Chapter 5: SYMMETRY

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The chapter Symmetry involves hypothesizing and observing different objects and their symmetry. The chapter contains three lessons: Investigation of Line of Symmetry, Investigation of Rotation Symmetry and a lesson titled Seeing is Believing. The last lesson incorporates the concepts and GSP commands used throughout the chapter to assess students on the lessons previously explored; it also contains new concepts to further explore symmetry. All of the lessons incorporate the everyday modern alphabet for students to discover lines and rotation of symmetry with each letter. Students see letters all of the time, and discovering their symmetry will relate concrete materials in the everyday community to mathematical concepts.

GSP will be used to discover the symmetry of each letter. Students will hypothesize and conclude the symmetry that exists by placing the letters in the appropriate file in GSP. It is recommended that the instructor, initiate and guide students through the first lesson of this chapter, and assist in the remaining lessons. Students assessment of this chapter will take place with respects to written observations and conclusions as well as contributions to class discussions regarding their findings in symmetry using GSP.

LESSON ONE - Investigation of Line of Symmetry

ONTARIO CURRICULUM Covered:

- Grade 7: 7m47, 7m50, 7m51, 7m61, 7m62, 7m65
- Grade 8: 8m55, 8m68

The lesson Investigation of Line of Symmetry is a great introduction to this chapter on symmetry. It begins at the basics of the mathematical concept of symmetry, and each lesson then expands on this knowledge. This lesson would be best delivered initially by the instructor in order to demonstrate how to use GSP to find the Line of Symmetry in the objects created. Students may continue the lesson independently or in small groups.

This lesson probes the students to look beyond the number spectrum of mathematics to see that math is everywhere- it is all around them. It does so by asking the students relate symmetry to the everyday alphabet. Students will use GSP to produce a visual representation of each letter prior to examining the lines of symmetry present. Students will then identify the letters that have lines of symmetry and those which do not.

LESSON TWO - Investigation of Rotation Symmetry

ONTARIO CURRICULUM Covered:

- Grade 7: 7m47, 7m50, 7m51, 7m61, 7m62, 7m65
- Grade 8: 8m55, 8m68

Similar to the previous lesson in this chapter, Investigation of Rotation Symmetry will also examine the symmetry of the everyday alphabet. The complexity of this lesson increases as the students begin to work independently, as they apply their knowledge to make discoveries on their own.

It is beneficial for the instructor to educate students on Rotation Symmetry prior to this lesson to ensure student understanding of the functions and their purposes in GSP. GSP will give students a visual representation of each letter in the alphabet to aid in the investigation. The function that will be introduced and implemented in this lesson is rotate option.

LESSON THREE - Seeing is Believing

ONTARIO CURRICULUM Covered:

- Grade 7: 7m47, 7m50, 7m51, 7m61, 7m62, 7m65
- Grade 8: 8m55, 8m68

The lesson Seeing is Believing is the most involved of the lessons in this chapter. It requires the students to use previous knowledge of symmetry to solve problems using GSP. It integrates many functions in GSP explored in previous chapters and introduces new ones. Some of the commands that have been previously used include transform, reflect and mirror. The command introduced in this lesson is dashed.