

Ray Holt
EDSE 652
Common Core Lesson Plan
Mathematics – Geometric Volume Formulas & Calculations
Lafayette High School, Oxford, MS, Mrs Smith, Room 20, 10:49am -11:40am.

This is a Geometry class which consists of 19 students, 8 in 9th grade students, 2 in 10th grade, and 9 in 11th grade. The class consists of 13 boys and 6 girls. Two students are enrolled in a Resource Class for extra help. In general, the class is weak in basic math. I will be forming Learning Groups during this lesson; four groups of four and one group of three. There are very few strong students in this class so I will let each group select a Group Captain that will represent the group. This lesson is intended to give the students practical introduction and review of volumes of various geometric shapes. Physical geometric shapes, called “Transparent Relational GeoSolids” will be used. Each group will have a box set which includes all of the shapes.

This lesson will be on identifying various 3-dimensional shapes and calculating the volume for four of the shapes. Students will make the necessary measurements using a ruler and will apply their measurements to the volume formula for that shape. The student will be taught to make accurate measurements and to apply those measurements to calculating the volume of geometric shapes.

Content Standards:

Common Core

8.G.9 - Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Modeling with Geometry G-MG. Apply geometric concepts in modeling situations
1. Use geometric shapes, their measures, and their properties to describe objects.

Mathematical Practices

1. Make sound reasoning and sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Apply geometric concepts in modeling mathematics.
4. Construct viable arguments and critique the reasoning of others.
5. Use appropriate tools strategically.

Establishing Inclusion:

The Learning Groups of four will include all students in the learning process. Each student will have lesson assignment sheets to fill out but will be allowed to work as a group. I will identify one shape from the GeoShape box and all groups will work on that shape. All students will be asked to identify the shape, draw a sketch of the shape, write the volume formula for the shape, take appropriate measurements, and calculate the volume. For each shape, one group member will be asked to present their work.

Developing Attitude:

During my lesson introduction I will use nine geometric shapes. I will identify the shape base, faces, edges, and vertices (if any). Students will record this information on an assignment sheet chart. For each shape we will identify the volume formula and the students will record it. I will emphasize the uniqueness of each shape and simple ways to remember how to calculate volume.

Enhancing Meaning:

I will be interacting with the students at several places in the lesson. After introducing the shapes and having the students fill out the chart I will distribute the box of Geoshapes to each group. I will then identify one of the shapes and ask them to remove it from the box. Each group will work together and take appropriate measurements from the shape and apply the measurements to the volume formula. Students will be asked to make a sketch of the shape as well as to identify a real-world application for this shape. For each shape, one Group Captain will be asked to explain their work.

Engendering Competence:

During the in-class exercises I will be able to walk the room and see how the students are doing on the various problems. Students know to work within their Learning Groups and for each member to help each other. If all Learning Center members are confused and need help then they raise their hands. During the group time the students will be formulating the measurements, applying the volume formula, and answering the real-world question. During this time I will be able to measure their competence to the material and to reinforce any confusion.

Learning Objectives:

Students should be able to recognize various basic geometrical shapes (square, rectangle, triangles, and circles).
Students should be able to recognize the different aspects of the Geoshapes, such as, base, face, edge, vertices.
Students should know the formulas for the various Geoshapes.
Students should be able to apply measured values and calculate the formula of the Geoshape.

Assessment Strategy:

There will be several places during the lesson where I will be able to assess the students. During the initial bell ringer exercise I will be able to interact with the students as we discuss the various shapes, their parameters, and volume formulas. During my explanation of the Geoshapes I will be asking questions. During the in-class exercises I will be observing and asking questions. Students will also be asking questions to each other in their groups. If an entire group can't help each other then they can ask a group question. All of these places in the lesson I will be able to assess if the students are learning the basic geometric shapes, performing correct measurements and using the correct formulas. If I sense they are weak on one aspect of the lesson I will be able to reinforce the lesson at that time.

Description of Lesson Flow:

When the students enter the room they will be asked to form groups by rearranging their chairs. They will be allowed to form a group of four with any other three students. Each student will be handed an initial bell ringer exercise in identifying shapes as an assessment. This is expected to take five minutes after the bell rings. Next I will demonstrate nine Geoshapes and discuss the parameters of each shape as well as the volume formula. I will ask questions on the shape parameters and volume. I will perform a sample calculation of volume on some of the shapes. This should take ten minutes.

Next each student group will be given four worksheets. Each worksheet will allow the student to identify a Geoshape, make a sketch of the shape, write the formula for the volume, measure the appropriate parameters, and calculate the volume. Each worksheet should take 10 minutes. After each worksheet is completed I will have one student from one of the groups explain their work to the class.

Materials:

Objects: Learning Resources "Transparent Relational GeoSolids" box of various 3-dimensional shapes.

Measuring Devices: Ruler (one per student)

Handouts:

- a) Bell ringer exercise.
- b) Worksheet: Identify These Geometric Shapes?
- c) Worksheet: Calculate Volume Using Measurements

Time	Activity	Anticipated Student Responses	Teacher Response	Justification
5 min	Bell Ringer: Students will rearrange in groups of four and will work on a pre-assessment exercise covering identifying 3-dimensional shapes.	I expect some students to be confused with the grouping. I do expect questions on the pre-assessment. I will encourage questions within the groups.	I will ask each group to try to answer any questions and if all students in a group do not know the answer I will work with the group towards the answer.	Students expect to have some activity when they enter the room. This helps them to get organized quickly and to be quiet.
10 min	Identify These Geometric Shapes? I will guide the students through nine Geoshapes identifying their parameters such as base, face, edge, vertices. I will also discuss the volume formula.	Most students will understand and a few will ask questions.	Where necessary I will explain concepts, show formulas and calculations.	Concepts and formulas are the foundation of complex shapes.
40 min	Calculate Volume Using Measurements. Each group will be given a worksheet for each of four Geoshapes. Each worksheet will ask them to identify, sketch, calculate volume, and identify a real-world application. Each worksheet is expected to take ten minutes. For each worksheet one group captain will be asked to explain their solution.	Students will be excited to receive the box of Geoshapes and will want to play with them. I expect about 50% of the students to fully understand all concepts and 10% to not understand at all. The rest will do well. Learning Center teams will work together with stronger students helping weaker students. Some students will struggle using the ruler.	I expect to explain the assignment and how to use a ruler.	Students learn to identify various shapes, the volume formula, and how to make measurements.