b>3</b>	<b>8</b>			Year Three
<b>4</b>				
<b>5</b>				

After 8 years Farmer Jill's Garden will have a perimeter of \_\_\_\_\_ meters.

# Growing Patterns













## Problem Solving Sheet # 2

Names in Group:













1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

1. Discuss the patterns that you see, and draw what the next pattern would be. Decide if the pattern is a growing pattern or shrinking pattern. On the back of this page, discuss the pattern using math language.
2. Use pattern blocks to come up with one pattern that grows and one that shrinks. Trace it on paper. Trade with another group to see if they can finish your group's pattern.

**A.**

				<b>?</b>
<b>Circle:</b>				
Growing				
or				
<b>Shrinking</b>				
				
				

**B.**

				
<b>Circle:</b>				
Growing				
or				
<b>Shrinking</b>				
				<b>?</b>
				
				

# Growing Patterns

## Problem Solving Sheet # 3

A Garden of Patterns  
BLM 5.3

Names in Group:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

Farmer Bob wanted to find out how many days it would take his carrots to grow and be ready for pickup. He wants to pick them when they are 15 cm long. Use the **T-table** below to find out which day the carrots will be ready.

Day	Length (cm)
# 1	1 cm
#2	3 cm
#3	5 cm
?	?

(Remember to answer in a sentence!)

---

---

---

# Growing Patterns Problem Solving Sheet #4

Names in Group:

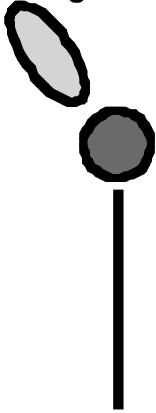
\_\_\_\_\_

\_\_\_\_\_

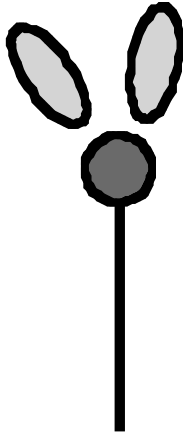
\_\_\_\_\_

\_\_\_\_\_

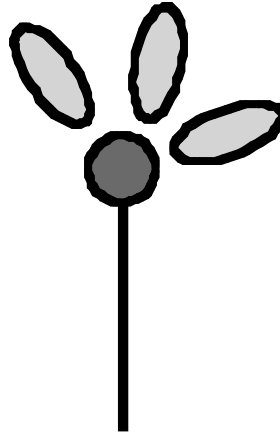
3 Days After Planting



6 Days After Planting



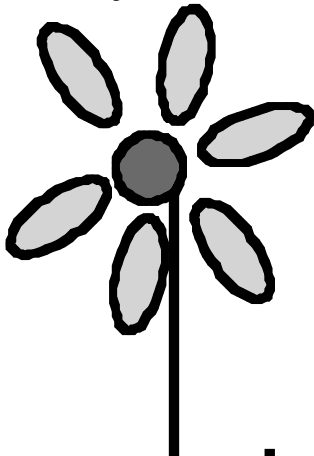
9 Days After Planting



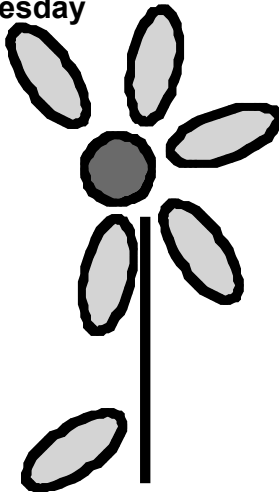
Day	# Petals
3	1
6	2
9	3
?	?

It is spring and the flowers are growing petals. This flower has a total of 6 petals when it is full grown. How many days until it has the full 6 petals? Use the T-table.

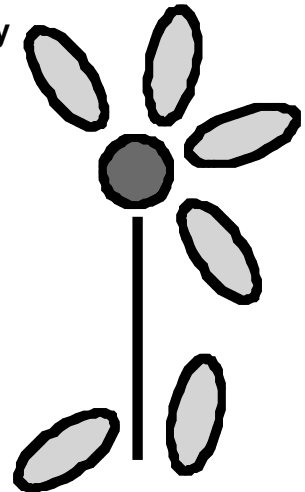
Monday



Wednesday



Friday

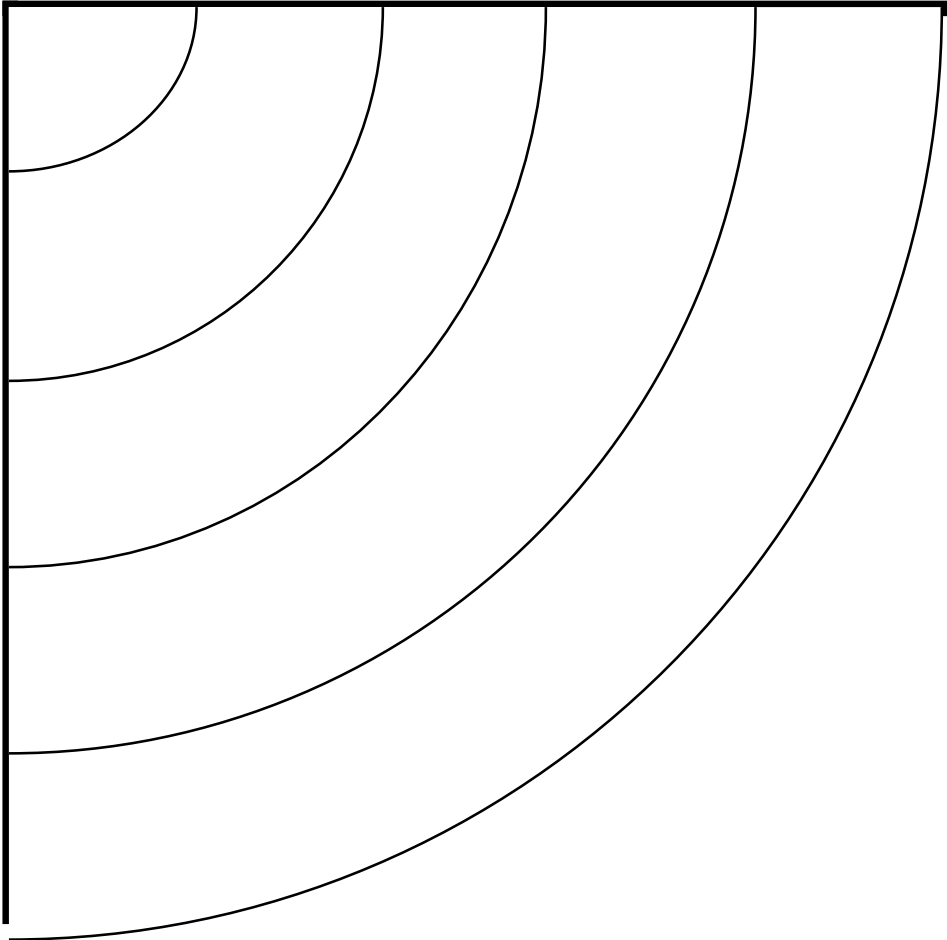


Day	# Petals
Monday	6
Wednesday	5
Friday	4
?	?

It is now fall and the leaves are falling off the flower one at a time. If the pattern continues, on what day will there be no petals left? Use the T-table.

Use with Subtask #5 to help  
with the growing pattern in the  
diorama

# Template for Growing Pattern



Note: Adjust the size of this template to fit the box that is being used. Use the increase/decrease option on photocopier.



# Student Assessment For Growing Pattern (Subtask # 5)

A Garden of Patterns  
BLM 5.6

Task	Rate Myself 1 = Poor 5 = Excellent
In my garden I made rows of flowers starting at the corner. Each row grows by a certain number of flowers.	1 2 3 4 5
In my garden I tried my best to be creative and neat when making my growing pattern garden.	1 2 3 4 5
In my "Garden Journal" I used words, pictures and numbers to describe my growing pattern in my garden.	1 2 3 4 5
In my garden I used math language to explain my pattern rule.	1 2 3 4 5

## **Problem Solving Strategies**

- 1. Act it out**
- 2. Guess and check**
- 3. Look for a pattern**
- 4. Draw a picture**
- 5. Choose the operation**
- 6. Make a table or graph**
- 7. Brainstorm**
- 8. Explore solutions with a calculator**

## Problem Solving Using Arrays

### Problem

You are having a party and need to get some donuts. The donuts are sold in packages of 6 and 12. Use this information to answer the following questions.

1a) Find out how many **small packages** of donuts you would need to feed 24 people. Show your work.

I would need \_\_\_\_\_ packages of 6 donuts.

1b) Find out how many **large packages** of donuts you would need to feed 24 people? Show your work.

I would need \_\_\_\_\_ packages of 12 donuts.

A **small package** of donuts cost **\$2.00**

A **large package** of donuts cost **\$3.00**

2a) How much would it cost to buy 24 donuts in **small packages**?

The cost of 24 donuts in small packages would be \_\_\_\_\_.

2b) How much would it cost to buy 24 buns in **large packages**?

The cost of 24 donuts in large packages is \_\_\_\_\_.

3. To save money, I would buy donuts in (circle one)  
**Small Packages**                      **Large Packages**

## Shopping For Vegetables

You are now responsible for doing some shopping for vegetables for your garden. You will be calculating the cost of your vegetable plot, using the vegetables sold in trays. Below is a table of vegetables and the trays they are sold in.

### Trays of 3

lettuce (L)  
peas (P)  
Bok Choy (BC)  
red peppers (RP)

### Trays of 6

squash (S)  
carrots (Ca)  
broccoli (B)  
egg plant (E)

Cost: \$2.00 per tray

Cost: \$3.00 per tray

### 1. The task

You have been given a garden plot in which to plant an array of vegetables. Your array must have 18 vegetables in it. How you come up with that array is up to you. Keep in mind the packaging of the vegetables. An example might be:

Ca	Ca	Ca
Ca	Ca	Ca
E	E	E
E	E	E
P	P	P
L	L	L

### 2. Planning your plot

Using the vegetable trays in BLM 6.5 and BLM 6.6, you will need to plan out your array of 18 vegetables. Use the symbols given above, to label each box in the array. You may use any combination you wish, as long as it adds up to 18 vegetables.



**3. Calculating the cost of your vegetable plot.**

Using the prices listed above, you will now be calculating how much your vegetable plot will cost. Use your array from question #2 to assist you.

Show your work

The total cost of my trays of 3 will be \_\_\_\_\_

Show your work

The total cost of my trays of 6 will be \_\_\_\_\_

**Student Assessment: Array For Vegetable Garden  
(Subtask #6)**

Garden of Patterns  
BLM 6.3

<b>Task</b>	<b>Rate Myself</b> <b>1 = Poor</b> <b>5 = Excellent</b>
I was able to plan out my array of 18 vegetables using the trays of 3 and 6.	1 2 3 4 5
When making the models of vegetables for my garden, I took my time and did my best work.	1 2 3 4 5
I successfully calculated the cost of my vegetable trays, and recorded it properly using decimal notation.	1 2 3 4 5
I wrote a description in my "Garden Journal" using words, pictures and numbers to describe my vegetable garden using math language.	1 2 3 4 5

Use with subtask #6 as packages of donuts sold in groups of 6 and 12. Cut out if easier to manipulate.

A Garden of Patterns  
BLM 6.4















Use with Subtask #6 individual array of 18 vegetables. Use as a planning sheet.

A Garden of Patterns  
BLM 6.5







Use with Subtask #6 individual array of 18 vegetables. Use as a planning sheet.





Calendar for Month of \_\_\_\_\_

Sunday      Monday      Tuesday      Wednesday      Thursday      Friday      Saturday


Legend:

## Calendar Checklist - Using Environmental Data

**Name:** \_\_\_\_\_

**Criteria**

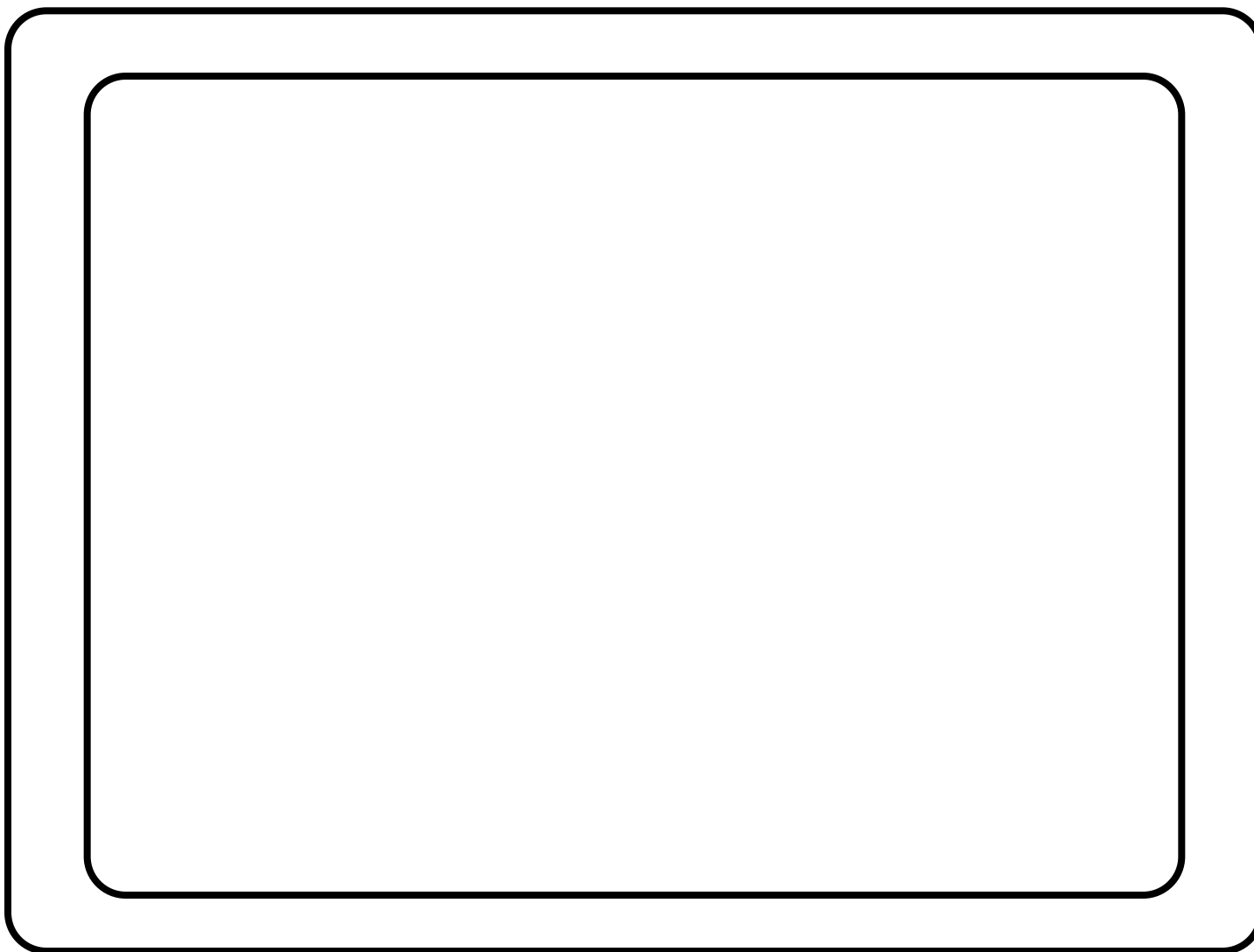
	<b>Self</b>		<b>Teacher</b>	
	Yes	No	Yes	No
1. Does the student have a correct repeating pattern of <b>jobs</b> for their garden?				
2. Does the student have a symbol for <b>their jobs</b> ?				
3. Does the student have a legend on the page, stating the symbol and its meaning in words? (Example: <b>W = Weeding Garden</b> )				
4. Does the student demonstrate an overall understanding of using environmental data to create models of patterns and to display these patterns on a chart?				



**Teacher Comments:**

Use to create a sign for the garden. Use with subtask 8.

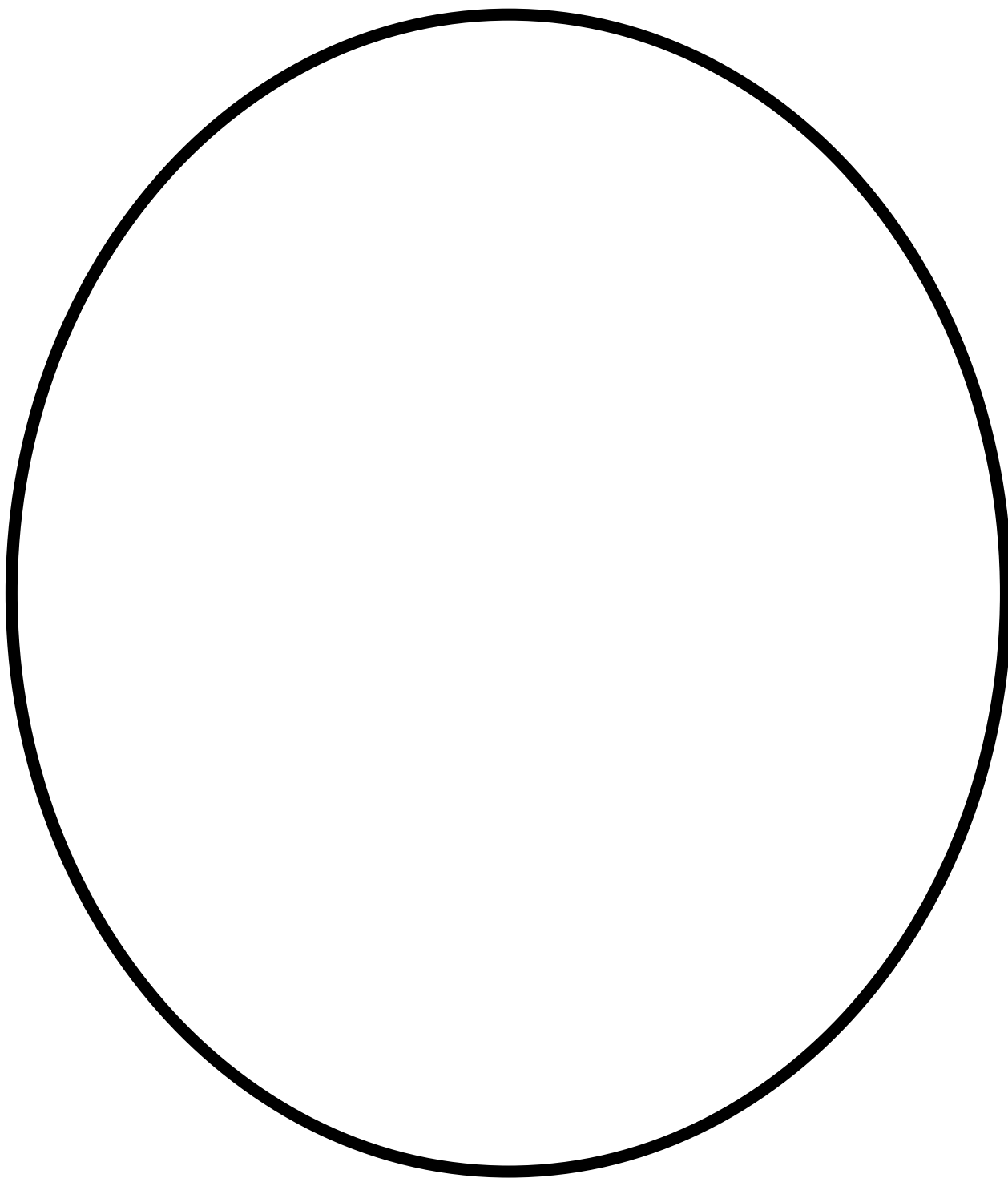
A Garden of Patterns  
BLM 8.2





Use as a template for flower  
centre in Subtask 9

A Garden of Patterns  
BLM 9.1



## BLM 8.1 A Garden Of Patterns

### for use with Subtask 8 : The Garden Creation - Culminating Task

from the Grade 3 Unit: A Garden of Patterns!

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

#### Expectations for this Subtask to Assess with this Rubric:

- 3e60** – speak on a variety of topics in classroom discussions using some specialized language (e.g., metres in measurement), and select words carefully to convey their intended meaning;
- 3e61** – use appropriate volume, tone of voice, gestures, and stance when speaking, making a presentation, or reading aloud;
- 3m78** • identify, extend, and create linear and non-linear geometric patterns, number and measurement patterns, and patterns in their environment;
- 3a32** – use art tools, materials, and techniques correctly to create different effects (e.g., paint with a sponge to create an open, airy feeling in a work; apply paint thickly with a brush to suggest heaviness).

Category/Criteria	Level 1	Level 2	Level 3	Level 4
<u>Communication of required knowledge</u> *discuss pattern rule in each pattern designed using math terminology	– unclear and imprecise – rarely using appropriate mathematical terminology	– with some clarity and some precision – sometimes using appropriate mathematical terminology and symbols	– clearly and precisely – usually using appropriate mathematical terminology and symbols	– clearly, precisely, and confidently – always using appropriate mathematical terminology and symbols
<u>Understanding of concepts</u> *growing patterns *repeating patterns *patterns in hundreds chart *arrays *environmental patterns	– by giving partially complete but inappropriate explanations – using only a few of the required concepts	– by giving appropriate but incomplete explanations – using more than half of the required concepts	– by giving both appropriate and complete explanations – using most of the required concepts	– by giving both appropriate and complete explanations, and by showing that he or she can apply the concepts in a variety of contexts – using all of the required concepts
<u>Application of mathematical procedures</u> *applies the knowledge of patterning to design a garden.	– that are considered to be basic in solving problems – with major errors and/or omissions	– that are considered to be appropriate in solving problems – with several minor errors and/or omissions	– that are considered to be the most appropriate in solving problems – with a few minor errors and/or omissions	– that are considered to be the most appropriate in solving problems, and justifies the choice – with practically no minor errors and/or omissions
<u>Aesthetic Qualities</u> *colour *design *neatness *materials *overall appearance	– uses only minimal colour – rarely incorporates a design	– some colour used – some design incorporated	– various colours are used – usually incorporates design	– various colours are used – innovative designs



## BLM 3.4 100 Chart Assessment

for use with **Subtask 3 : Hundreds Chart - Design a Patio**  
from the Grade 3 Unit: **A Garden of Patterns!**

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Expectations for this Subtask to Assess with this Rubric:

- 3m77** • recognize that patterning results from repetition;
  
- 3m78** • identify, extend, and create linear and non-linear geometric patterns, number and measurement patterns, and patterns in their environment;
  
- 3m81** – understand patterns in which operations are repeated (e.g., multiplication), transformations are repeated, or multiple changes are made to attributes;
  
- 3m84** – discuss the choice of a pattern rule;
  
- 3m86** – use addition and subtraction facts to generate simple patterns in a hundreds chart;

Category/Criteria	Level 1	Level 2	Level 3	Level 4
<b>Understanding of concepts is evident</b>  <b>(Does the patio contain a repeating pattern?)</b>	– using only a few of the required concepts  – there is a simple pattern, but the special stone pattern is missing. Several major errors.	– using more than half of the required concepts – the pattern is simple, and includes a special stone that has a separate pattern. There are several errors.	– using most of the required concepts  – the pattern is complete, and includes a special stone that has a separate pattern. There are few errors.	– using all of the required concepts  – the pattern is complex and complete with a special stone that has a separate pattern. There are no errors.
<b>Communication of required knowledge related to concepts, procedures, and problem solving</b>  <b>Refer to Garden Journal</b>	– unclearly and imprecisely – rarely using appropriate mathematical terminology	– with some clarity and some precision – sometimes using appropriate mathematical terminology and symbols	– clearly and precisely – usually using appropriate mathematical terminology and symbols	– clearly, precisely, and confidently – always using appropriate mathematical terminology and symbols
<b>Application of mathematical procedures</b>  <b>Look at the patio and Garden Journal for evidence of mathematical procedures.</b>	– with major errors and/or omissions	– with several minor errors and/or omissions	– with a few minor errors and/or omissions	– with practically no minor errors and/or omissions - can justify why pattern was chosen

**A Garden of Patterns!**

**A Unit For Grade Three An Integrated Unit for Grade 3**

		Selected	Assessed
<b>Mathematics---Patterning and Algebra</b>			
<input type="checkbox"/> 2m85	– recognize that patterning results from repeating an operation (e.g., addition), using a transformation (slide, flip, turn), or making some other change to an attribute (e.g., position, colour);		1
<input type="checkbox"/> 2m88	– combine two attributes in creating a pattern (e.g., size and position);		1
<input type="checkbox"/> 2m92	– relate growing and shrinking patterns to addition and subtraction;		1
<input type="checkbox"/> 2m93	– explain a pattern rule;		1
<b>English Language---Writing</b>			
<input type="checkbox"/> 3e1	• communicate ideas and information for specific purposes and to specific audiences (e.g., write a notice for a community newspaper advertising an upcoming school event);	1	1
<input type="checkbox"/> 3e2	• write materials that show a growing ability to express their points of view and to reflect on their own experiences (e.g., journal notes);	2	
<input type="checkbox"/> 3e27	– select and correctly use the format suited to their purpose for writing (e.g., letter, e-mail, chart);		1
<b>English Language---Reading</b>			
<input type="checkbox"/> 3e29	• read a variety of fiction and non-fiction materials (e.g., chapter books, children’s reference books) for different purposes;	1	
<input type="checkbox"/> 3e32	• express clear responses to written materials, relating the ideas in them to their own knowledge and experience and to ideas in other materials that they have read;	1	1
<b>English Language---Oral and Visual Communication</b>			
<input type="checkbox"/> 3e51	• listen to discussions and ask questions to clarify meaning;	2	1
<input type="checkbox"/> 3e53	• talk about characters and situations in stories, and information and ideas in non-fiction materials;	2	
<input type="checkbox"/> 3e54	• apply the rules for working with others;	6	1
<input type="checkbox"/> 3e57	• use the conventions (e.g., sentence structure) of oral language, and of the various media, that are appropriate to the grade (see below);		1
<input type="checkbox"/> 3e60	– speak on a variety of topics in classroom discussions using some specialized language (e.g., metres in measurement), and select words carefully to convey their intended meaning;	1	1
<input type="checkbox"/> 3e61	– use appropriate volume, tone of voice, gestures, and stance when speaking, making a presentation, or reading aloud;		1
<input type="checkbox"/> 3e63	– contribute ideas appropriate to the topic in group discussion and listen to the ideas of others;	1	
<b>Mathematics---Number Sense and Numeration</b>			
<input type="checkbox"/> 3m8	• solve problems and describe and explain the variety of strategies used;		1
<input type="checkbox"/> 3m9	• justify in oral or written expression the method chosen for addition and subtraction, estimation, mental computation, concrete materials, algorithms, calculators;		2
<input type="checkbox"/> 3m13	– count by 1’s, 2’s, 5’s, 10’s, and 100’s to 1000 using various starting points and by 25’s to 1000 using multiples of 25 as starting points;		1
<input type="checkbox"/> 3m22	– use a calculator to examine number relationships and the effect of repeated operations on numbers (e.g., explore the pattern created in the units column when 9 is repeatedly added to a number);	1	
<input type="checkbox"/> 3m23	– interpret multiplication and division sentences in a variety of ways (e.g., using base ten materials, arrays);	1	1
<input type="checkbox"/> 3m27	– demonstrate and recall multiplication facts to 7 x 7 and division facts to 49 ÷ 7 using concrete materials;	1	
<input type="checkbox"/> 3m30	– add and subtract money amounts and represent the answer in decimal notation (e.g., 5 dollars and 75 cents plus 10 cents is 5 dollars and 85 cents, which is \$5.85);		1
<input type="checkbox"/> 3m31	– pose and solve number problems involving more than one operation (e.g., if there are 24 students in our class and 5 boys and 9 girls wore boots, how many students did not wear boots?);		1
<input type="checkbox"/> 3m32	– use appropriate strategies (e.g., pencil and paper, calculator, estimation, concrete materials) to solve number problems involving whole numbers;		1
<b>Mathematics---Measurement</b>			
<input type="checkbox"/> 3m34	• demonstrate an understanding of and ability to apply measurement terms: centimetre, metre, kilometre; millilitre, litre; gram, kilogram; degree Celsius; week, month, year;	1	
<input type="checkbox"/> 3m51	– measure the perimeter of two-dimensional shapes using standard units (centimetre and metre), and compare the perimeters;		1
<b>Mathematics---Patterning and Algebra</b>			
<input type="checkbox"/> 3m77	• recognize that patterning results from repetition;	1	2
<input type="checkbox"/> 3m78	• identify, extend, and create linear and non-linear geometric patterns, number and measurement patterns, and patterns in their environment;	1	5
<input type="checkbox"/> 3m79	• create charts to display patterns;	1	

**A Garden of Patterns!**

**A Unit For Grade Three An Integrated Unit for Grade 3**

		Selected	Assessed
<input type="checkbox"/> 3m80	• identify relationships between and among patterns.	1	4
<input type="checkbox"/> 3m81	– understand patterns in which operations are repeated (e.g., multiplication), transformations are repeated, or multiple changes are made to attributes;	1	1
<input type="checkbox"/> 3m82	– identify patterns in which at least two attributes change (e.g., size, colour);	1	
<input type="checkbox"/> 3m83	– create a pattern in which two or more attributes change (e.g., size, colour, position);	3	1
<input type="checkbox"/> 3m84	– discuss the choice of a pattern rule;	3	3
<input type="checkbox"/> 3m85	– given a rule, extend a pattern and describe it in informal mathematical language (e.g., starting at 3, add 3 to each number to create a pattern);	1	1
<input type="checkbox"/> 3m86	– use addition and subtraction facts to generate simple patterns in a hundreds chart;		1
<input type="checkbox"/> 3m87	– use environmental data to create models of patterns (e.g., Monday – sunny, Tuesday – rainy) and display the patterns on a chart;	2	1
<input type="checkbox"/> 3m88	– identify relationships between addition, subtraction, multiplication, and division;	1	
<input type="checkbox"/> 3m89	– use a calculator and a computer application to explore patterns.	1	

**Science and Technology---Life Systems**

<input type="checkbox"/> 3s22	– describe various settings in which plant crops are grown (e.g., farms, orchards, home gardens);	1	
<input type="checkbox"/> 3s24	– compare the requirements of some plants and animals, and identify the requirements that are common to all living things (e.g., the need for water and minerals);	1	
<input type="checkbox"/> 3s25	– demonstrate awareness of ways of caring for plants properly (e.g., ensure that a plant has sufficient light and water);	1	

**The Arts---Visual Arts**

<input type="checkbox"/> 3a22	• produce two- and three-dimensional works of art that communicate ideas (thoughts, feelings, experiences) for specific purposes and to familiar audiences;		1
<input type="checkbox"/> 3a23	• identify the elements of design (colour, line, shape, form, space, texture), and use them in ways appropriate for this grade when producing and responding to works of art;	2	
<input type="checkbox"/> 3a32	– use art tools, materials, and techniques correctly to create different effects (e.g., paint with a sponge to create an open, airy feeling in a work; apply paint thickly with a brush to suggest heaviness).	1	2
<input type="checkbox"/> 3a34	– produce two- and three-dimensional works of art (i.e., works involving media and techniques used in drawing, painting, sculpting, printmaking) that communicate their thoughts and feelings about specific topics or themes (e.g., produce a mural in a group interpreting a Native legend through colour, shape, and line);	1	
<input type="checkbox"/> 3a35	– identify and explain the specific choices they made in planning, producing, and displaying their own art work (e.g., the choices of subject matter, colours, location for display);	1	1
<input type="checkbox"/> 3a36	– identify strengths and areas for improvement in their own and others' art work (e.g., the need to have better control in using paints).	1	

# Expectation Summary

Selected **Assessed**

## A Garden of Patterns!

### A Unit For Grade Three An Integrated Unit for Grade 3

#### English Language

3e1	1	1	3e2	2	3e3	3e4	3e5	3e6	3e7	3e8	3e9	3e10						
3e11			3e12		3e13	3e14	3e15	3e16	3e17	3e18	3e19	3e20						
3e21			3e22		3e23	3e24	3e25	3e26	3e27	1	3e28	3e29	1	3e30				
3e31			3e32	1	1	3e33	3e34	3e35	3e36	3e37	3e38	3e39		3e40				
3e41			3e42		3e43	3e44	3e45	3e46	3e47	3e48	3e49	3e50		3e51				
3e51	2	1	3e52		3e53	2	3e54	6	1	3e55	3e56	3e57	1	3e58	3e59	3e60	1	1
3e61		1	3e62		3e63	1	3e64	3e65	3e66									

#### Mathematics

3m1		3m2		3m3		3m4		3m5		3m6		3m7		3m8	1	3m9	2	3m10					
3m11		3m12		3m13	1	1	3m14	3m15	3m16	3m17	3m18	3m19	3m20										
3m21		3m22	1	3m23	1	1	3m24	3m25	3m26	3m27	1	3m28	3m29	3m30				1					
3m31	1	3m32	1	3m33		3m34	1	3m35	3m36	3m37		3m38	3m39	3m40									
3m41		3m42		3m43		3m44		3m45	3m46	3m47		3m48	3m49	3m50									
3m51	1	3m52		3m53		3m54		3m55	3m56	3m57		3m58	3m59	3m60									
3m61		3m62		3m63		3m64		3m65	3m66	3m67		3m68	3m69	3m70									
3m71		3m72		3m73		3m74		3m75	3m76	3m77	1	2	3m78	1	5	3m79	1	3m80	1	4			
3m81	1	1	3m82	1	3m83	3	1	3m84	3	3	3m85	1	1	3m86	1	3m87	2	1	3m88	1	3m89	1	3m90
3m91		3m92		3m93		3m94		3m95	3m96	3m97		3m98	3m99	3m100									
3m101		3m102		3m103		3m104		3m105	3m106														

#### Science and Technology

3s1		3s2		3s3		3s4		3s5		3s6		3s7		3s8		3s9		3s10
3s11		3s12		3s13		3s14		3s15		3s16		3s17		3s18		3s19		3s20
3s21		3s22	1	3s23		3s24	1	3s25	1	3s26		3s27		3s28		3s29		3s30
3s31		3s32		3s33		3s34		3s35		3s36		3s37		3s38		3s39		3s40
3s41		3s42		3s43		3s44		3s45		3s46		3s47		3s48		3s49		3s50
3s51		3s52		3s53		3s54		3s55		3s56		3s57		3s58		3s59		3s60
3s61		3s62		3s63		3s64		3s65		3s66		3s67		3s68		3s69		3s70
3s71		3s72		3s73		3s74		3s75		3s76		3s77		3s78		3s79		3s80
3s81		3s82		3s83		3s84		3s85		3s86		3s87		3s88		3s89		3s90
3s91		3s92		3s93		3s94		3s95		3s96		3s97		3s98		3s99		3s100
3s101		3s102		3s103		3s104		3s105		3s106		3s107		3s108		3s109		3s110
3s111		3s112		3s113		3s114												

#### Social Studies

3z1		3z2		3z3		3z4		3z5		3z6		3z7		3z8		3z9		3z10
3z11		3z12		3z13		3z14		3z15		3z16		3z17		3z18		3z19		3z20
3z21		3z22		3z23		3z24		3z25		3z26		3z27		3z28		3z29		3z30
3z31		3z32		3z33		3z34		3z35		3z36		3z37		3z38		3z39		3z40
3z41		3z42		3z43		3z44		3z45		3z46		3z47		3z48		3z49		3z50
3z51																		

#### Health & Physical Education

3p1		3p2		3p3		3p4		3p5		3p6		3p7		3p8		3p9		3p10
3p11		3p12		3p13		3p14		3p15		3p16		3p17		3p18		3p19		3p20
3p21		3p22		3p23		3p24		3p25		3p26		3p27		3p28		3p29		3p30
3p31		3p32		3p33		3p34		3p35		3p36		3p37		3p38		3p39		

#### The Arts

3a1		3a2		3a3		3a4		3a5		3a6		3a7		3a8		3a9		3a10
3a11		3a12		3a13		3a14		3a15		3a16		3a17		3a18		3a19		3a20
3a21		3a22	1	3a23	2	3a24		3a25		3a26		3a27		3a28		3a29		3a30
3a31		3a32	1	2	3a33	3a34	1	3a35	1	1	3a36	1	3a37		3a38		3a39	3a40
3a41		3a42		3a43		3a44		3a45		3a46		3a47		3a48		3a49		3a50
3a51		3a52		3a53		3a54		3a55		3a56		3a57		3a58		3a59		3a60
3a61		3a62																

**A Garden of Patterns!****A Unit For Grade Three An Integrated Unit for Grade 3**

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**Analysis Of Unit Components**

- 9 Subtasks
- 91 Expectations
- 87 Resources
- 94 Strategies & Groupings
- Unique Expectations --
- 12 Language Expectations
- 28 Mathematics Expectations
- 3 Science And Tech Expectations
- 6 Arts Expectations

**Resource Types**

- 2 Rubrics
  - 31 Blackline Masters
  - 2 Licensed Software
  - 25 Print Resources
  - 1 Media Resources
  - 2 Websites
  - 13 Material Resources
  - 6 Equipment / Manipulatives
  - 0 Sample Graphics
  - 0 Other Resources
  - 2 Parent / Community
  - 3 Companion Bookmarks
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**Groupings**

- 9 Students Working As A Whole Class
- 2 Students Working In Pairs (copied)
- 6 Students Working In Small Groups
- 9 Students Working Individually

**Assessment Recording Devices**

- 7 Anecdotal Record
- 3 Checklist
- 3 Rating Scale
- 2 Rubric

**Teaching / Learning Strategies**

- 1 Brainstorming
- 3 Collaborative/co-operative Learning
- 1 Direct Teaching (copied)
- 4 Discussion
- 2 Learning Log/ Journal
- 2 Mini-lesson
- 3 Model Making
- 3 Oral Explanation (copied)
- 1 Peer Practice
- 1 Problem Posing (copied)
- 3 Problem-solving Strategies
- 1 Read Aloud (copied)
- 1 Reading Response (copied)
- 1 Rehearsal / Repetition / Practice
- 1 Sketching To Learn (copied)
- 3 Working With Manipulatives

**Assessment Strategies**

- 1 Classroom Presentation
- 1 Exhibition/demonstration
- 6 Learning Log
- 4 Observation
- 5 Performance Task
- 1 Quizzes, Tests, Examinations
- 4 Self Assessment