Instructional programs for Measurement grades 6th-8th should enable all students to:

- Understand, select, and use units of appropriate size and type to measure angles, perimeter, area, surface area, and volume.

**CCSS.MATH.CONTENT.6.G.A.2**

*Geometry, Grade 6 - Solve real-world and mathematical problems involving area, surface area, and volume.*

Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

**CCSS.MATH.CONTENT.7.G.B.6**

*Geometry, Grade 7 - Draw construct, and describe geometrical figures and describe the relationships between them*

Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

**21st Century Skills**

*Learning and Innovation Skills*

**Critical Thinking and Problem Solving**

- Exercising sound reasoning in understanding
- Understanding the interconnections among systems
- Framing, analyzing and synthesizing information in order to solve problems and answer questions

*Life and Career Skills*

**Initiative & Self-Direction**

- Defining, prioritizing and completing tasks without direct oversight
- Utilizing time efficiently and managing workload

**Leadership & Responsibility**

- Using interpersonal and problem-solving skills to influence and guide others toward a goal
**Objective**

In this activity students will study measurement, rounding to the nearest centimeter, and find the area, surface area, and volume of a Rubik's Cube.

**Materials**

1 for each student or small group of students
- Rubik's Cube
- Calculators
- Centimeter Rulers

1 for each student
- Measurement Activity Sheet

**Procedure**

1. Divide class into groups of three and distribute rulers, calculators, and activity sheets.
2. Review the concepts of surface area, volume, and measuring to the nearest centimeter.
3. Each group will measure the dimensions of their Rubik's Cube to the nearest centimeter and calculate the volume and surface area of the cube by completing the activity sheet.

**Notes to Teacher**

- This lesson will take approximately one 45-minute class period.
- Students who finish early and seek a challenge can convert their answers from cm² to in².
SECTION I - DIRECTIONS
Use a centimeter ruler to find the following measurements of your Rubik’s Cube. Round the measurements to the nearest centimeter. Next convert the centimeter measurement to inches. Remember there are 2.54 cm in 1 in.

HEIGHT: ________________ cm = ________________ in

WIDTH: ________________ cm = ________________ in

LENGTH: ________________ cm = ________________ in

SECTION II - DIRECTIONS
Use the measurements of your Rubik’s Cube to calculate the volume of the cube. Volume is found by multiplying the HEIGHT x WIDTH x LENGTH.

The volume of the Rubik’s Cube is: ________________ cubic centimeters (cm³).

SECTION III - DIRECTIONS
To find the area of each face, multiply the length and the width of each face. Then, find the surface area of your Rubik’s Cube by adding the areas of the six faces.

Area of Front: ________________ cm²
Area of Back: ________________ cm²

Area of Right Face: ________________ cm²
Area of Left Face: ________________ cm²

Area of Top: ________________ cm²
Area of Bottom: ________________ cm²

The total surface area of my Rubik’s Cube is ________________ cm².

SECTION IV - CHALLENGE
Convert the area of each face from cm² to in². Use the scale 2.54 cm in 1 in

How many cm² are in one in²?

The area of one of the faces is

Therefore, the surface area of the cube is

What would be the volume of the Rubik’s Cube, in cubic inches?
### SECTION I - DIRECTIONS

Use a centimeter ruler to find the following measurements of your Rubik’s Cube. Round the measurements to the nearest centimeter. Next convert the centimeter measurement to inches. **Remember there are 2.54 cm in 1 in.**

- **HEIGHT:** 5.7 cm = ___ in
- **WIDTH:** 5.7 cm = ___ in
- **LENGTH:** 5.7 cm = ___ in

### SECTION II - DIRECTIONS

Use the measurements of your Rubik’s Cube to calculate the volume of the cube. Volume is found by multiplying the HEIGHT x WIDTH x LENGTH.

The **volume** of the Rubik’s Cube is: 185.193 or 185.2 cubic centimeters (cm³).

### SECTION III - DIRECTIONS

To find the area of each face, multiply the length and the width of each face. Then, find the surface area of your Rubik’s Cube by adding the areas of the six faces.

- **Area of Front:** 32.49 or 32.5 cm²
- **Area of Back:** 32.49 or 32.5 cm²
- **Area of Right Face:** 32.49 or 32.5 cm²
- **Area of Left Face:** 32.49 or 32.5 cm²
- **Area of Top:** 32.49 or 32.5 cm²
- **Area of Bottom:** 32.49 or 32.5 cm²

The **total surface area** of my Rubik’s Cube is: 194.94 or 195 cm².

### SECTION IV - CHALLENGE

Convert the area of each face from cm² to in². Use the scale 2.54 cm in 1 in.

- How many cm² are in one in²? 6.4516 in²
- The area of one of the faces is 5.04 in²
- Therefore, the surface area of the cube is 30.24 in²
- What would be the **volume** of the Rubik’s Cube, in cubic inches? 128.02 in³