**Thematic Unit: Perimeter, Area, and Volume**

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**Analysis Document**

**Learning Goals**

* Students will be able to calculate perimeter and area of two-dimensional objects that include rectangles, triangles, rhombus, and trapezoids.
* Students will be able to calculate volume of three-dimensional objects that include rectangular prisms and triangular prisms.
* Within given parameters, students will be able to determine if the situation requires the calculation of perimeter, area, or volume.
* Students will be able to explain how and why the use their calculation method within the given parameters.
* The curriculum will include ties to math, science, social studies, and language arts.

**Needs Analysis**

The Common Core State Standards for 6th grade in geometry require students to solve real-world mathematical problems involving area, surface area, and volume.

1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
2. 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 by found by multiplying the edge lengths of the prism. Apply the formulas *V=lwh* and *V=bh* to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

Students will receive pre and post assessments to determine prior knowledge and the effectiveness of core instruction.

**Learner Analysis**

The information is based on school and class demographics as well as a survey given in the fall of 2012.

Demographics

* Bell View Elementary is 80% Caucasian, 10% Hispanic, 3% Pacific Islander, 2% African American, 2% Asian, and 2% American Indian. 43% of the students are on free or reduced lunch. 22% are considered to have disabilities and 7% are English Language Learners.
* My 6th grade classroom is 82% Caucasian, 15% Hispanic, and 3% Pacific Islander. 22% of the students have an IEP and receive special education services and/or speech services. Of those, 7% are self-contained resource students and spend three hours in the special education classroom because they are significantly below grade level. 7% are ELL students. Most likely, the class reduced or free lunch percentage is similar to the school demographics. There are 9 females and 18 males.
* 40% of the students come from divorced parents and are currently living with either single parents, grandparents, or blended families.
* 88% of the students attend school regularly. 1 student is regularly absent with psychological issues and the other two have non-illness related attendance issues.

Attitudes, Values, and Opinions

* 93% of the students report enjoying school. The class is split pretty evenly with a slight majority preferring math and sciences to the language arts. 96% of the students prefer working in groups or pairs rather than working alone.
* On the Praxis scale of engagement, 1 student is considered a reluctant learner, 2 are invisible learners, 5 are engaged, and 19 are fully engaged in their learning process.
* 24 of the students regularly complete homework and consistently complete in-class assignments. Of the three remaining students, one is self-contained resource and classified as invisible, one is a reluctant learner, and the other is engaged in class, but does not complete work at home.

Access to Technology

88% of the students have access to a computer or tablet. However, only 70% of the class has consistent access with the ability to use technology for homework assignments. 100% of the students have daily computer access at school.

Schedules

Math is taught daily for 60 minutes of core instruction and 30 minutes of intervention groups. The geometry unit will take 13 core instruction days.

Learner Skills

* Fall Canyons School District Benchmarks 2012-2013:
* 46% of the students met the reading benchmarks.
* 85% of the students meet comprehension benchmarks.
* 56% of the students met the math concepts and application benchmarks.
* 70% of the students met the math computation benchmarks.
* Winter Canyons School District Benchmarks2012-2013:
* 48% of the students met the reading benchmarks.
* 70% of the students meet comprehension benchmarks.
* 74% of the students met the math concepts and application benchmarks.
* 93% of the students met the math computation benchmarks.
* Increase or decrease.
* Reading fluency increased by 2%.
* Comprehension decreased by 15%.
* Math application skills increased by 18%.
* Math computation increased by 23%.

**Task Analysis**

The tasks are broken down into the following sections:

1. Geometry: 3-dimensional figures
   1. Overarching goal: Students Will Be Able To (SWBAT) compute perimeter, area, and volume, differentiate between the three, and apply them to real-life situations.
   2. Review 2-dimensional figures: polygon classifications with an emphasis on triangles and quadrilaterals.
   3. Objective 1: Establish vocabulary for the unit.
      1. Vocab: Polygon, triangle, square, rectangle, parallelogram, trapezoid, rhombus, base, height.
2. 3-dimensional figure features.
   1. Objective 1: Establish vocabulary for the unit.
      1. Vocab: Face, edge, vertices, classifications of prisms, pyramids, cylinders.
      2. *Language Arts Connection*: Sir Cumference and the Sword in the Cone.
   2. Objective 2: SWBAT identify features in three-dimensional figures.
      1. Identifiable Features: Face, edge, vertices, classification.
      2. *Social Studies Connection*: History of Mathematics. Egyptian contributions to area formulas and Greek contributions to geometry. http://en.wikipedia.org/wiki/History\_of\_mathematics
3. Perimeter, area, and volume.
   1. 3A. Perimeter
      1. Objective 1: SWBAT understand perimeter using examples and non-examples.
      2. *Language Arts Connection*: Sir Cumference and the Isle of Immeter
      3. Objective 2: SWBAT compute perimeter.
   2. 3B. Area
      1. Objective 3: SWBAT understand area of 2-D figures and surface area of 3-D figures, limited to parallelograms and triangles using examples and non-examples.
      2. Objective 4: SWBAT discover-a-relationship between perimeter and area/surface area.
      3. Objective 5: SWBAT compute area of 2-D figures and surface area of 3-D figures.
      4. 3C. Volume
      5. Objective 6: SWBAT understand volume of 3-D prisms using examples and non-examples.
         1. *Science Connection*: Students will establish a volume relationship between the Earth, the Sun, and other heavenly bodies in our solar system.
      6. Objective 7: SW discover-a-relationship between area and volume of 3-D prisms.
      7. Objective 8: SWBAT compute volume of 3-D figures.
   3. 3D. Differentiate between perimeter, area, and volume
      1. Objective 9: SWBAT differentiate between perimeter, area, and volume and accurately communicate the difference.
      2. Objective 10: SWBAT apply perimeter, area, and volume to real-life problems.

**Instruction Context**

1. Resources
   1. Math books and teacher edition
   2. Document camera
   3. Individual white boards for students
   4. Task sheets for individual objectives
   5. Homework task sheets for individual objectives
   6. Pre and post test assessments
   7. Sir Cumference and the Sword in the Cone
   8. Sir Cumference and the Isle of Immeter
   9. Computer for the teacher
   10. Computers for student centers
2. Delivery MethodsErika Bradshaw Page 1 2/7/13Erika Bradshaw Page 1 2/7/13
   1. This unit will be taught in thirteen different 60-minute class periods. Students will begin by establishing vocabulary for the unit, reviewing features of the 2-D and 3-D figures.
   2. Delivery will involve direct instruction in the “I do”, “We do”, “You do” model. Students will often use individual white boards to respond in cooperative groups. Task sheets are often used for students to discover relationships in mathematics and explain their thinking in writing. A summative assessment will be given at the end of the unit.
3. Delivery Design
   1. The delivery method is designed for maximum opportunities to respond in the classroom. Individual white boards and task sheets both allow students to respond simultaneously to the instructor’s prompts.
   2. The delivery method is designed to:
      1. Support my ELL students with specific language goals of vocabulary acquisition and a gradual release of responsibility to scaffold for them.
      2. Both increased OTR’s and increased feedback have proven to have a large effect size for student achievement. My delivery methods optimize OTR’s and feedback.
      3. Task sheets require students to describe their problem solving process, apply algorithmic skills, and differentiate uses for the algorithmic skills. These provide higher level thinking skills beyond simple calculation skills.