Lesson Plan

Grade 9 Academic **Lesson: 54**

Unit/Chapter: Measurement **Topic: Volumes and Surface Area of Spheres**

- ***homework check:*** **NPM 9 p. 455 # 3, 6, 7, 10, 13, 14, 15, 17**

- ***note:*** **Volumes and Surface Area of Spheres**

The surface area of a shape made from the combination of other three dimensional figures is the sum of the areas of the exposed surfaces. Likewise, the volume of a shape made from the combination of other three dimensional figures is the sum of the volumes of the other figures. The formulas for the surface area and volume of a sphere are:

$SA = 4\pi r^2$ $V = \frac{4}{3}\pi r^3$

Again, notice the relationship between the circle, cylinder, and sphere. Greek mathematician Archimedes proved that the surface area of a sphere is exactly the same as a cylinder of the same dimension without the ends. Therefore, the cylinder that encloses the sphere has a height of 2r. The surface area would then be:

$SA = 2\pi r(2r)$

$SA = 4\pi r^2$

Mathematicians also show that the volume of a sphere is two thirds the volume of a cylinder with the same radius and height. Again, we know that the height of the cylinder is 2r. The volume would then be:

$V = \frac{2}{3}\pi r^2 (2r)$

$V = \frac{4}{3}\pi r^3$

For example, calculate the volume and surface area of a sphere with a radius of 13 mm.

$SA = 4\pi(13)^2$

$SA = 2123.7mm^2$

$V = \frac{4}{3}\pi(13)^3$

$V = 9202.8mm^3$

- ***homework assignment:*** **NPM 9 p. 470 # 3, 5 – 9, 11, 13, 14**