Geometry and Spatial Sense
Grade 1
Ontario Edition

hands-on mathematics

Project Editor
Jennifer E. Lawson

Senior Author
Dianne Soltess

Mathematics Consultant
Meagan Mutchmor

Unit Writers
Patricia Ashton
Joni Bowman
Gail Ruta Fontaine
Betty Johns
Cathy Haggart
Kara Kolson
Suzanne Mole

Portage & Main Press
Winnipeg • Manitoba • Canada

From *Hands-On Mathematics: Grade 1*, © 2006

Portage & Main Press acknowledges the financial support of the Government of Canada through the Book Publishing Industry Development Program (BPIDP) for our publishing activities.

Series Editor:	Leslie Malkin
Book and Cover Design:	Relish Design Ltd.
Illustrations:	Jess Dixon
Senior Consultants:	Meagan Mutchmor Dianne Soltess
Program Reviewer:	Pat Steuart

Geometry and Spatial Sense
Grade 1
Ontario edition

Printed and bound in Canada by Prolific Group

ISBN 978-1-55379-112-6

PORTAGE & MAIN PRESS
100-318 McDermot Avenue
Winnipeg, Manitoba, Canada R3A 0A2

Email: books@portageandmainpress.com
Tel: 204-987-3500
Toll Free: 1-800-667-9673
Fax: 1-866-734-8477

Contents

Introduction to *Hands-On Mathematics* **1**

Program Introduction **1**
Program Principles **1**
The Big Ideas of Mathematics **1**
Ontario Curriculum for Mathematics (2005) Learning Expectations **6**
Program Implementation **8**
Classroom Environment **9**
Timelines **9**
Classroom Management **9**
Planning Guidelines **10**

Assessment **13**

The *Hands-On Mathematics* Assessment Plan **13**

Websites **29**

Geometry and Spatial Sense **31**

Books for Children **32**
Introduction **33**
1 Two-Dimensional Shapes **34**
2 Three-Dimensional Objects (Geometric Solids) **44**
3 Building Three-Dimensional Objects **49**
4 Describing the Relative Position of Two-Dimensional Shapes and Three-Dimensional Objects **53**
5 Matching Size and Shape of Figures **59**
6 Reflection and Symmetry **77**
7 Concrete Maps **93**
Problem Solving Black Line Master: Geometry and Spatial Sense **95**
References for Teachers **97**

Introduction

Just like measurement skills, geometry skills apply directly to students' everyday lives. After completing the tangible and logical activities found in this module, students will begin to see geometry's application in the real world.

In this module, students will:

- explore and classify two-dimensional shapes and three-dimensional objects according to their properties.
- describe, orally, the relative position of two-dimensional shapes and three-dimensional objects.

Mathematics Vocabulary

Throughout this module, teachers should use, and encourage students to use, vocabulary such as: *circle, triangle, square, rectangle, sphere, cube, rectangular prism, pyramid, cylinder, triangular prism, face, vertex, vertices, edge, in front, behind, beside, under, over, right, left, on, above, below, bottom, top, tan, tangram*, and *reflection.* Continue adding new vocabulary, as it is introduced, to your Math Word Wall.

1 Two-Dimensional Shapes

Materials

- "The Shape Song" (lyrics included, 4.1.1)
- Terry Triangle, Sammy Square, Robby Rectangle, and Cindy Circle character templates (included. Cut out, colour, and laminate.) (4.1.2)
- construction paper
- pencil crayons, markers, or crayons
- stapler
- glue
- paper
- scissors
- shape templates (included, 4.1.3).

Activity: Part One

Begin the activity by introducing four new friends who have come to spend the day in the Grade- One class: Terry Triangle, Sammy Square, Robby Rectangle, and Cindy Circle. Hold up each character, one at a time, saying his/her name. Ask students:

- What can you tell me about _____ (name of character)?

Discuss the name of the shape each character represents, as well as the characteristics of each shape. Some sample questions include:

- How many sides does Terry Triangle have?
- How many corners (vertices) does Terry Triangle have?
- How many sides does Sammy Square have?
- What can you tell me about the length of these sides?
- Are Robby Rectangle's sides all the same length?
- How many corners (vertices) does Robby Rectangle have?
- How is Sammy Square different from Robby Rectangle?
- Does Cindy Circle have any straight sides?
- Does Cindy Circle have any corners (vertices)?
- How is Cindy Circle different from all the other shapes?

Introduce "The Shape Song" (4.1.1) to students, showing them the actions. Encourage them to try the actions along with you. Now, sing each line, and have students repeat it after you.

Once students have sung "The Shape Song" a number of times, tell them they are now going to make their own Shape Song books. Distribute Activity Sheet A (4.1.4).

Note: You may wish to make a sample Shape Song book ahead of time to show students.

Explain to students that there are several steps involved in making their books:

1. Fill in the blank under each picture.
2. Colour the shape characters.
3. Cut out the four pages, and put them in order (the numbers are in the top, right corner of each page).
4. Select a piece of construction paper for the cover.
5. Print the title of the book, "The Shape Song," on the cover, and then decorate the cover.
6. Staple the pages together (students may need help with this).

Encourage students to take their completed books home to share with their families.

Activity Sheet A

Note: This is a two-page activity sheet.

Directions to students:

Fill in the blank under each picture. Colour each shape character. Cut out the four pages and put them in order. Choose a piece of construction

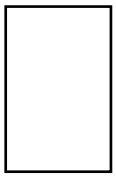
▶

paper for the cover, and print the title of the song on it. Decorate the cover, and staple the pages of your book together (4.1.4).

Activity: Part Two

Using their completed "Shape Song" books, have students identify and describe their shapes. Encourage the use of the following terms: *side, line, corner/vertex, base*.

Note: The base of a shape is its foundation, or the lowest side or face. For example, on the rectangle below, the base is the bottom line:



base

Problem Solving

Have students work in pairs. Provide each pair with a circle, a triangle, a square, and a rectangle paper cutout (shape templates included, 4.1.3). Ask one partner to close his/her eyes while the other selects and covers one of the shapes with his/her hands. When the former opens his/her eyes, have the latter slowly reveal one part of the shape to his/her partner, who must try to guess the shape based on the part he/she sees.

Extensions

- Add the terms *circle, triangle, square*, and *rectangle* to the Math Word Wall.
- Select a shape (e.g., circle). Have students look around the room to see if they can spot a circle in the classroom. Challenge them to touch five circles in the classroom. Repeat the activity with a different shape.
- Give each student a circle, a triangle, a square, and a rectangle paper cutout. Have students place their shapes on the floor in front of them. Say:
  - Give me a _____ ! (name shape, e.g., triangle).

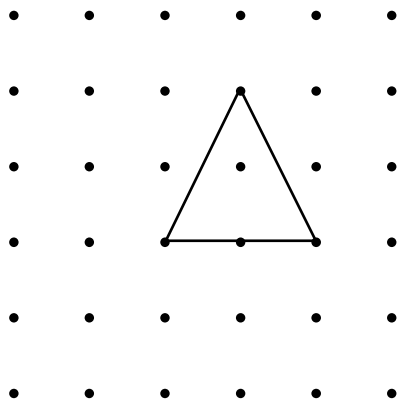
  Have students find the shape, hold it up in the air, and repeat its name. Once they are comfortable with the chant, select a student to choose a shape and call it out.
- Give each student a circle, a triangle, a square, and a rectangle paper cutout. Then, using the shapes, sing "The Shape Shake Song," to the tune of "The Hokey Pokey." For example:

  You put your circle in, you put your circle out,
  You put your circle in, and you shake it all about.
  You do the Hokey Pokey and you turn yourself around.
  That's what it's all about.

  When students hear the shape name, have them pick up their corresponding paper ones, and use them for the actions of the song.
- Have students create shape pictures using a variety of precut, paper shapes.
- Give each student a piece of sidewalk chalk and have them draw different shapes on the schoolyard pavement.
- Go on a shape walk. Have students look for different shapes in your area.

1

- Have students create different shapes using geoboard and elastics, or geoboard dot paper (included, 4.1.5). Students join the dots to create shapes, as in the following example:



Assessment Suggestion

Using the shape templates, have students identify the four two-dimensional shapes and describe them using terms such as *side, line, corner (vertex), base*. Use the Individual Student Observations sheet, found on page 18, to record your results.

The Shape Song

(Sing to the tune of "Twinkle, Twinkle, Little Star")

Terry Triangle, look at me,

Count my sides, there are three

(draw a triangle, with your hands, in the air).

Sammy Square, that's my name,

I have four sides all the same

(draw a square, with your hands, in the air).

Robby Rectangle, I have four,

Two long, *(draw in the air)*

Two short, *(draw in the air)*

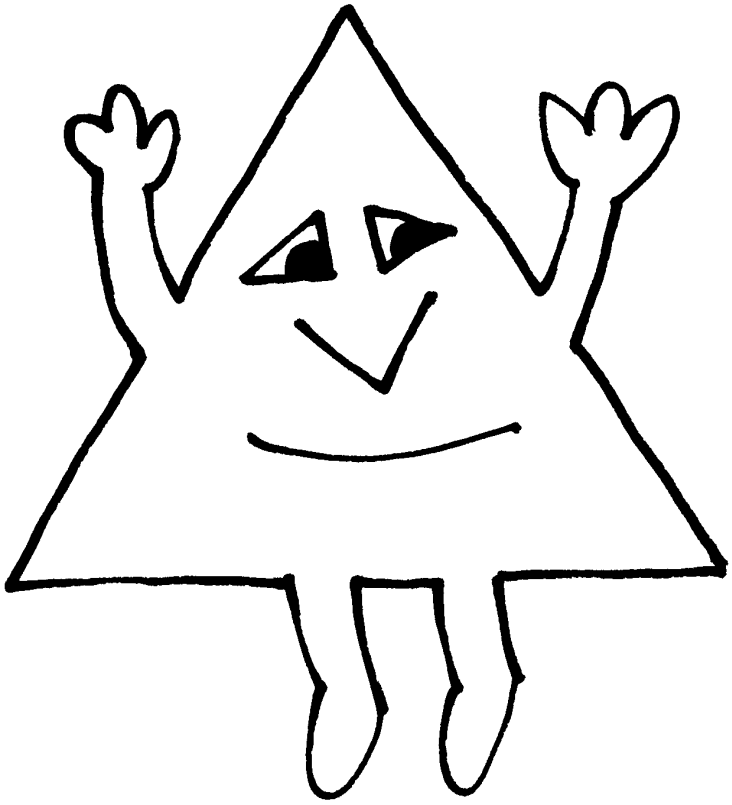
But no more *(shake head).*

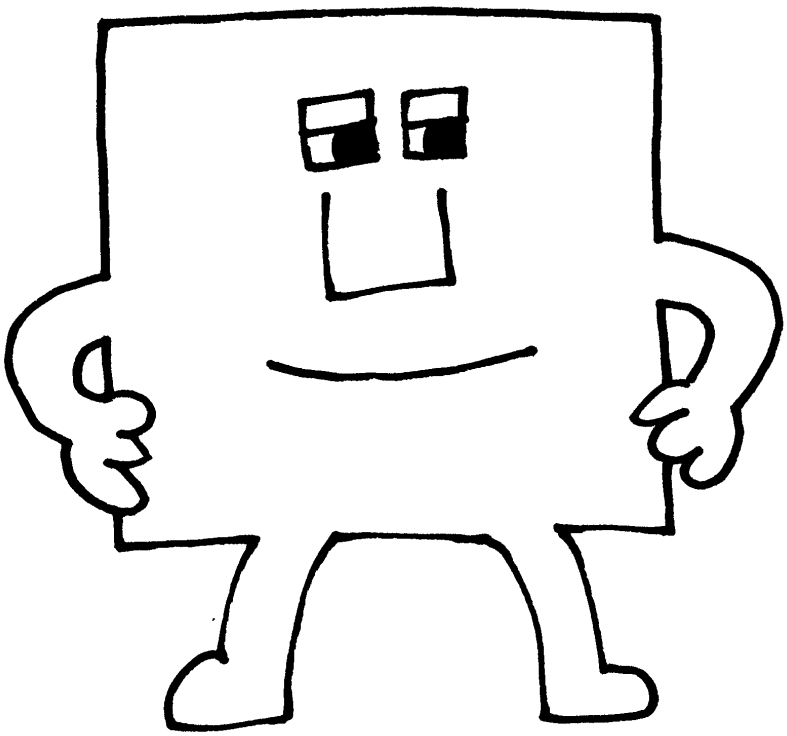
Cindy Circle, just one line,

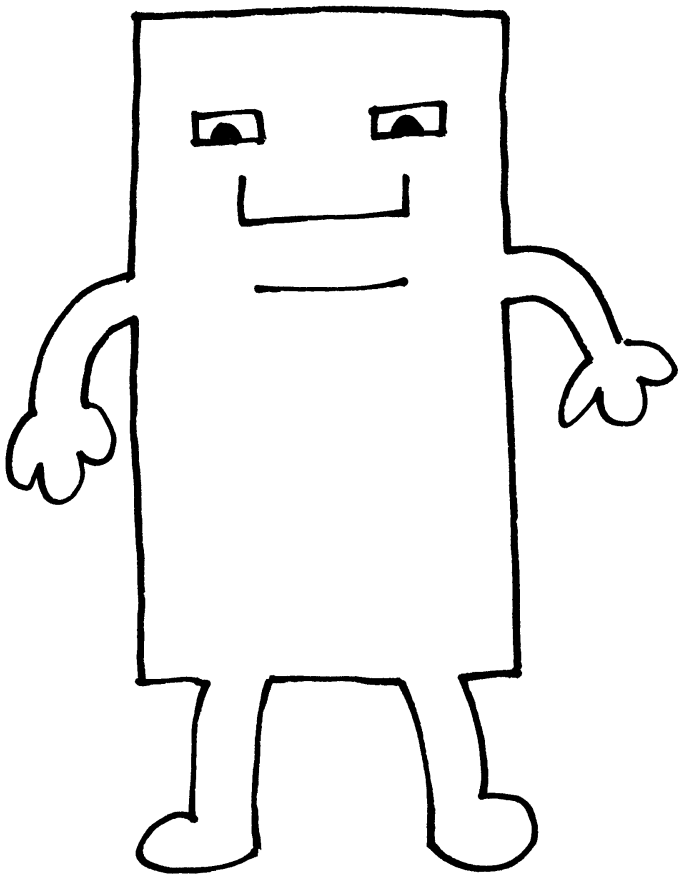
Make it round,

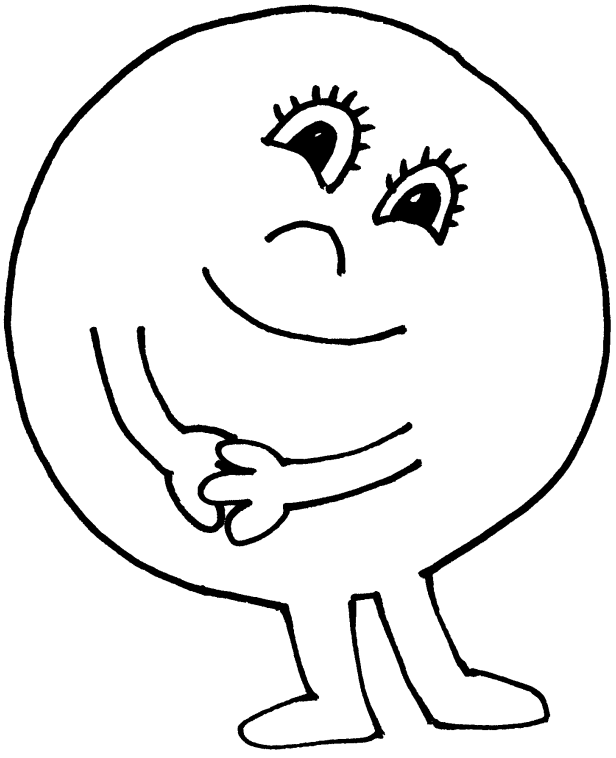
That is fine *(draw a circle in the air).*

Character Templates

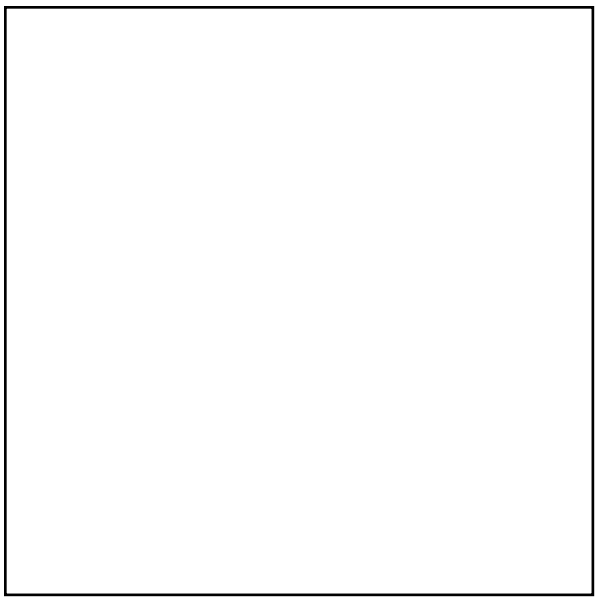


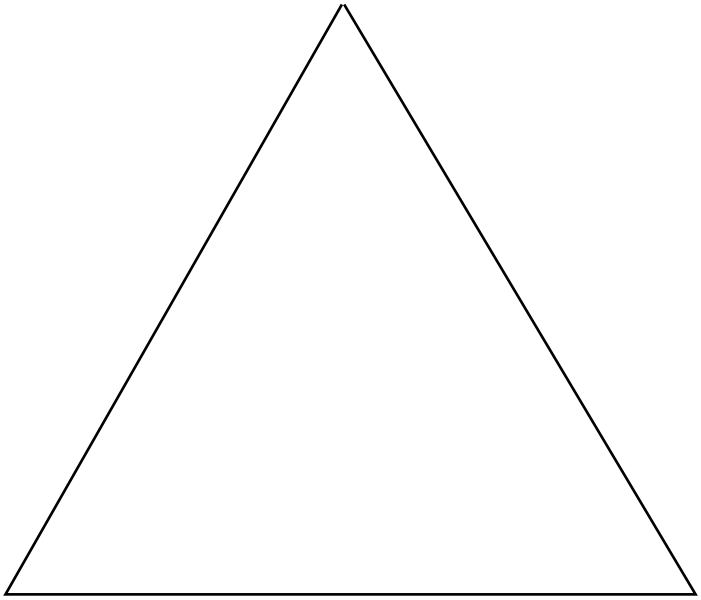


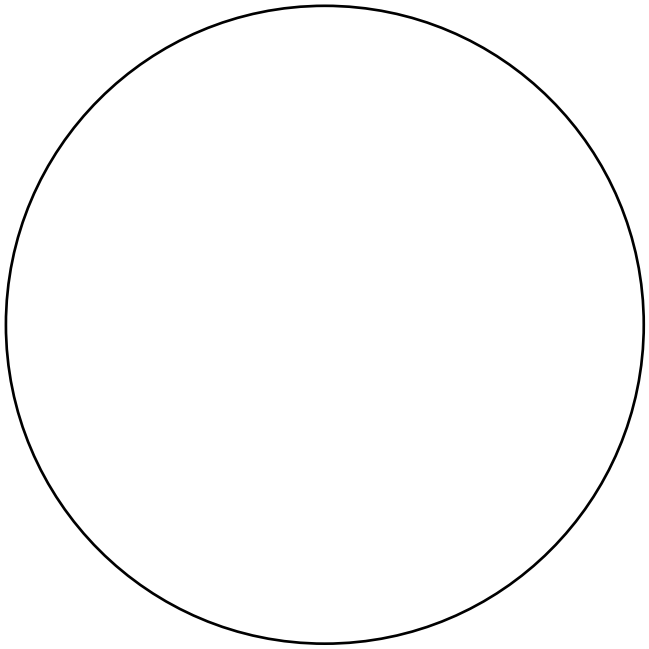


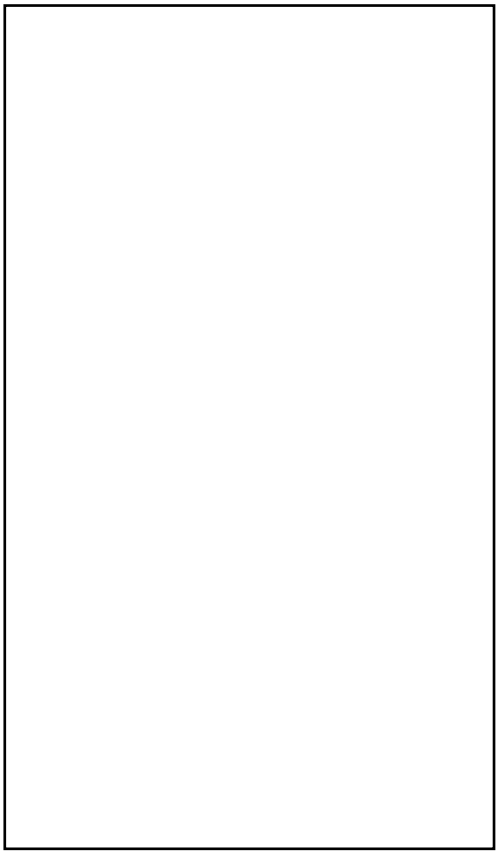


Shape Templates



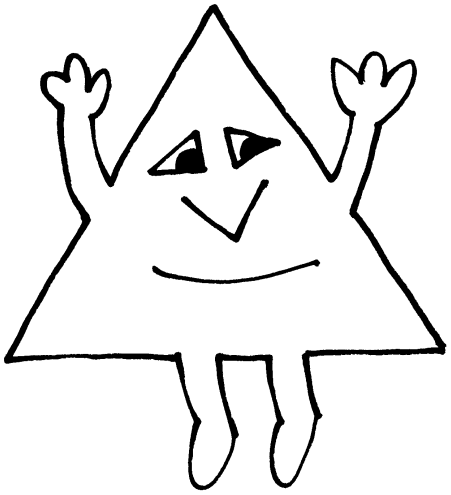






Shape Book

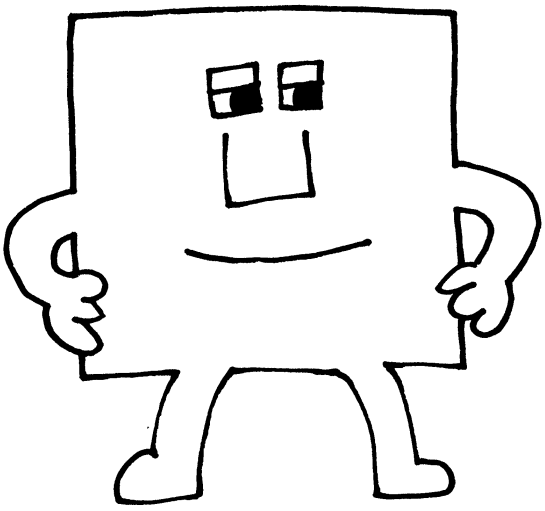
1



Terry Triangle, look at me,

Count my sides, there are _____ .

2

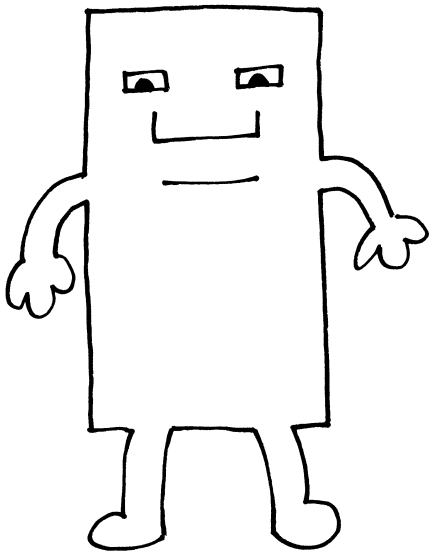


Sammy Square, that's my name,

I have _____ sides all the same.

Shape Book

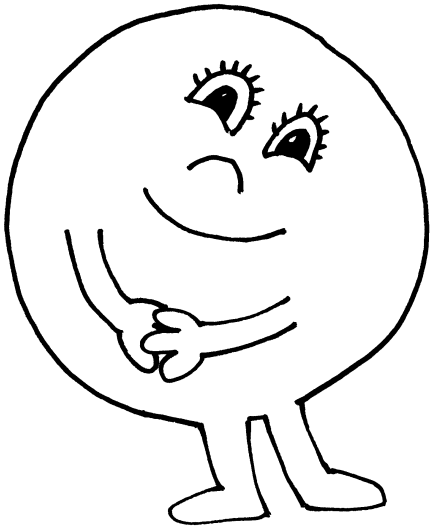
3



Robby Rectangle, I have _____ ,

_____ long, _____ short, but no more.

4



Cindy Circle, just _____ line,

make it round, that is fine.

Geoboard Dot Paper