Chapter 7: VOLUME

The chapter Volume concludes the lessons on the use of the Geometer's Sketchpad program. It involves prior knowledge from the chapter Area. Knowledge of both the area of specified geometric figures as well as knowledge of volume itself is necessary within the three lessons. Volume of a Cube, Volume of Prisms (Investigation using Rectangular Prism) and Volume of Pyramids will be explored within the chapter using given geometric shapes. Students will be asked to make conclusions to explain their observations within each lesson.

The GSP functions that will be explored include: measure, width, height, length and point size. Instructors are urged to guide the first lesson and proceed to offer assistance in the latter lessons. Assessment of this chapter is sufficiently met in the concluding lesson- Volume of Pyramids as it is an intricate lesson summarizing the conclusions made within the other lessons of the chapter.

LESSON ONE - Volume of a Cube

ONTARIO CURRICULUM Covered:

- Grade 7: Used as an intro Volume of Prisms
- Grade 8: Used as an intro Volume of Pyramids

To begin the chapter on volume, Volume of a Cube will introduce the concept of volume while incorporating the GSP software application. Students will be given a file that contains a specified geometric shape; they will examine the shape and determine the volume of it using GSP. While examining the volume of a cube, students will generate a definition and other conclusions based on their observations.

It is recommended that this lesson be teacher-directed because of its complexity. Volume of a cube uses the concepts of both volume and area, and requires students to problem solve, and perform several calculations using GSP. Some of the commands used in GSP include: width, length, height, animate and animation line.

To assess this lesson, instructors will examine the answers given to each of the specified questions specific to this lesson. Students will actively problem-solve on their own or with partners to derive formulas and answers within the GSP program.

LESSON TWO - Volume of Prisms

ONTARIO CURRICULUM Covered:

- Grade 7: 7m31, 7m43, 7m44, 7m45, 7m46
- Grade 8: Used as an intro to Volume of Pyramids

In this lesson, students will be required to examine two separate prisms in a specified file created in GSP. Students will derive the formula for volume of any prism by investigating these prisms while using Geometer's Sketchpad's animation feature as well as their prior knowledge of determining the area of various geometric figures. This lesson is more involved than the last, and it is advised that teachers aid students when necessary, or perhaps promote small group work in order for students to

make accurate conclusions. Students will be asked to hypothesize and make conclusions throughout the lesson, and therefore will be assessed based on their conclusions, both written and oral.

GSP functions that will be explored throughout this lesson include: length, width, height, base area, distance and measure.

LESSON THREE - Volume of Pyramids

- **ONTARIO CURRICULUM Covered:**

    - Grade 7: Used for your more advanced students
    - Grade 8: 8m37, 8m51, 8m52, 8m53, 8m54

The lesson Volume of Pyramids appropriately concludes the chapter Volume. It requires students to use previous knowledge of volume and area, as well as GSP functions previously used throughout this chapter. Students will be given a GSP file containing two pyramids that they will examine throughout the lesson. They will compare and contrast pyramid 1 to pyramid 2 making observations and conclusions to share with their peers and instructor. Throughout this lesson, students will continually make observations and conclusions to best understand the volume of pyramids in GSP.

The GSP functions that are explored in this lesson include: animation line, width, height, length and animate. Students will be assessed based on their knowledge of the GSP functions explored throughout the chapter as well as the written and oral contributions they each make.