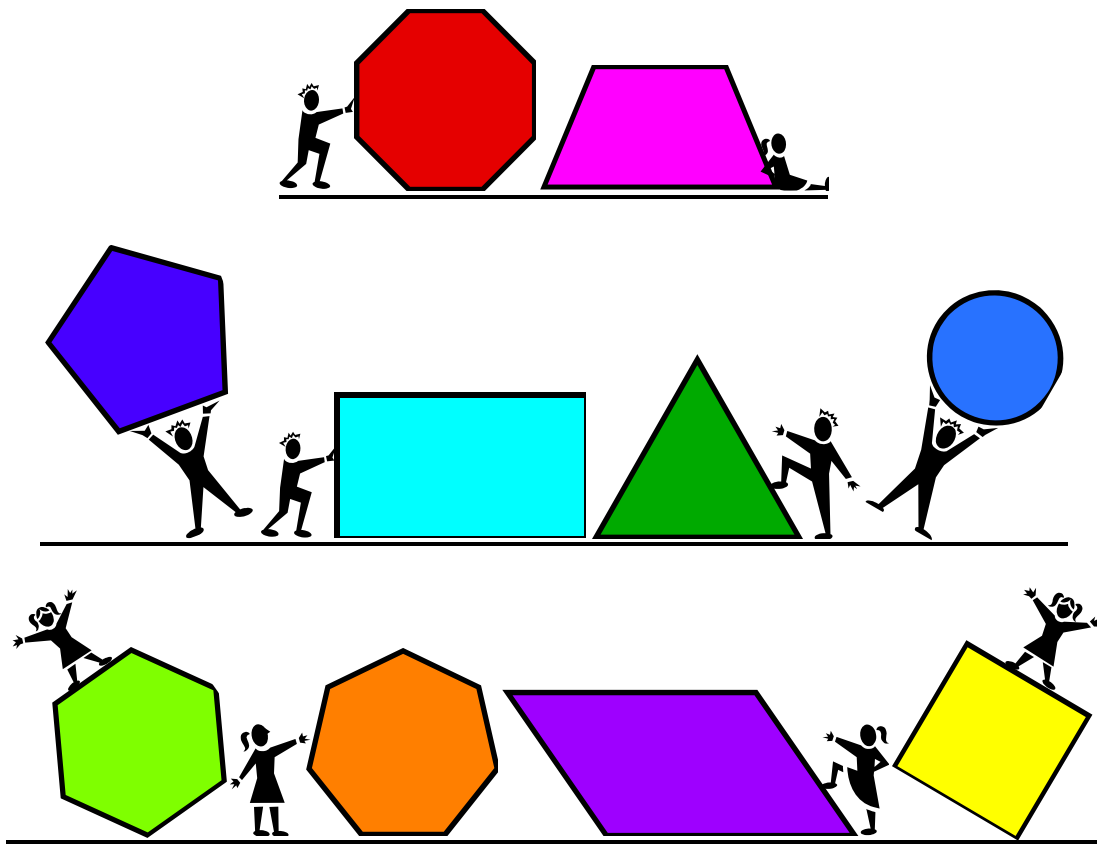


PUBLIC SCHOOL NUMBER FIVE

West New York, New Jersey

Eisenhower Professional Development School Project 2008-2009

GEOMETRY SMARTS



Janet Stirone

6th Grade Math

Title of Project: Enhancing the Fifth and Sixth Grade Mathematics Classroom Curriculum Through Technology For Under and Over Achieving Students

Grade Level: 6th Grade

Subject: Mathematics and Technology

Purpose: The purpose of this project is to focus on developing areas of technology to be utilized in the teaching of sixth grade mathematics; to launch and establish the Smart Board into the classroom to stimulate and develop problem solving methods; to involve utilization of Smart Board technology and software, how to use the Smart Board as a tool to demonstrate math lessons; to use computers and laptops in the classroom and school lab; to incorporate student generated lessons to assist every student in establishing “ownership” toward becoming a more active, motivated participant in mathematics; demonstrate the ability to verbalize and write their understanding of the process they used to solve, answer, and label lessons; to use the internet and other sources that provide opportunities to expand the curriculum.

Academic and Technology Objectives and Core Curriculum Standards:

- Design and produce a basic multimedia project **5-8.8.1.A.8**
- Use network resources for storing and retrieving data **5-8.8.1.A.10**
- Problem Solving and Decision Making **5-8.8.1.B.8**
- Use computer applications to modify information independently and/or collaboratively to solve problems **5-8.8.1.B.8**
- Design and produce a basic multimedia project **5-8.8.1.A.8**
- Use network resources for storing and retrieving data **5-8.8.1.A.10**
- Use common features of an operating system (e.g., creating and organizing files and folders) **5-8.8.1.A.2**
- Identify lines, rays, and segments (9.1) **4.2.6A1**
- Name, measure, and draw angles (9.2) **4.2.6A1, 4.2.6E2**
- Classify angles (9.3) **4.2.6A1, 4.2.6E2**
- Classify triangles according to their angles and sides (9.4) **4.2.6A2**
- Classify quadrilaterals (9.5) **4.2.6A2**
- Classify polygons (9.6) **4.2.6A2**
- Identify congruent and similar figures (9.7) **4.2.6A3, 4.1.6A4**
- Identify line symmetry (9.8) **4.2.6A4;1.2.6D1**
- Graph points in all four quadrants (11.6) **4.2.6B1,2; 6.6.8A**

- Identify translations of figures (11.6) **4.2.6B1,2**
- Identify reflections of figures (11.7) **4.2.6B1**
- Identify rotations of figures and rotational symmetry (11.7) **4.2.6B1, 4.2.6A4**
- Identify tessellations (page 614) **4.2.6B1,2; 1.2.6D1**
- Find the area of a parallelogram (10.1) **4.2.6D1; 4.2.6E2**
- Find the area of a triangle (10.2)) **4.2.6D1; 4.2.6E2**
- Find the circumference of a circle (10.3)) **4.2.6D1; 4.2.6E2**
- Find the area of a circle (10.4)) **4.2.6D1; 4.2.6E2**
- Classifying solids (10.5) **4.2.6A5**
- Find the surface area of a prism (10.6) **4.2.6D1, 4.3.6D3, 4.2.6E3**
- Draw the front, side and top views of a solid (p549, supplement) **4.2.6A6,7; 1.2.6.D1**
- Demonstrate competence in active listening by interpreting and applying received information to new situations and in solving problems **6.3.4.B.2**
- Gather, select, and organize information appropriate to a topic, task, and audience **6.3.2.D.2**
- Write for different purposes (e.g., to express ideas, inform, entertain, clarify, share) and a variety of audiences (e.g., self, peers, community). **6.3.2.D.1**

Materials:

McDougal Little Math Course 1

Smart Board Technology

Notebook Software

Interactive Tools: Protractor

Internet Smart Board Lessons

Teacher-Made Smart Board Lessons

Internet Web Links (Accessed via student link to independent lesson generated)

School Computer Lab

Classroom Computers (40-minute Independent Weekly Work Cycles)

Learning Environment:

Math classes meet daily for 80 minutes. We have 4 classroom computers and will use the Newly Established School Computer Lab on a weekly basis for 80 minutes.

Lesson 1**Duration: 1-80 minute Block****Objectives:**

- Identify lines, rays, and segments (9.1) **4.2.6A1**

Activities and Assignments:

Introduction to Geometry

Chapter 9.1 pp. 455-459

Students will identify key terms: lines, points, endpoints, rays, planes, parallel lines, intersecting lines, and segment. They will work cooperatively on identifying and naming lines, rays, and segments through guided practice. Students will continue labeling intersecting lines and identifying parallel lines. They will practice leveled skill items and work with problem solving format to complete activities from the textbook.

Assessment: Online Quiz www.classzone.com (Appendix A) using Smart Board

Lesson 2**Duration: 1-80 minute Block****Objectives:**

- Name, measure, and draw angles (9.2) **4.2.6A1, 4.2.6E2**

Activities and Assignments:

Angles

Chapter 9.2 pp. 460-464

Review concepts from previous lesson. Students will identify key terms: angle, vertex, degrees, and protractor. Using guided practice, students will work cooperatively with examples for naming, drawing, and measuring angles. Teacher will present various examples of angles on the Smart Board.

Assessment: Students will practice using the Interactive Protractor in Smart Notebook.

Lesson 3

Duration: 1-80 minute Block

Objectives:

- Classify angles (9.3) **4.2.6A1, 4.2.6E2**

Activities and Assignments:

Classifying Angles

Chapter 9.3 pp.465-469

Students will identify key terms: right, acute, obtuse, straight angles, vertical angles, complementary angles, and supplementary angles. They will define and classify all angles. Students will be guided through practice examples in which they will practice using, classifying, and solving unknown measurements. They will practice various examples and identify angles in the classroom. Students will record these classroom angles in Smart Notebook. Using Smart Board technology, the teacher will present activities for students to classify and measure angles.

<http://education.smarttech.com/ste/en-US/Ed%2BResource/Lesson%2Bactivities/Notebook%2Bactivities/Browse%2BNotebook/United%2BStates/Elementary/4-6/Math/Classifying%2BAngles%2B%28SMART-created%29.htm>

(Appendix A and Appendix B)

Assessment: Angle Assessment for Smart Board (Appendix B)

Lesson 4

Duration: 1-80 minute Block

Objectives:

- Use network resources for storing and retrieving data **5-8.8.1.A.10**
- Use common features of an operating system (e.g., creating and organizing files and folders) **5-8.8.1.A.2**
- Use computer applications to modify information independently and/or collaboratively to solve problems **5-8.8.1.B.8**
- Identify lines, rays, and segments (9.1) **4.2.6A1**
- Name, measure, and draw angles (9.2) **4.2.6A1, 4.2.6E2**
- Classify angles (9.3) **4.2.6A1, 4.2.6E2**

Computer Lab

Introduce Program (Notebook Software)

Teacher Demonstrated Location and Use of Buttons on Tool Bar in Smart Notebook in order to achieve the following:

To Find Graphics

To Type

To Clone

To Create Angles (Use Textbook and concepts of Geometry to model angles)

To Use Interactive Protractor to Measure and Identify Angles

To Create Pages

Model in Smart Notebook using: [triangle lesson ike.notebook](#) (Appendix B)

Demonstrate further by using online video lessons for students to view.

<http://phschool.com/webcodes10/index.cfm?fuseaction=home.gotoWebCode&wcprefix=aae&wcsuffix=0775> (Prentice Hall Videos) (Appendix A)

Assessment: Students saved work will be checked

Lesson 5

Duration: 1-80 minute Block

Objectives:

- Classify triangles according to their angles and sides (9.4) **4.2.6A2**

Activities and Assignments:

Investigating and Classifying Triangles

Chapter 9.4 pp.477-479

Review previous Lesson 3 by classifying angles as acute, right, obtuse, or straight. Introduce key terms: triangle, acute triangle, right triangle, obtuse triangle, equilateral triangle, isosceles triangle, and scalene triangle. Have students draw, label, and define each type. Use guided practice and world pictures to identify each type of triangle. Work cooperatively between Interactive Smart Board and problem solving activities.

Assessment: Technology: use a spreadsheet to find unknown angle measures of triangles. Using Text p. 447 and Smart Board, create a spreadsheet in MS Excel to determine the measure of the third angle (subtract the sum of the first two angle measures (enter in cells B1 and B2) from 180°). Formula: $B3 = 180 - \text{SUM}(B1: B2)$.

Assessment: Classifying Triangles by sides and angles: Beat the Computer Drill (Appendix B)

Lesson 6

Duration: 1-80 minute Block

Objectives:

- Use network resources for storing and retrieving data **5-8.8.1.A.10**
- Use common features of an operating system (e.g., creating and organizing files and folders) **5-8.8.1.A.2**
- Use computer applications to modify information independently and/or collaboratively to solve problems **5-8.8.1.B.8**
- Classify triangles according to their angles and sides (9.4) **4.2.6A2**

Activities and Assignments:

Notebook Software

Students will begin creating interactive activities based on geometry lessons

Use of Triangles

Create pages classifying triangles (Acute, Isosceles, Obtuse, Right, Scalene, and Equilateral: Define and Identify

Assessment: Saved work will be evaluated and assistance will be given.

Lesson 7

Duration: 1-80 minute Block

Objectives:

- Classify quadrilaterals (9.5) **4.2.6A2**

Activities and Assignments:

Classifying Quadrilaterals

Chapter 9.5 pp. 479-484

Students will investigate and classify Quadrilaterals. Review classification of triangles by their angles and sides. Define, draw, and label key quadrilaterals: quadrilateral, parallelogram, rectangle, rhombus, and square. Practice with guided examples. Apply concepts to problem solving strategies and skills. Smart Board Lesson: [Quadrilaterals.notebook](#) (Appendix B)

Assessment: Evaluate understanding by using examples of Differentiated levels: Basic # 10 and 14; Average # 16 and 22; Advanced # 24 and 36 from Text pp. 482-483. Plus, online quiz at www.classzone.com. (Appendix A)

Lesson 8

Duration: 1-80 minute Block

Objectives:

- Classify polygons (9.6) **4.2.6A2**

Activities and Assignments:

Classifying Polygons

Chapter 9.6 pp. 485-489

Students will classify figures by their angles and sides. Classify Polygons: polygon, pentagon, hexagon, octagon, and regular polygon. Define key terms: vertex and diagonal. Using Smart Board and Textbook, create various polygons for students to label. Work with identifying the number of triangles that are formed by diagonals from one vertex of a regular hexagon. [Polygons.notebook](#) (Appendix B)

Assessment: Skills Practice and Establishment of in-class rotation of computers for independent work. Use an online quiz at www.classzone.com. (Appendix A)

Lessons 9-10

Duration: 2-80 minute Blocks

Objectives:

- Identify congruent and similar figures (9.7) **4.2.6A3, 4.1.6A4**
- Identify line symmetry (9.8) **4.2.6A4;1.2.6D1**

Activities and Assignments:

Congruent and Similar Figures

Line Symmetry

Chapters 9.7 and 9.8 pp. 490-498

Students will use triangles to explore congruent (same size and shape) and similar (same shape) figures. They will work cooperatively on listing and using corresponding parts. Students will also identify multiple lines of symmetry (vertical, horizontal, and diagonal folds). They will identify lines of symmetry in

different figures in the text and in the classroom or other world applications (i.e. baseball diamond, tennis court, the letter Y, etc)

Smart Board Applications/Lessons:

http://gets.gc.k12.va.us/tchrweb/richardson/SOL%207.11_files/Similar%20Figures.ppt

<http://tech.ccps.org/downloads/Symmetry,%20Rotation,%20Translation,%20Reflection.ppt> (Appendix A)

Assessment: Chapter Review/Test Generator p. 499 (Concept); or 500-504 (Review); Chapter Test pp.505-509

Lessons 11-15

Duration: 5-80 minute Blocks

Objectives:

- Design and produce a basic multimedia project **5-8.8.1.A.8**
- Use network resources for storing and retrieving data **5-8.8.1.A.10**
- Problem Solving and Decision Making **5-8.8.1.B.8**
- Use computer applications to modify information independently and/or collaboratively to solve problems **5-8.8.1.B.8**
- Design and produce a basic multimedia project **5-8.8.1.A.8**
- Use network resources for storing and retrieving data **5-8.8.1.A.10**
- Use common features of an operating system (e.g., creating and organizing files and folders) **5-8.8.1.A.2**
- Identify lines, rays, and segments (9.1) **4.2.6A1**
- Name, measure, and draw angles (9.2) **4.2.6A1, 4.2.6E2**
- Classify angles (9.3) **4.2.6A1, 4.2.6E2**
- Classify triangles according to their angles and sides (9.4) **4.2.6A2**
- Classify quadrilaterals (9.5) **4.2.6A2**
- Classify polygons (9.6) **4.2.6A2**
- Identify congruent and similar figures (9.7) **4.2.6A3, 4.1.6A4**
- Identify line symmetry (9.8) **4.2.6A4;1.2.6D1**

Activities and Assignments:

Computer Lab

Program (Notebook Software)

Students will identify the concept they will use as a practice lesson.

Write a Script for presentation.

Begin to create an interactive multimedia activity for the geometric concept chosen

Teacher will assist students in creating Internet Links and Notebook Page Links.

With teacher assistance, students will practice Recording.

<http://www.kenton.k12.ky.us/SmartBoard/smartmath.htm> (Appendix A)

Assessment: Saved Voice Recordings in Windows Media Player.

Lessons 16-17

Duration: 2-80 minute Blocks

Objectives:

- Identify translations of figures (11.6) **4.2.6B1,2**
- Identify reflections of figures (11.7) **4.2.6B1**
- Identify rotations of figures and rotational symmetry (11.7) **4.2.6B1, 4.2.6A4**

Activities and Assignments:

Translations in a Coordinate Plane and Reflections and Rotations

Chapters 11.6 and 11.7 pp.603-613

Review positive and negative coordinates: Battleship

<http://www.primarygames.com/puzzles/strategy/battleship/index.htm>

(Appendix A)

Identify key terms such as coordinate plane, quadrants, translation, image, reflection, rotation, transformation. Practice: translating a figure, identifying reflections, rotations, and transformations.

Assessment 1: Replay Battleship. Students continue to work independently on classroom computers to practice for their creation of an interactive activity.

Assessment 2: Chapter Test: Test Generator or use Chapter Test on Text pp. 621-622.

Lesson 18

Duration: 1-80 minute Block

Objectives:

- Identity tessellations (page 614) **4.2.6B1,2; 1.2.6D1**

Activities and Assignments:

Extension use of Tessellations

Chapter 11; Text pp. 614-615

Students will identify key terms: tessellation and regular tessellation. They will practice forming regular tessellations. Provide active use of the following Power Point Presentation:

<http://www.seymour.k12.wi.us/rle/art/powerpoints/Tessellations.ppt> (Appendix A)

Assessment: Answer the Essential Question: Which shapes can form a regular tessellation of the plane? (You can draw tessellations and identify whether or not a polygon can form a regular tessellation: equilateral triangle, square, and regular hexagon.

Lessons 19-20

Duration: 2 to 4-80 minute Blocks

Objectives:

- Design and produce a basic multimedia project **5-8.8.1.A.8**
- Use network resources for storing and retrieving data **5-8.8.1.A.10**
- Problem Solving and Decision Making **5-8.8.1.B.8**

- Use computer applications to modify information independently and/or collaboratively to solve problems **5-8.8.1.B.8**
- Design and produce a basic multimedia project **5-8.8.1.A.8**
- Use network resources for storing and retrieving data **5-8.8.1.A.10**
- Use common features of an operating system (e.g., creating and organizing files and folders) **5-8.8.1.A.2**

Activities and Assignments:

Computer Lab

Program (Notebook Software)

Students will finalize their projects. Teacher will assist all students. Students will continue to save all generated lessons that they produced and recorded on district H:// drives and teacher memory stick. Students will present their polished lessons to their class.

Assessment: Rubric for Geometry Smarts (Appendix C)

Reflective Narrative by Janet Stirone

When we *teach* a child *design*, we *reveal* the *geometry* of the world.

Alexander, Jane. Chairman, National Endowment for the Arts (1993-1997)

When we teach a child to create, we inspire ownership. The vision to create and giving students the sense of ownership are the fundamental beliefs on which I teach. Participating in the Eisenhower Grant has afforded me the opportunity to characterize and identify with many of our students in Public School Number Five. Being an auditory and hands on learner myself, the technology brought into the classroom has given me a renewed sense of “ownership”. My lessons, the “touch” technology of the Smart Board, and students creating their own lessons using technology have provided all within the 6th grade level, including me, the power to design, create, and above all — learn.

Gaining a better knowledge in various technology programs has produced a positive leaning atmosphere. Contributing to their own leaning process was especially advantageous for the proficient and partially proficient student. These students gained more knowledge and a sense of ownership when tackling geometry concepts.

Students interacted with varying geometrical topics to establish lessons for each other and future 6th grade students. They were empowered by their learning process, and therefore, were inspired to exceed expectations.

My interaction with technology has given me a renewed passion for teaching. Throughout this venture, my process has been to focus on a student-centered approach to mathematics via technology. Judging by my students’ responses and cooperative learning experiences, I believe the project was very successful.

Appendix A

WEB AND TECHNOLOGY RESOURCES

www.classzone.com

<http://education.smarttech.com/ste/en-US/Ed%2BResource/Lesson%2Bactivities/Notebook%2Bactivities/Browse%2BNotebook/United%2BStates/Elementary/4-6/Math/Classifying%2BAngles%2B%28SMART-created%29.htm>

[triangle lesson ike.notebook](#)

[Quadrilaterals.notebook](#)

[Polygons.notebook](#)

http://gets.gc.k12.va.us/tchrweb/richardson/SOL%207.11_files/Similar%20Figures.ppt

<http://tech.ccps.org/downloads/Symmetry,%20Rotation,%20Translation,%20Reflection.ppt>

<http://www.primarygames.com/puzzles/strategy/battleship/index.htm>

<http://www.seymour.k12.wi.us/rle/art/powerpoints/Tessellations.ppt>

<http://www.fi.edu/school/math2/>

<http://phschool.com/webcodes10/index.cfm?fuseaction=home.gotoWebCode&wcprefix=aae&wcsuffix=0775> (Prentice Hall Videos)

<http://illuminations.nctm.org/Activities.aspx>

<http://faculty.usiouxfalls.edu/arpeterson/smartboard.htm>

http://www.fairfield.k12.ct.us/Rogerludlowe/crogerludlowe03/Smartboard/smartboard_tips.htm

<http://www.kenton.k12.ky.us/SmartBoard/smartmath.htm>

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Appendix C

Rubric: GEOMETRY SMARTS

	4	3	2	1	Score
Content-Accuracy	All content throughout the presentation is accurate. There are no factual errors.	Most of the content is accurate but there is one piece of information that might be inaccurate.	The content is generally accurate, but one piece of information is clearly flawed or inaccurate.	Content is typically confusing or contains more than one factual error.	
Effectiveness	Project includes all material needed to gain a comfortable understanding of the topic. It is a highly effective study guide.	Project includes most material needed to gain a comfortable understanding of the material but is lacking one or two key elements. It is an adequate study guide.	Project is missing more than two key elements. It would make an incomplete study guide.	Project is lacking several key elements and has inaccuracies that make it a poor study guide.	
Spelling and Grammar	Presentation has no misspellings or grammatical errors.	Presentation has 1-2 misspellings, but no grammatical errors.	Presentation has 1-2 grammatical errors but no misspellings.	Presentation has more than 2 grammatical and/or spelling errors.	
Buttons and Links Work Correctly	All buttons and links work correctly.	Most (99-90%) buttons and links work correctly	Many (89-75%) of the buttons and links work correctly.	Fewer than 75% of the buttons work correctly.	
Originality	Presentation shows considerable originality and inventiveness. The content and ideas are presented in a unique and interesting way.	Presentation shows some originality and inventiveness. The content and ideas are presented in an interesting way.	Presentation shows an attempt at originality and inventiveness on 1-2 cards.	Presentation is a rehash of other people's ideas and/or graphics and shows very little attempt at original thought.	
Background	Background does not detract from text or other graphics. Choice of background is consistent from card to card and is appropriate for the topic.	Background does not detract from text or other graphics. Choice of background is consistent from card to card.	Background does not detract from text or other graphics.	Background makes it difficult to see text or competes with other graphics on the page.	

Student Name: _____ Room Number: _____ Total Score: _____

