|  |  |
| --- | --- |
| Date: 9/8/2022 | Duration of Lesson: 30 minutes |
| Title of Unit: Discovering Volumes | Title of Lesson: Volume of Cylinders |
| Lesson Objectives: Students will discover the volume formula for a cylinder through exploration. |
| Groupings (e.g., whole class, small groups, co-teaching): Whole Class and Pairs |
| Skills & Standards:  8.G.C.9 Know the formulas for the volumes of cones, cylinders and spheres and use them to solve real-world and mathematical problems  |
| **Progression of Learning & Teaching**  |
| Opener:  | * I will be discussing with students what volume is and how to calculate it, comparing what they already know to what I want them to understand.
* What is a cylinder? Locate cylinders around the room.
 | **Points to Remember**  |
| Activities & Tasks:  | * The lesson will be guided by a series of steps for students to measure the necessary components of cylindrical volume. What is the area of the circular face ($Area=πradius^{2}$)? The area of the circle results in square units, which we then have to multiply by the height because the cylinder is that many circle faces “tall”. Which results in the volume of the cylinder in cubic units. V$=πr^{2}h$. Reminding student throughout that volume is a 3 dimensional measurement so units should always be cubic units or units3.
* Use handout to guide students through using calculations of circular area and height to calculate volume.
* I Do: I will review the calculations to find the area of a circle.
	+ During this time, shade in the area of the circle to remind them of what area is versus circumference. Recall the vocabulary what is a radius of a circle? What is the diameter?
* Y’all: Students work in pairs
* We Do: Facilitate a class discussion about what volume is. Show the process of filling up a cylinder with sand or pieces of circle paper to demonstrate what volume is (area of the circle base times the height of the cylinder=volume in cubic units)
	+ Facilitate a discussion around how many dimensions we looking at for volume? Length is one, area is two, and volume is three. So when sharing the volume of a cylinder the units should always be cubic units or units3.
	+ I will be walking around the room helping struggling students.
* You Do**:**Students will practice calculating independently after the lesson.
 | Resources: Handout (see below); cylinders; compass; ruler; sand or circle paper cutouts in the shape of a cylinder.Vocabulary:  * Area: the total space taken up by a flat (2-D) surface or shape of an object.
* Volume: the space occupied within the boundaries of an object in three-dimensional space. It is also known as the capacity of the object.
* Cylinder: a solid object with two identical flat ends that are circular (or more generally have a curved boundary) and one curved side.
* Diameter: a straight line passing from side to side through the center of a body or figure, especially a circle or sphere.
* Radius: The distance from the center to the circumference of a circle. It is half of the circle's diameter.
* Squared: a number multiplied by itself.
* Exponent: power or exponent indicates the number of times a number needs to be multiplied by itself.
* Compass: an instrument with two arms, one sharp and one with a pencil that can be used to draw circles or arcs.
* Circumference: the distance around the edge of a circle (or any curvy shape). It is a type of perimeter.

Scaffolding/Differentiation: I will be walking around the room monitoring calculations and participation through the handout work. |
| Level of Cognitive Complexity:  | [ ] Creating [ ] Evaluating  [ ] Analyzing  | [ ] Applying [x] Understanding [x] Remembering  |
| Key questions:  | * What is volume?
* How is the volume of a cylinder related to area?
 |
| Closure:  | Students will figure out the formula based on their experiences with area and height. |
| Next Steps:  |  They will then practice using the formula for volume calculations. | Formative Assessment Criteria for Success:  I will use a handout to guide students and hold them accountable for their participation in the lesson. |

**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Student Worksheet**

**Volume of Cylinders**



