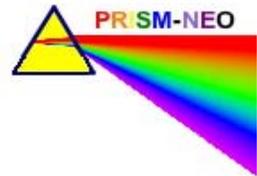


Volume - Just Figure it Out!

<---Sketch Title



Sketch Filename: Volume_Right_Prism.gsp

Movie Filename: Volume_Right_Prism.mov

Math Concept(s) **Suggested Grades** **Sketchpad Level**

Volume

7
 8
 9 Applied

Easy
- drag points and click buttons

Beginner
Intermediate
Experienced

Learning Goals:

- determine that the relationship between the height, the area of the base, and the volume of right prisms with simple polygonal bases is $area\ of\ base \times height = volume$

“Sketchy” Description:

This 9-page sketch includes:

- determining the relationship between the three values when the area of the base is fixed and the height is varied
- determining the relationship between the three values when the height is fixed but the area of the base is varied
- determining the relationship between the three values when both the area of the base and the height are varied
- an extension to discover the effect on the volume of a rectangular-based prism when all of the dimensions are multiplied by the same amount
- a practice page to consolidate the relationship

Lesson Plan Suggestions

- description of how the sketch might be used in each of the three lesson parts - *Minds On, Action!, Consolidate.*
- includes student groupings, instructional strategies, and connections to manipulatives or other technologies.

Minds On - To activate prior knowledge, have students print out the “Minds-on: Volumebiks” activity from the sketch. Students will fill in the rectangular prism net with 5 facts they know about the concept of volume.

- With a teacher led discussion, use geometric solids to identify the base and height of right prisms. For each solid, change the orientation of the solid to provide a different perspective and have students identify the base and height of the solid again.

- In a Pairs/Share activity, using linking cubes, each pair of students should create a rectangular prism having a height of one. Have the students determine the volume of the prism. The students should then make an identical prism to stack on top of the original. Ask students to think about what has changed (and how it changed) and what has remained the same. Have pairs share their observations with the class. Finally, have students stack another prism identical to the original prism on top and have the students reflect once again upon what has changed and what has remained constant.

Action! - Preview the sketchbook with students and then have students work in pairs through the following five activities: Volume Triangular Prism, Volume Rectangular-Based Prism, Volume Parallelogram-Based Prism, Volume Trapezoid-Based Prism, and Volume Polygon-Based Prism.

Consolidate - Assign questions from the textbook having students calculate the volume of a prism when given the height and base. Include questions in which the students must decompose the base into triangles and rectangles to find the area of the base. There should also be questions that ask students to determine the area of the base (or the height), when given the volume and height (or area of the base).

Extensions:

- Use the extension sketch to discover the effect on the volume when all dimensions of a rectangular prism are multiplied by the same amount. {The students should discover that when the dimensions are all doubled, the volume of the new prism is 8 times the volume of the original prism. When the dimensions are all tripled, the volume of the new prism is 27 times the volume of the original prism. Ultimately, advanced students may recognize that the volume is multiplied by the factor three times (cubed.)}

Questions or activities for students/parents to explore together:

1. Find some interesting prisms in your house. Take appropriate measurements and find the volume of your prism. Locate prisms in the store which could be combined to make a larger prism. Find the volume of the smaller prisms and use these to determine the volume of the larger prism. Find two prisms with different bases in your house which have the same volume.
2. Find a cylindrical can. Use 100 mL (100 cm³) of water to determine the area of the base.