PATTERNS AND RELATIONS
GRADE 1
MANITOBA EDITION

hands-on
mathematics

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Patterns and Relations
Grade 1
Revised, Manitoba edition

Contents

Introduction

Background Information for Teachers

Pattern is the underlying theme of mathematics. Students need to recognize patterns and use them as tools for problem solving. This skill is extremely important for the development of a student's mathematical understanding.

Patterning should focus on:

- Repeating patterns: e.g., stringing beads by repeating colours (*red, blue, green, red, blue, green, red, blue, green*)
- Growth patterns: e.g., determining the number of wheels on one bicycle (two wheels), two bicycles (four wheels), three bicycles (six wheels).

Patterning activities involve early stages of *algebraic reasoning*, as students investigate both spatial and numerical patterns. Looking at growth patterns is an important first step in developing skills in algebraic reasoning.

The activities in this module give students many hands-on opportunities to experience pattern using visual, auditory, and physical attributes. Each activity is described using manipulatives that are readily available in the classroom or that can be easily obtained. Students will learn to identify, name, reproduce, extend, create, and compare many different patterns while describing them through actions, manipulatives, diagrams, and in spoken terms.

The module ends with an exploration of concepts related to equality and inequality, addressing the "Variables and Equations" component of the Patterns and Relations strand of the WNCP document *The Common Curriculum Framework for K–9 Mathematics* (*May, 2006*).

Mathematics Vocabulary

Throughout this module, teachers should use, and encourage students to use, vocabulary such as: *pattern train, size, shape, circle, triangle, square, rectangle, colour, pattern, attribute, continue, extend, repeat, increase*, *decrease, equal, unequal,* and *equal symbol* (=).

Consider creating a Math Word Wall for new vocabulary that is introduced in ***Hands-On Mathematics***. Put the letters of the alphabet along the top of an otherwise empty bulletin board. As new terms arise in each lesson, write those words on index cards, and attach them to the bulletin board under the appropriate letters.

1 | What Is a Pattern?

Background Information for Teachers

When developing the concept of *patterning*, it is more meaningful for students if they become aware of patterns and discover them on their own. This activity uses the students themselves as elements of a pattern. As a result, students are able to observe and be part of a pattern. This enables them to discover, and describe for themselves, what makes a pattern.

Note: A pattern core should repeat at least three times, in order to give students sufficient information to continue it. For example, a pattern on a string of beads would be presented as: red, green, red, green, red, green, _____, _____, _____

Materials

- students
- chart paper
- markers

Activity

Make a pattern using students in the class (e.g., *boy, girl, boy, girl, boy, girl*). Ask:

- Who can I put next?
- How do you know?

Continue adding more students with the other students' help.

Now, make a different pattern, using different students (e.g., *facing forward, facing forward, facing backward, facing forward, facing forward, facing backward*). Ask:

- Can anyone tell me what you call this?

Tell students that you are making a *pattern*. Explain that a pattern occurs when something is repeated over and over again. Ask:

- Can you make a different pattern, placing the students in a different way?

Continue this activity making several more patterns with students. Record each pattern on chart paper, using pictures and words. Include patterns such as:

- *sit, stand*
- *hands up, hands down*
- *one leg up, both legs down*

Have students use Activity Sheet A (1.1.1) to record one pattern made with the students in the class.

Activity Sheet A

Directions to students:

Draw one pattern that we made using students in the class. Describe your pattern (1.1.1).

Problem Solving

The students in Room 6 are standing in line in a *boy, girl, boy, girl* pattern. If the first person in line is a boy, is the tenth person a girl or a boy? What about the fifteenth person? The twentieth person? How do you know?

Note: A reproducible master for this problem can be found on page 115.

Extensions

- Add the term *pattern* to the Math Word Wall.

- Take the class to the gym or outside to make other patterns using actions and objects. Examples include:

  - *throw a ball into the air, bounce, bounce, throw a ball into the air, bounce, bounce*, and so on
  - *jump, hop, jump, hop, jump, hop*, and so on
  - *hop on right leg, hop on left leg, hop on both legs, hop on right leg, hop on left leg, hop on both legs*, and so on

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Assessment Suggestion

Assess students' understanding of a pattern by interviewing them. Have students:

- describe the pattern orally
- extend the pattern
- translate the pattern into actions

Use the Individual Student Observations sheet, found on page 15, to record your observations.
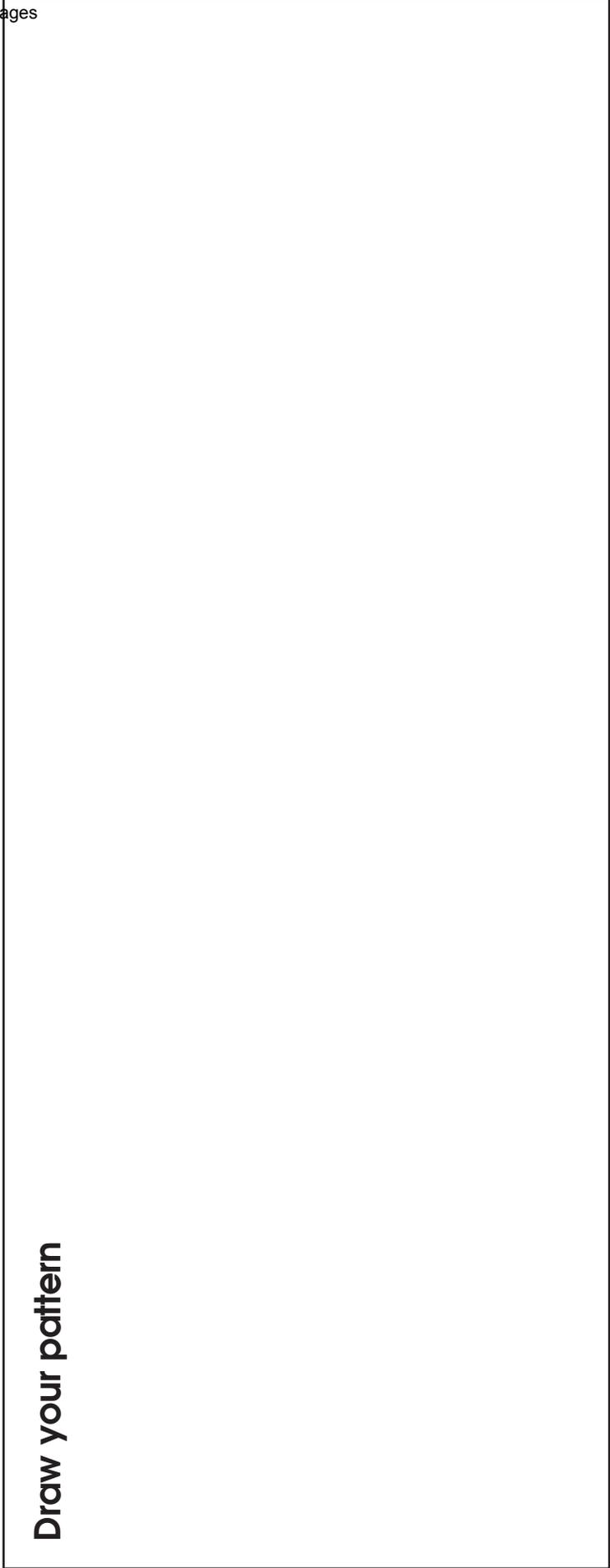
Date: _____

Name: _____

Patterns Using Students

Draw your pattern

Describe your pattern

_____

_____

_____

_____

1A

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