You're too ACUTE for your own good.

Stop barking up the wrong

GEOMETRY.

-OR-

Throw Mama from the

TRAINsformation

An Integrated, Interdisciplinary
Thematic Unit for 6th Grade
Students Examining
Geometry.

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I. **CONTENT**:
    Evidence of geometry and its relevant applications are apparent in the natural and man-made world. A firm understanding of geometry and spatial sense allows humans to design and construct structurally sound and architecturally appealing buildings and to appreciate geometric forms that occur in nature. Students will gain an awareness of geometric shapes in the surrounding environment that make it aesthetically pleasing, practical and functional.

II. **PROCESS:**
    Through observation, discussions, physical manipulation, problem solving, cooperative learning and critical thinking, students will be able to use spatial reasoning, properties of geometric objects and transformations to analyze mathematical situations and solve problems.

III. **PRODUCT:**
    Students will be able to identify, classify, compare and analyze characteristics, properties and relationships of one-, two- and three-dimensional geometric figures and objects.

Unit Overview: Alignment with
National / State / District Pupil Performance Standards

Ohio Mathematics Content Standards--Geometry and Spatial Sense Standard: Students identify, classify, compare and analyze characteristics, properties and relationships of one-, two-, and three-dimensional geometric figures and objects. Students use spatial reasoning, properties of geometric objects and transformations to analyze mathematical situations and solve problems.

1. Classify and describe two-dimensional and three-dimensional geometric figures and objects by using their properties; e.g., interior angle measures, perpendicular/parallel sides, congruent angles/sides.

2. Use standard language to define geometric vocabulary: vertex, face, altitude, diagonal, isosceles, equilateral, acute, obtuse, and other vocabulary as appropriate.

3. Use multiple classification criteria to classify triangles; e.g., right scalene triangle.

4. Identify and define relationships between planes (i.e. parallel, perpendicular and intersecting).

5. Predict and describe sizes, positions and orientations of two-dimensional shapes after transformations such as reflections, rotations, translations and dilations.

6. Draw similar figures that model proportional relationships; e.g., model similar figures with a 1 to 2 relationship by sketching two of the same figure, one with corresponding sides twice the length of the other.

7. Build three-dimensional objects built with cubes and sketch the two- dimensional representations of each side; i.e., projection sets.

I–SEARCH INDEPENDENT RESEARCH PROJECTS
FOR GIFTED AND TALENTED STUDENTS

1.   **PARADOXES:**
A strip of paper is clearly a two-dimensional object. However, when it is twisted to make a mobius strip, it looks three-dimensional but does not always act that way.

PRODUCT: Create a mobius strip and investigate its properties. Prepare a presentation on your findings and defend whether it is two- or three-dimensional.

2.   **ATTRIBUTES:**
Silos are structures used to store grain, but these structures always are cylindrical in shape.

PRODUCT: Using prototypes of various three-dimensional shapes, postulate why our ancestors chose cylinders for the shape of silos.

3.   **ANALOGIES:**
Inventions change over time to meet the needs of society. Early wheels were made of stone, but today wheels are made of a variety of materials.

PRODUCT: Research the evolution of the wheel and create a Power Point presentation depicting the progression of the wheel.

4.   **DISCREPANCIES:**
Geometric shapes like rectangles and pentagons and prisms appear to be invented and man-made; however, these and other geometric shapes repeatedly appear in nature.

PRODUCT: Investigate the occurrence of geometric shapes in nature. Bring in examples of these shapes to display in the classroom.

5.   **PROVOCATIVE QUESTIONS:**
A Golden Rectangle is a rectangle in which the ratio of the length to the width is the Golden Ratio, a special number approximately equal to 1.6180339887498948482. The Golden Ratio is considered the "divine proportion" because when it is appears in nature or is used in art or architecture, the objects are considered quite aesthetically appealing.

PRODUCT: Design a pictorial puzzle using the Golden Ratio.

6.   **EXAMPLES OF CHANGE:**
Western Classical architecture, such as that of Greece and Rome, as well as the Eastern architecture of Hinduism and Buddhism considered the circle, the square, and the triangle to be the most perfect of building forms. These geometric forms are directly expressed in architecture, but are often different in perception

PRODUCT: Create a hidden picture like those found in the website
www.coolbubble.com/features/hiddenpictures/

7.   **EXAMPLES OF HABIT:**
Throughout history, there have been different examples of theater structures, from the amphitheater to the 360 degree panoramic theater.

PRODUCT: Lead a class debate about the pros and cons of the types of theaters and include your findings.

8. **ORGANIZED RANDOM SEARCH:**
Collect photos of geometric shapes appearing in structures in your city.

PRODUCT: Design a space city using a variety of two- and three-dimensional shapes.

9. **SKILLS OF SEARCH:**
Research the reasons Egyptians built the pyramids in Egypt.

PRODUCT: Create a drawing of a period you would draw for yourself. Show what you would put in it.

10. **TOLERANCE FOR AMBIGUITY:**
You drive on a parkway and park on a driveway.

PRODUCT: Create a rap explaining why all squares are rectangles but not all rectangles are squares.

11. **INTUITIVE EXPRESSION:**
There are so many mathematicians who have contributed to all the mathematical knowledge that we have today.

PRODUCT: Imagine you are a famous mathematician in the 21st century. Write a fictional story of how you feel, what your life is like, and the challenges you face.

12. **ADJUSTMENT TO DEVELOPMENT:**
Environmentalists are concerned about how the growth of the human population is taking a toll on our planet.

PRODUCT: Design an advertisement enticing people to move to your new space colony.

13. **STUDY CREATIVE PEOPLE AND PROCESS:**
M.C. Escher created geometrically accurate and visually stimulating art work.

PRODUCT: Create a mural displaying Escher-like qualities.

14. **EVALUATE SITUATIONS:**
A variety of shapes have been used to create medals of honor for military service.

PRODUCT: Research the significance of the shapes used. Interview someone who received a medal of honor from the U. S. military and ask them to discuss the impact of receiving the medal.

15. **CREATIVE READING SKILL:**
Euclid is considered the "Father of Geometry." Research his contributions to mathematics.

PRODUCT: Role-play Euclid in a presentation to the class.

16. **CREATIVE LISTENING SKILL:**
Geometry has had a significant impact on sound and music. For example: the shape of a guitar, drum, strings on a harp.

PRODUCT: Investigate this topic and produce a multi-media presentation to share your results.

17. **CREATIVE WRITING SKILL**:
Publishing information so that a number of people can have access to that knowledge is a critical to the growth and development of civilization.

PRODUCT: Collect all of the "What am I" poems created by the class, edit them for mathematical content, and "publish" it using word processing software. Ask the school media specialist to place it in the library for the whole school to use.

18.   **VISUALIZATION SKILL:**
Shapes can be found in the man-made world and nature every day.

PRODUCTS: Use a disposable digital camera to take photos of geometric shapes that you found during a "Geometry Walk."

ACADEMIC / CRITICAL THINKING SKILLS
ANALYZING HUMAN ACTIVITIES! (AHA!)

STATE STANDARD # GSS 2   STUDENTS WILL BE ABLE TO: Use geometric shapes to understand efficient, economical bumper sticker designs.   .

ESSENTIAL QUESTION: How does the Universal Theme of **Producing, Exchanging and Distributing** create mastery learning of essential concepts in Geometry?

1.   **PRODUCING, EXCHANGING, AND DISTRIBUTING** [ECONOMICS]
     Textbook or Database: Internet

     KNOWLEDGE:
     Anticipatory Set: Show examples of bumper stickers.
     Students will: Create a bumper sticker for the slogan "If you can read this, thank a teacher" using a variety of geometric shapes.

     COMPREHENSION:
     Students will explain why one shape might work better than another shape for various road signs.

     APPLICATION:
     Anticipatory Set: Show bumper stickers that are not rectangles.

     Students will: Use the phrase "If you can read this, thank a teacher" to create a bumper sticker that is not rectangular in shape.

     Multicultural and/or ESL and/or Bilingual Link: Use a website such as www.freetranslation.com to translate an English phrase into a foreign language for a bumper sticker.

     Mathematics/Science Link and/or Humanities Link: As a class, create a graph to display the various shapes of bumper stickers the class made.

     School-to-Career/Tech Prep Link: Discuss which companies/politicians would or would not benefit from producing bumper stickers.

     HIGHER ORDER THINKING SKILLS (H.O.T.S.):
     Anticipatory Set: Discuss the manufacturing cost effectiveness of bumper stickers.

     Students will: Determine the greatest number of bumper stickers that can be created using one 8 1/2 x 11 inch piece of paper.

Class/team/individual product: Students will create geometry-related bumper stickers using only 1 sheet of paper. Requirements: Bumper sticker must contain some mathematical information and must be readable at a distance of 6 feet.

INDIVIDUAL JOURNAL ASSIGNMENT: Justify which geometric shape for a bumper sticker would be most cost-effective.

HOMELINK: For a period of 4 days, gather data on bumper stickers. Document the various shapes seen on vehicles and bring data to class. Data will be used to create a class graph.

STATE STANDARD #1, 2, 5   STUDENTS WILL BE ABLE TO identify various geometric shapes in the transportation world.

ESSENTIAL QUESTION: How does the Universal Theme of **Transportation** create mastery learning of essential concepts in Geometry?

2. **TRANSPORTATION**
   Textbook or Database: speaker, song clip, internet

   KNOWLEDGE:

   Anticipatory Set: Show various road sign outlines/silhouettes. Listen to "Stop in the Name of Love" (Supremes).

   Students will: Identify the type of sign showed based on its silhouette.

   COMPREHENSION:
   Given a set of road signs, students will identify geometric figures and justify their answer by listing geometric properties of the signs.

   APPLICATION:
   Anticipatory Set: Listen to "Signs" by Tessla or Five Man Electrical Band.

   Students will create a (class / team product): Estimate interior angles of given signs and then use a protractor to give the exact measure.

   Multicultural and/or ESL and/or Bilingual Link: Search the internet to find foreign road signs and print three.

   Mathematics/Science Link and/or Humanities Link: Discuss why they believe signs have rounded vertices.

   School-to-Career/Tech Prep Link: Invite a speaker from the Department of Transportation to visit the class and discuss/answer questions about the geometry of road signs.

   HIGHER ORDER THINKING SKILLS (H.O.T.S.):
   Anticipatory set: Discuss specific needs-based signs (i.e. Deaf child, etc.)

   Students will: Justify the specific needs-based sign they want to create and their choice of shape and color of the sign.

   Class/team/individual product: Create a sign to address a specific need. Give the specific shapes, dimensions, and angle measurements.

<u>INDIVIDUAL JOURNAL ASSIGNMENT</u>: Explain why you chose the shape and color for your sign.

<u>HOMELINK</u>: On the way home from school, document various road signs that you see, indicating specific shapes and approximate angle measures.

STATE STANDARD # GSS 4   STUDENTS WILL BE ABLE TO use appropriate geometric vocabulary to communicate directions.

ESSENTIAL QUESTION: How does the Universal Theme of **Communications** create mastery learning of essential concepts in Geometry?

3. **<u>COMMUNICATIONS</u>**
   Textbook or Database: textbook, movie clips

   <u>KNOWLEDGE</u>:
   Anticipatory Set: Show "Treasure Hunt" clip from <u>National Treasure</u>.

   Students will: participate in "I Describe, you Draw" Activity.

   <u>COMPREHENSION</u>:
   Students will discuss the importance of using vocabulary to obtain the given design.

   <u>APPLICATION</u>:
   Anticipatory Set: Tell students they will be going on a "Treasure Hunt."

   Students will create a (class / team product): Follow a given set of directions to a specific three-dimensional object in the classroom/building.

   Multicultural <u>and/or</u> ESL <u>and/or</u> Bilingual Link: With a partner, describe a geometric shape using only non-verbal communication.

   Mathematics/Science Link <u>and/or</u> Humanities Link: Discuss how topological maps show elevation.

   School-to-Career/Tech Prep Link: Simulate being a 911 emergency dispatch officer to understand the importance of clear and specific directions needed to respond in an emergency.

   <u>HIGHER ORDER THINKING SKILLS (H.O.T.S.)</u>:
   Anticipatory set: Give students a diagram of the emergency exit map of the school.

   Students will: Devise a scavenger hunt to locate 7 geometric shapes in the building.

   Class/team/individual product: Write precise and concise directions to go along with the scavenger hunt. Students will follow each other's scavenger hunt.

   <u>INDIVIDUAL JOURNAL ASSIGNMENT</u>: Tell how difficult or easy it was for you to follow someone else's directions for their scavenger hunt.

STATE STANDARD # GSS 7 STUDENTS WILL BE ABLE TO recognize that spatial figures occur in the real world and be able to build three-dimensional objects with cubes, and sketch the two-dimensional representations of each side.

ESSENTIAL QUESTION: How does the Universal Theme of **Protecting and Conserving** create mastery learning of essential concepts in Geometry?

4. **PROTECTING AND CONSERVING**
   Textbook or Database: internet, Power Point

KNOWLEDGE:
Anticipatory Set: Display pictures of the "Twin Towers" before 9-11.

Students will: Name the three-dimensional figure represented by the towers and sketch the two-dimensional representation of each side.

COMPREHENSION:
Students will give examples in nature that represent three-dimensional geometric objects. Students could use information from national parks to find these examples.

APPLICATION:
Anticipatory Set: Students will predict which three-dimensional object would be the best shape for a recycling bin.
Students will create a (class / team product): Sketch a two-dimensional representation of the recycling bin discussed above.

Multicultural and/or ESL and/or Bilingual Link: Research environmental restrictions and recycling efforts in other countries.

Mathematics/Science Link and/or Humanities Link: Students will create an original diamante poem about three-dimensional shapes using the following format: Line 1: Noun; Line 2: Two adjectives; Line 3: Three action verbs that end in –ing; Line 4: Four nouns; Line 5: Three action verbs that end in –ing; Line 6: Two adjectives; Line 7: Noun.

School-to-Career/Tech Prep Link: Research what type of education they would need to design environmentally friendly structures.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory set: Present materials such as cardboard, straws, tape, toothpicks, string, Popsicle sticks, rubber bands, paper tubes, etc.

Students will: List what needs to be considered when designing a recycling bin.

Class/team/individual product: In groups of 2 or 3, construct an original design for a recycling bin that would hold a given amount of recyclable materials. Identify which group's design is most efficient.

INDIVIDUAL JOURNAL ASSIGNMENT: What do you think the recycling logo means?

STATE STANDARD #GSS 6 STUDENTS WILL BE ABLE TO deliver a focused coherent presentation of their video game project.

ESSENTIAL QUESTION: How does the Universal Theme of **Providing Education** create mastery learning of essential concepts in this unit?

5. **PROVIDING EDUCATION**

KNOWLEDGE:
Anticipatory Set: Show a video clip of Spy Kids 3-D: Games where the kids go from playing the video game to being actually in the game.

Students will: Describe the approximate scale of objects in a video game to objects in real life.

COMPREHENSION:
Compile and categorize all student estimates of the scale. Predict which estimate is closest to the actual.

APPLICATION:
Anticipatory Set: Listen to "Pacman Fever" by Buckner and Garcia.

Students will create a (class / team product): Select a geometric shape in the room and compute the measurements for a 2 to 1 scale similar figure with corresponding sides twice the length of the original.

Multicultural and/or ESL and/or Bilingual Link: Research different types of games from other countries.

Mathematics/Science Link and/or Humanities Link: Discuss the need for proportionally smaller medical tools so they can be used inside small areas of the human body.

School-to-Career/Tech Prep Link: Learn what it would take to become a video game designer.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory set: Show a video clip from Arcade.

Students will: Research a virtual reality game design.

Class/team/individual product: In groups of 3 or 4, prepare an outline for a new geometry-related video game and have a mock-up ready to share with the class.

INDIVIDUAL JOURNAL ASSIGNMENT: Reflect on how virtual reality games might be useful for certain jobs (i.e. training pilots, medical professionals, etc.)

HOMELINK: Explain your group's video game design to your family.

STATE STANDARD # GSS 6   STUDENTS WILL BE ABLE TO draw similar figures that model proportional relationships.   .

ESSENTIAL QUESTION: How does the Universal Theme of **Making and Using Tools and/or Technology** create mastery learning of essential concepts in Geometry?

6. **MAKING AND USING TOOLS AND/OR TECHNOLOGY**

KNOWLEDGE:
Anticipatory Set: Give each group "silly putty" and a comic strip. Listen to the song "It's a Small World After All."

Students will: Make an imprint of a comic and manipulate it to observe what happens to the original print when it is stretched in various directions.

COMPREHENSION:
Summarize the effect of stretching the silly putty.

APPLICATION:
Anticipatory Set: Show the car scene clip from The Nutty Professor.
Students will create a (class / team product): Use 2 rubber bands tied together making a "rubber band sketcher" to draw similar figures reflecting proportional relationships. Compare similar sides to calculate the proportional relationship.

Multicultural and/or ESL and/or Bilingual Link: Compare tools from different countries.

Mathematics/Science Link and/or Humanities Link: Show pictures of the Long Neck Women of the Karen people living along the Thai-Burma border and discuss them.

School-to-Career/Tech Prep Link: Have a caricaturist come to the class to draw caricatures of some of the students.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory set: Show clip from Honey I Shrunk the Kids.

Students will: Devise a way to proportionally shrink a shape.

Class/team/individual product: In teams of 2 or 3, construct the shrunken shape and justify their technique to the class.

INDIVIDUAL JOURNAL ASSIGNMENT: Why are scale drawings important?

HOMELINK: Survey 5 adults to see if they have ever heard of or used ""Shrinky Dinks."

STATE STANDARD # GSS 2, 4 STUDENTS WILL BE ABLE TO use geometric vocabulary to describe recreational activities.

ESSENTIAL QUESTION: How does the Universal Theme of **Providing Recreation** create mastery learning of essential concepts in Geometry?

7. **PROVIDING RECREATION**
Textbook or Database: internet

KNOWLEDGE:
Anticipatory Set: Show a diagram of a basketball court.

Students will: Count the number of parallel and perpendicular lines in a basketball court.

COMPREHENSION: Explain what distinguishes parallel and perpendicular.

APPLICATION
Anticipatory Set: Show hockey and soccer sports field diagrams and discuss the number of vertices, faces, edges in each field.

Students will create a (class / team product):   Construct a table of the total number of vertices, edges and faces for each field: Hockey, soccer and basketball.

Multicultural and/or ESL and/or Bilingual Link: Discuss how "futball is soccer in South America and other countries "favorite" sport (i.e. USA--football, baseball).

Mathematics/Science Link and/or Humanities Link: Show Nike sports commercial.

School-to-Career/Tech Prep Link: Discuss how referees must know about parallel lines in football (i.e. 1st down or high kicked ball for field goal).

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory set: Show commercial on www.verb.com where students make up new rules to football.

Students will: In small groups, design a new sport, including a field design that you can play at home.

Class/team/individual product: Build a model of the playing field.

INDIVIDUAL JOURNAL ASSIGNMENT: How are perfectly parallel and perfectly perpendicular lines on sports fields important?

HOMELINK: Play the game you designed in the previous section.

STATE STANDARD #GSS 1, 2, 3 STUDENTS WILL BE ABLE TO use standard language and geometric vocabulary to describe geometric shapes in flags of different nations.

ESSENTIAL QUESTION: How does the Universal Theme of **Organizing and Governing** create mastery learning of essential concepts in Geometry?

8. **ORGANIZING AND GOVERNING**

KNOWLEDGE:
Anticipatory Set: Show video clip of the opening ceremonies of the Olympics showing flags of different nations.

Students will: Students will brainstorm different geometric shapes that might be represented on a flag. (Flag website: www.fotw.net/flags/)

COMPREHENSION:
Generalize the most frequently used geometric shape on national flags.

APPLICATION:
Anticipatory Set: Play the Star Spangled Banner and We Are the World.

Students will create a (class / team product): Produce a line graph of the various shapes that appear in the flags from the activities above.

Multicultural <u>and/or</u> ESL <u>and/or</u> Bilingual Link: Research the basis of the designs of a flag from a different nation.

Mathematics/Science Link <u>and/or</u> Humanities Link: Determine whether all flag dimensions and/or areas are the same.

School-to-Career/Tech Prep Link: Use a computer drawing program to create a school flag.

<u>HIGHER ORDER THINKING SKILLS (H.O.T.S.)</u>:
Students will: Categorize continental flags for similarities in design.

Class/team/individual product: Create a fictional country and design a flag based on the values and principals of that fictional country.

<u>INDIVIDUAL JOURNAL ASSIGNMENT</u>: What does the American Flag mean to you?

<u>HOMELINK</u>: Discuss the importance/pride of the flag over the past several decades.

STATE STANDARD # GSS   4   STUDENTS WILL BE ABLE TO gain an appreciation for those who are elderly disabled and the challenges they face daily.

ESSENTIAL QUESTION: How does the Universal Theme of **Moral, Ethical and Spiritual Behavior** to create mastery learning of essential concepts in Geometry?

9. **<u>MORAL, ETHICAL AND SPIRITUAL BEHAVIOR</u>**

<u>KNOWLEDGE</u>:
Anticipatory Set: Play "Stairway to Heaven"

Students will: Identify problems elderly or disabled individuals may encounter as they try to go about their daily routines.

<u>COMPREHENSION</u>:
Students will defend the decision to modify water fountains at public places so they are handicapped accessible.

<u>APPLICATION</u>:
Anticipatory Set: Show scenes from <u>Misery</u> as the male character is trying to escape from the house.

Students will create a (class / team product): Go on a school tour to observe and record changes/modifications necessary to prepare the building for handicapped students.

Multicultural <u>and/or</u> ESL <u>and/or</u> Bilingual Link: Research disability laws in other countries.

Mathematics/Science Link <u>and/or</u> Humanities Link: Discuss how a handicap ramp is a simple machine and how other simple machines can aid the disabled and elderly.

School-to-Career/Tech Prep Link: Invite the school nurse to lead a variety of activities for students to experience what a handicapped person must go through every day.

<u>HIGHER ORDER THINKING SKILLS (H.O.T.S.)</u>:
Anticipatory set: Show Lincoln Memorial scene from <u>National Treasure</u>.

Students will: Discuss what makes this structure not handicapped accessible.

Class/team/individual product: In small groups, design a handicapped accessible ramp to enter a building whose door is 10 feet above ground level. The design needs to be cost-efficient.

INDIVIDUAL JOURNAL ASSIGNMENT: Write a letter to a politician justifying the need for handicapped accessible drinking fountains in public places.

HOMELINK: Figure out what you would have to do to make your house handicapped accessible.

STATE STANDARD #GSS 1, 2 STUDENTS WILL BE ABLE TO create a stained glass window using the following elements of design: line, shape, space and color.   .

ESSENTIAL QUESTION: How does the Universal Theme of Aesthetic Needs create mastery learning of essential concepts in Geometry?

10. **AESTHETIC NEEDS**

KNOWLEDGE:
Anticipatory Set: Bring in apples and oranges (various fruits).

Students will: Cut fruits in half and discuss geometry that occurs in nature.

COMPREHENSION:
Students will explain through verbal brainstorming how geometry occurs in nature. Record on a class chart.

APPLICATION:
Anticipatory Set: Show CD "Wright Art Glass."

Students will create a (class / team product): Create an art glass window using the seven basic shapes. Arrange designs on the ceiling as one large stained glass window.

Multicultural and/or ESL and/or Bilingual Link: Show pictures of stained glass windows in other countries.

Mathematics/Science Link and/or Humanities Link: Write a poem displaying the beauty represented in their class stained glass window.

School-to-Career/Tech Prep Link: Have the art teacher demonstrate painting a "real" piece of glass.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory set: Play "Window Pane Blues" by Tommie Bradley.

Students will: Research Frank Lloyd Wright's "A Tree of Life."

Class/team/individual product: In groups of two or three, design a model of a building that contains two to three stained glass windows that are proportional to the building.

INDIVIDUAL JOURNAL ASSIGNMENT: Compare and contrast the feelings you have when you look through a stained glass window compared to a regular window.

STATE STANDARD #GSS 1   STUDENTS WILL BE ABLE TO Identify and describe geometric components of architectural structures within different eras.

ESSENTIAL QUESTION:
How does the discipline/sub-discipline of Architecture relate to mastery learning of Geometry?

11. ARCHITECTURE
Textbook or Database: Internet Search, Power Point

KNOWLEDGE:
Anticipatory Set: Show a Power Point presentation of buildings and other architectural features from different eras.

Students will: Identify various two- and three-dimensional shapes in these photos.

COMPREHENSION:
Students will explain the properties and characteristics of two-and three-dimensional shapes.

APPLICATION:
Anticipatory Set: Take students on a "geometry tour" of the neighborhood and observe various geometric shapes.

Students will: Discuss similarities and differences in the architecture from the Power Point presentation to the structures seen on the "geometry tour."
Class/team product: Students will create a Venn diagram of the similarities and differences identified in their team discussion.

Multicultural and/or ESL and/or Bilingual Link: Compare different types of dwellings for different cultures.

Mathematics/Science Link and/or Humanities Link: Discuss bridge design aesthetics and stability features that would be needed in different geographical areas.

School-to-Career/Tech Prep Link: Invite a local architect to come in and discuss how geometry is an important part of building designs.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory set: Give each student an index card with the name of an architectural structure and discuss geometric characteristics of these buildings.

Students will: Create a rough sketch of their structure and determine what items they will need to construct a model of their structure.

Class/team/individual product: Use a variety of objects (i.e. paper rolls, construction paper, index cards, straws, tape, glue, etc.) to construct a model of the structure written on their index card.

INDIVIDUAL JOURNAL ASSIGNMENT: What era would you like to have lived in based on what you have learned about building design? Why?

HOMELINK: Look at the buildings on your street. Based on the geometric designs in the buildings, what decade do you think these structures were built?

STATE STANDARD # GSS 5 STUDENTS WILL BE ABLE TO describe positions and orientations of two-dimensional shapes after transformations.

ESSENTIAL QUESTION:
How does the discipline/sub-discipline of Art   relate to mastery learning of Geometry?

12. <u>ART</u>
Textbook or Database: LCD projector, internet, drawing software

<u>KNOWLEDGE</u>:
Anticipatory Set: Play "Turn, Turn, Turn" by the Byrds. Write the words slide, flip, turn on the board. Write the words translation, rotation, reflection, and dilation on the board.

Students will: Draw an example that illustrates the meaning of each word.

<u>COMPREHENSION</u>:
Translate the basic words into the formal words for the transformations (i.e. slide = translation)

<u>APPLICATION</u>:
Anticipatory Set: Display a triangle on the overhead.

Students will create a (class / team product): Discuss as a class how you can translate, rotate and reflect the triangle. The students can demonstrate using the computer.

Multicultural <u>and/or</u> ESL <u>and/or</u> Bilingual Link: Research HEX signs and explain what each color and shape used represents. Internet links: <u>www.folkart.com/hex/meaning.htm</u> <u>www.caneandreed.com/hexsigns.html</u> , <u>www.ea.pvt.klz.pa.us/htm/Units/IsDevon/hexsigns01.htm</u>

Mathematics/Science Link <u>and/or</u> Humanities Link: How many 12-inch quilt squares are needed to cover a queen-sized bed?

School-to-Career/Tech Prep Link: Invite someone in to display the quilts he or she has made.

<u>HIGHER ORDER THINKING SKILLS (H.O.T.S.)</u>:
Anticipatory set: Cut out pictures of quilts from magazines or off the internet.

Students will: Create an individual, unique design on a blank quilt square using crayons, colored pencils, or markers.

Class/team/individual product: Create a 40 cm x 40 cm quilt square for each transformation. As a class, connect the individual quilts to create a class transformation quilt for display.

<u>INDIVIDUAL JOURNAL ASSIGNMENT</u>: Explain which transformation is the simplest to draw and why.

<u>HOMELINK</u>: Make a mosaic quilt of your family heritage. Include all four transformations. Use 12" x 12" graph paper.

STATE STANDARD #GSS 3 STUDENTS WILL BE ABLE TO use multiple classification criteria to classify triangles based on sides and angles.

ESSENTIAL QUESTION:
How does the discipline/sub-discipline of Geography relate to mastery learning Geometry?

13. <u>GEOGRAPHY</u>
    Textbook or Database:

<u>KNOWLEDGE</u>:
Anticipatory Set: Show "Devil's Triangle" clip from PBS' <u>Savage Seas: The Captain's Bridge</u>
discussing ships disappearing in the Bermuda Triangle.

Students will: Use a picture of the triangle and have students characterize the triangle based on sides and angles.

<u>COMPREHENSION</u>:
Students should be able to give examples of other triangles in nature and classify each.

<u>APPLICATION</u>:
Anticipatory Set: Listen to "Walk Like and Egyptian."

Students will create a (class / team product): Cut triangles out of construction paper to create all 7 different types of triangles (i.e. scalene right triangle, scalene obtuse, etc.)

Multicultural <u>and/or</u> ESL <u>and/or</u> Bilingual Link: Talk about Egyptian pyramids and why they were built.

Mathematics/Science Link <u>and/or</u> Humanities Link: Discuss how leverage would have helped to build pyramids.

School-to-Career/Tech Prep Link: Discuss how scientists discovered surface tension of water holds boats up. If the surface tension is not there, the boat will sink.

<u>HIGHER ORDER THINKING SKILLS (H.O.T.S.)</u>:
Anticipatory set: Show pictures of a diamond mine.

Students will: Estimate the number of triangular faces on a diamond using a close-up picture of a diamond.

Class/team/individual product: Construct an icosahedron.

<u>INDIVIDUAL JOURNAL ASSIGNMENT</u>: How is a pyramid much more of a sound structure than a traditional skyscraper? What are the disadvantages of a pyramid in a heavily populated country?

<u>HOMELINK</u>: Draw a blueprint of a triangle shaped house. How would you design it?

STATE STANDARD #GSS 1-7 STUDENTS WILL BE ABLE TO recognize and appreciate references to geometry in literature.

ESSENTIAL QUESTION:
How does the discipline/sub-discipline of Literature   relate to mastery learning of Geometry?

14. <u>LITERATURE</u>
    Textbook or Database:

KNOWLEDGE:
Anticipatory Set: Display a variety of fiction and non-fiction books related to geometry.

Students will: Be able to select a book, skim through it, and identify several geometry concepts.

COMPREHENSION:
Explain the concepts located in the book and state specific examples.

APPLICATION:
Anticipatory Set: Teach students an appropriate song from the website www.songsforteaching.com

Students will create a (class / team product): Use geometry terms to create a "What am I?" poem for a particular two- or three-dimensional shape or object.

Multicultural and/or ESL and/or Bilingual Link: Bring in foods from other countries in a specific shape (baklava, pizza, sushi)

Mathematics/Science Link and/or Humanities Link: Research the Greek or Latin origin of the terms.

School-to-Career/Tech Prep Link: Invite a foreign-exchange student in to talk to the class.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory set: Show a clip from Short Circuit."

Students will: Design and construct a "GeoBot" made of different two- and three-dimensional shapes.

Class/team/individual product: Construct their "GeoBot" and explain what it is made of and infer how the GeoBot would feel to be made of different shapes (i.e. having a smooth circle right up against a pointy triangle).

INDIVIDUAL JOURNAL ASSIGNMENT: Describe what your GeoBot was designed to do.

HOMELINK: Watch the movie "Short Circuit."

STATE STANDARD #GSS 3 STUDENTS WILL BE ABLE TO identify and classify geometric shapes.

ESSENTIAL QUESTION:
How does the discipline/sub-discipline of Astronomy relate to mastery learning of Geometry?

15. ASTRONOMY

KNOWLEDGE:
Anticipatory Set: Students will view photos of Milky Way on the internet and in astronomy magazines.

Students will: List shapes found in the photos above. Share pictures and identify geometric shapes with a partner.

COMPREHENSION:
Students will draw and name geometric shapes after viewing pictures on the internet (NASA website) of constellations. Determine their significance.

APPLICATION:
Anticipatory Set: Visit a planetarium. Discuss major constellation in Ohio at this time of year.

Students will create a (class / team product):   In small groups of 2 or 3, make a peep box to show constellations visible in Ohio at this time of year.

Multicultural and/or ESL and/or Bilingual Link: Study the constellation myth in four other countries.

Mathematics/Science Link and/or Humanities Link: Discuss and evaluate the importance of mathematics to astronomers and other jobs related to space.

School-to-Career/Tech Prep Link: Research qualifications and educations requirements to be an astronomer.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory set: Review myths about stars from the website Windows to the Universe
www.windows.ucar.edu

Students will: Create a constellation.

Class/team/individual product: Students will discuss and design a three-dimensional model of a new constellation and explain its importance.

INDIVIDUAL JOURNAL ASSIGNMENT: Students will answer in journal if people still use myths to explain unknown phenomena.

HOMELINK: Students discuss with older family members if they have myths they believe in when experiencing unknown phenomena.

STATE STANDARD #GSS 2, 3   STUDENTS WILL BE ABLE TO identify the relationship between the number of sides in a regular polygon and the number of struts (diagonals) needed to make each polygon rigid.

ESSENTIAL QUESTION:
How does the discipline/sub-discipline of Cooperation create mastery learning of the essential concepts in Geometry?

16. **COOPERATION**

KNOWLEDGE:
Anticipatory Set: Show Magic School Bus #304: "Under Construction"

Students will: predict what design they would need to build a structure to escape danger.

COMPREHENSION:
Explain that all shapes are not rigid (stable) and that structures can be made to fit together, stand on their own and bear their own weight.

APPLICATION:

Anticipatory Set: Provide for students 25 strips of 1cm by 7 cm paper with holes punched near each end; 10 strips of 1cm by 30 cm with holes punched near one end of each strip; 25 1-inch paper fasteners, hole punch to share and scissors.

Students will create a (class / team product): A triangle, square, rectangle, pentagon, hexagon by connecting paper strips with paper fasteners. As a class, determine which shapes are flexible and which are rigid. Determine the least number of support struts (diagonals) that are needed to form rigid shapes.

Multicultural <u>and/or</u> ESL <u>and/or</u> Bilingual Link: Learn the names for these shapes in another language.

Mathematics/Science Link <u>and/or</u> Humanities Link: Create a pop-up shape geometry shape book to give to students in an elementary classroom.

School-to-Career/Tech Prep Link: Discuss importance of bridge design and show video clip of the Tacomna Narrows Bridge collapse.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory set: View clip from <u>Skyscraper: Higher and Higher.</u>

Students will: Note an "triangle power" being used in any of the buildings in the video.

Class/team/individual product: Within small groups, students will roll newspaper into cylinders and tape them together. Individual groups will develop techniques to hold the joints of several cylinders together to form a wall to be joined with other team walls until they have a space large enough to walk inside. No ceiling is required and teams must use as few newspaper cylinders as possible.

INDIVIDUAL JOURNAL ASSIGNMENT: Write to Mrs. Frizzle's class and advise them how to successfully build a tall, rigid and strong building.

HOMELINK: Clip pictures from newspapers or magazines that display buildings, bridges or other structures showing how triangles are used in construction.

STATE STANDARD #GSS 2 STUDENTS WILL BE ABLE TO identify various objects they encounter in daily life.

ESSENTIAL QUESTION:
How does the discipline/sub-discipline of Daily Life relate to mastery learning of Geometry?

17. **DAILY LIFE**

KNOWLEDGE:
Anticipatory Set: Show pictures of stairways, bridges, soccer balls, books, etc.

Students will: Describe what these items have in common.

COMPREHENSION:
Student will distinguish the 7 basic shapes (circle, triangle, quadrilaterals, pentagons, hexagons, octagons, decagons) . They will give properties of each using appropriate vocabulary.

APPLICATION:
Anticipatory Set: Play "Round and Round" by Aerosmith and "Hip to be Square" by Huey Lewis and the News.

Students will create a (class / team product): Develop a chart to display what students use everyday with the 7 basic shapes.

Multicultural and/or ESL and/or Bilingual Link: Brainstorm how various cultures utilize shapes (i.e. Eiffel Tower, etc.).

Mathematics/Science Link and/or Humanities Link: Change lyrics of song "Signs" to "Shapes."

School-to-Career/Tech Prep Link: List careers that use geometry.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory set: Show circle of life scene from Lion King.

Students will: Compile a collection of photos from magazine which portrays geometric shapes.

Class/team/individual product: Create a class collage using pictures they collected.

INDIVIDUAL JOURNAL ASSIGNMENT: How did this lesson open your eyes to geometry in your surroundings?

HOMELINK: Walk through your house and sketch shapes you see.

**MORAL / ETHICAL / SPIRITUAL
REASONING AND DILEMMAS
FOR CHARACTER EDUCATION**

TEN ETHICAL DILEMMAS
STATE STANDARD # GSS 1-7

ESSENTIAL QUESTION: How does the content of this unit reflect **character education** through Moral and Ethical dilemmas?

1.   **Producing, Exchanging, and Distributing** [Economics]
ESSENTIAL QUESTION: How does the **Human Activity** of **Producing, Exchanging and Distributing** create moral/ethical dilemmas?

DILEMMA: What is displayed on various bumper stickers can arouse different emotions within people. In our society, we are allowed to practice freedom of speech even though it may be offensive and demoralizing to others. How would you handle a situation in which a family member has a bumper sticker that is offensive to you.

2.   **Transportation**
ESSENTIAL QUESTION: How does the **Human Activity** of **Transportation** create moral/ethical dilemmas?

DILEMMA: While driving a route you regularly take you notice the stop sign is laying in the ditch. This area is heavily patrolled due to a rash of stolen street signs. You feel obligated to fix the sign in hopes of preventing an accident from occurring. Should you risk being accused of trying to steal the sign while trying to fix it or should you ignore the matter and let someone else deal with it?

3.   **Communications**
ESSENTIAL QUESTION: How does the **Human Activity** of **Communications** create moral/ethical dilemmas?

DILEMMA: A new student enrolls in your school. He is unsure of where he is to go for each class so your friends give him bogus directions. You know by following their directions, he will be late to class. Do you try to catch him to give him the correct directions even though you risk being ridiculed by your friends?

4.   **Protecting and Conserving**
ESSENTIAL QUESTION: How does the **Human Activity** of **Protecting and Conserving** create moral/ethical dilemmas?

DILEMMA: Your city council has determined it is too costly to do curbside recycling pick-up; however, they will keep the recycling center open for people who want to drop off their recycling. You have learned the importance and benefits of recycling and believe the program should continue. What could you do to see that recycling does not end in your city?

5.   **Providing Education**
ESSENTIAL QUESTION: How does the **Human Activity** of **Providing Education** create moral/ethical dilemmas?

DILEMMA: Your younger brother wants a new video game for his X-box system. Your mother is not in tune with the video game rating system. You know the game is not appropriate for his age group. Do you discuss this with your mom knowing you would like to have the game yourself and your brother would be angry with you?

6.   **Making and Using Tools and/or Technology**
ESSENTIAL QUESTION: How does the **Human Activity** of **Making and Using Tools and/or Technology** create moral/ethical dilemmas?

DILEMMA: You are the president of a car manufacturer and you need to cut production costs. They have found a cheaper way to manufacture and you need to cut production costs. They have found a cheaper way to manufacture safety devices in vehicles (airbags, seatbelts, etc.). Using these cheaper devices will reduce manufacturing costs but may lead to more severe injuries. What should you do? Defend your position.

7.   **Providing Recreation**
ESSENTIAL QUESTION: How does the **Human Activity** of **Providing Recreation** create moral/ethical dilemmas?

DILEMMA: You and a teammate forge notes from your mothers stating that you cannot participate in P.E. (you have a tournament game that night). The principal calls you into the office one at a time to question you. Your friend lies and gets away with it. You know your parents will be angry if you lie. When the principal asks you about the note, how do you respond?

8.   **Organizing and Governing**
ESSENTIAL QUESTION: How does the **Human Activity** of **Organizing and Governing** create moral/ethical dilemmas?

DILEMMA: You are the President of the United States. The Senate and House have presented you with a bill to sign that will eliminate all references to God in government documents (i.e. removing "in God we trust" from our currency, "under God" from the Pledge of Allegiance, etc.). Do you veto the bill? Defend your decision.

9. Moral, Ethical and Spiritual Behavior

ESSENTIAL QUESTION: How does the **Human Activity** of **Moral, Ethical and Spiritual Behavior** create moral/ethical dilemmas?

DILEMMA: Your mother, who is not handicapped, wants to run into the mall for a few errands. You circle the parking lot a number of times and cannot find a spot except for those identified as "handicapped." Your mother questions whether or not she should park there. How do you respond?

10. Aesthetic Needs

ESSENTIAL QUESTION: How does the **Human Activity** of **Aesthetic Needs** create moral/ethical dilemmas?

DILEMMA: On your way home from school, you notice the school bullies defacing tombstones in the cemetery. They notice you watching them and you take off. They chase you until you reach home. What do you do the next day at school?

PRODUCTIVE THINKING SKILLS
DIVERGENT / CREATIVE THINKING

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1. **BRAINSTORM MODEL**
   A. BRAINSTORM ALL OF THE _____ .
   AHA #1: Bumper sticker slogans you have seen
   AHA #2: All the road signs on your way to school
   AHA #3: all the ways you can communicate to someone
   AHA #4: skyscrapers you know
   AHA #5: video games
   AHA #6: cartoons/comic strip characters
   AHA #7: parallel and perpendicular examples found in nature

   B. BRAINSTORM AS MANY _____ AS YOU CAN THINK OF.
   AHA #8: countries that participate in the Olympics
   AHA #9: handicaps
   AHA #10: fruits
   AHA #11: stores/buildings
   AHA #12: things that can turn
   AHA #13: supernatural occurrences
   AHA #14: books involving shapes

   C. HOW MANY WAYS CAN YOU COME UP WITH TO _____ ?
   AHA #15: count stars
   AHA #16: stay safe
   AHA #17: describe objects

2. **VIEWPOINT MODEL (Human or Animate)** USE CULTURAL LITERACY TERMS
   A. HOW WOULD _____ LOOK TO A(N) _____ ?
   AHA #1: bumper stickers/ Archimedes
   AHA #2: road sign/an animal
   AHA #3: map/protractor
   AHA #4: skyscraper/polygon
   AHA #5: the classroom/PacMan
   AHA #6: comic strips/Egyptian
   AHA #7: basketball court/ant

AHA #8: a state flag/country flag

B. WHAT WOULD A _____ MEAN FROM THE VIEWPOINT OF A(N)_____?
AHA #9:   slope/wheelchair
AHA #10: seed/apple
AHA #11: penny/top of the Eiffel Tower
AHA #12:   mirror/reflection
AHA #13: Bermuda Triangle / pirate
AHA #14: polygon/book
AHA #15:   vertex/constellation
AHA #16: escape ladder/building
AHA #17: pentagon/soccer ball

C. HOW WOULD <u>Archimedes</u> VIEW THIS?
      (Use one person from history here)
1: skyscrapers
2: modern architecture
3: space ship
4: computers
5: digital clocks
6: cars

3. **INVOLVEMENT MODEL (Personification / Inanimate object brought to life)**
A. HOW WOULD YOU FEEL IF YOU WERE_____?
AHA #1: the glue on the back of a bumper sticker
AHA #2: a Detour sign
AHA #3: you were the treasure at the end of a treasure map
AHA #4: the earth and rocks beneath a skyscraper
AHA #5: in a video game
AHA #6: silly putty
AHA #7:   a basketball

B. IF YOU WERE A_____, WHAT WOULD YOU (SEE, TASTE, SMELL, FEEL, etc.)?
AHA #8:   shape of a flag
AHA #9:   walking cane
AHA #10: pine cone
AHA #11: column
AHA #12: slide
AHA #13: triangle
AHA #14: page number

C. YOU ARE A _____. DESCRIBE HOW IT FEELS.
AHA #15: star
AHA #16: brick in a building
AHA #17: decagon

4. **CONSCIOUS SELF–DECEIT MODEL**
A. SUPPOSE_____. WHAT_____.
AHA #1: bumper stickers could talk/would else would they say besides their slogan
AHA #2: there were no road signs/would traffic be like
AHA #3: the map could talk/would it say
AHA #4: shapes grew on trees/would the juice be called
AHA #5: video games were never invented/would you do in your free time
AHA #6: suppose you were stretchable/would your day be like
AHA #7: train tracks weren't parallel/would train wheels have to look like

AHA #8: countries did not have flags/would their symbols be shown on
AHA #9: there were no laws protecting handicapped people/would the like of a handicapped person be like

B. YOU CAN _____ . WHAT _____?
AHA #10: see deep into the ocean/would you see
AHA #11: morph shapes/structure would you be
AHA #12: turn back time/would you do differently
AHA #13: build a pyramid/materials would you use
AHA #14: crawl inside a math book/do you hear
AHA #15:   win a trip to space/would you take
AHA #16:   see through buildings/would you do with this power
AHA #17:   connect every shape without a gap/would it look like

5.   **FORCED ASSOCIATION MODEL** USE CULTURAL LITERACY TERMS HERE
       A. HOW IS _____ LIKE _____?
       AHA #1: cylinder/tunnel
       AHA #2:   road sign/your parent
       AHA #3: scavenger map/lion
       AHA #4: recycling bin/Bermuda Triangle
       AHA #5: copy machine/rubber band sketcher
       AHA #6:   rubber band / transformation
       AHA #7: arena/basketball court

       B. GET IDEAS FROM _____ TO IMPROVE _____ .
       AHA #8:   tessellations/our flag
       AHA #9:   disabled veterans/mobility within society
       AHA #10: Frank Lloyd Wright/the window in your school
       AHA #11: ivy/houses
       AHA #12: M. C. Escher / rocket design
       AHA #13:   Pascal / building structures
       AHA #14: ghost/tesselations

       C. I ONLY KNOW ABOUT _____ . EXPLAIN _____ TO ME.
       AHA #15: two-dimensional shapes/three-dimensional shapes
       AHA #16: being flexible/being rigid
       AHA #17:   algebra/geometry

6.   **REORGANIZATION / SYNECTICS MODEL**
       A. WHAT WOULD HAPPEN IF _____ ?
       AHA #1: bumper stickers were illegal
       AHA #2: you had to learn a special code to read road signs
       AHA #3: everyone had the same treasure map
       AHA #4: Americans did not recycle
       AHA #5: architects could not use scale drawings
       AHA #6: you were shrunk to an inch tall
       AHA #7:   there were no regulations for field sizes

       B. SUPPOSE _____ (HAPPENED) WHAT WOULD BE THE CONSEQUENCES?
       AHA #8: Mexico became part of the United States
       AHA #9: there were no elevators
       AHA #10: all windows were stained glass
       AHA #11: houses had to be built underground
       AHA #12: quilts were never invented

AHA #13: the Bermuda Triangle moves
AHA #14: everyone was a GeoBot

C. WHAT WOULD HAPPEN IF THERE WERE NO _____ ?
AHA #15: differentiation between night and day
AHA #16: ceilings
AHA #17: geometric shapes

CULTURAL LITERACY

1. accessible
2. acute triangle
3. Archimedes
4. architecture
5. astronomy
6. Bermuda Triangle
7. bridges
8. caricatures
9. caricaturist
10. circle
11. coherent
12. comic strips
13. compile
14. concise
15. congruent
16. constellations
17. cost-efficient
18. cylinder
19. decagon
20. Devil's Triangle
21. diagonals
22. dilation
23. diamante poem
24. distinguish
25. dwellings
26. Egyptian
27. equilateral triangle
28. essential
29. face
30. flags
31. flexible
32. flip
33. Frank Lloyd Wright
34. fruits
35. GeoBot
36. Golden Triangle
37. hexagon
38. icosahedron
39. interior angles
40. intersecting
41. isosceles triangle
42. Johannes Kepler
43. Lincoln Memorial
44. manipulate
45. mosaic

46. obtuse triangle
47. octagon
48. Pac Man
49. parallel
50. parallelogram
51. paraphrase
52. Paschal
53. pentagon
54. perpendicular
55. phenomena
56. plane
57. polygon
58. predict
59. prism
60. proportional
61. protractor
62. pyramid
63. quadrilateral
64. rectangle
65. recyclable
66. reflection
67. regulations
68. rhombus
69. right triangle
70. rigid
71. road sign
72. rocket design
73. rotation
74. rubber band sketcher
75. scalene triangle
76. scavenger hunt
77. silhouette
78. slide
79. slogan
80. spots
81. square
82. struts
83. table
84. techniques
85. tessellations
86. Thai-Burma
87. three-dimensional
88. topological
89. topological map
90. transformations
91. translation
92. trapezoid
93. treasure hunt
94. triangle
95. triangular prism
96. turn
97. two-dimensional
98. vertices

Phrases

1. The bigger they come, the harder they fall.
2. Genius is one percent inspiration and ninety-nine percent perspiration.
3. If at first you don't succeed, try, try again.
4. Ignorance is bliss.
5. Knowledge is power.
6. Let's cross that bridge when we come to it.
7. Love makes the world go 'round.
8. A man's home is his castle.
9. One good turn deserves another.
10. People who live in glass houses should not throw stones.
11. Rome was not built in a day.
12. There's no place like home.
13. Walls have ears.
14. You can't fit a round peg in a square hole.
15. Come full circle.
16. From pillar to post.
17. Read between the lines.
18. Star-crossed lovers.
19. Vicious circles.

<u>RESOURCES</u>

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3. Burke, Jane <u>Shapes and Spaces for Grades 5 and Up</u>
4. Bowman-Crum, Mary   <u>Day in the Life of an Architect</u>
5. Brown-Glenn, Patricia <u>Under Every Roof</u>
6. Cohen, David   <u>Real Life Math – Book 1:Exploring Math</u>
7. Crosbie, Michael and Rosenthal, Steve <u>Architecture Shapes</u>
8. Frank, Marjorie <u>The Kids Stuff Book of Math for the Middle Grades</u>
9. Herbert, Janis <u>Leonardo DaVinci for Kids: His Life and Ideas</u>
10. Isaacson, Philip <u>Round Buildings, Square Buildings and Buildings that Wiggle Like Fish</u>
11. Juster, Norton <u>The Phantom Tollbooth</u>
12. Klette, Reinhard and Rosenfeld, Azriel <u>Digital Geometry: Geometric Methods for Digital Image Analysis (Morgan Kaufmann Series in Computer Graphics and Geomtric Modeling)</u>
13. Miller, Bob <u>Bob Miller's Geometry Book for the Clueless</u>
14. Neuschwander, Cindy <u>Sir Cumference and the Knights of the First Round Table</u>
15. Neuschwander, Cindy   <u>Mummy Math: An Adventure in Geometry</u>
16. Onyefulu, Ifeoma   <u>Triangle for Adora: An African Book of Shapes</u>
17. Reeves, Diane <u>Career Ideas for Kids Who Like Math</u>
18. Sheldrick Ross, Catherine <u>Circles: Fun Ideas for Getting Around in Math</u>
19. Spangler, David <u>Math for Real Kids</u>
20. Steel, Margarite <u>The Art of Shapes for Children and Adults</u>
21. Szecsei, Denise <u>Complete Idiot's Guide to Geometry</u>
22. Thorne-Thompsen, Kathleen <u>Frank Lloyd Wright for Kids: His Life and Ideas</u>
23. Thorne-Thompsen, Kathleen <u>Greene and Greene for Kids: Art, Architecture and Activities</u>
24. VanCleave, Janice <u>Janice VanCleave's Geometry for Every Kid: Easy Activities That Make Learning Geometry Fun (Science for Every Kid Series)</u>
25. Weitzman, David, Allison, Linda and Burns, Marilyn <u>Brown Paper School Book: I Hate Mathematics! (Brown Paper School Books)</u>

III.   **Educational Films / Videos**

1. Basic Math Tutor Series
2. Magic School Bus #304 "Under Construction"
3. "Skyscraper: Higher and Higher" #5 in series
4. Math Grows Up: Patterns and Relationships
5. Basic Geometry
6. World of Geometry
7. Standard Deviants DVD- Geometry
8. Learning 2000

9. Geometry from the Land of Incas
10. Geometria
11. Angles and Angle Measure
12. Fundamental Geometric Concepts
13. Variations of Congruent Triangles
14. Parallel Lines and Planes
15. Bubble-ology and Geometry
16. Math Monsters Episode #5 "Geometry"

IV. **Commercial Films / Videos**

1. Above the Rim, 1994
2. American Anthem, 1986
3. American Cyborg: Steel Warrior, 1994
4. Bean Stalk, 1994
5. Bliss, 1985
6. Creatures of the Black Lagoon, 1954
7. Ernest Rides Again, 1993
8. Firetrap, 2001
9. Friday the 13th Part 3, 1982
10. Ghostbusters 2, 1989
11. Hockey Night, 1984
12. I, Robot, 2004
13. Local Hero, 1983
14. Money Train, 1995
15. Quo Vadis, 1985
16. Rome, 1978
17. Short Circuit, 1986
18. Skyscrapers, 1995
19. The Arrival, 1996
20. The Blue Lagoon, 1980
21. The Grey Fox, 1983
22. The Matrix, 1999
23. The Mummy Returns, 2001
24. The Mummy, 1999
25. The Nutty Professor, 1996
26. Two Lost Worlds, 1950
27. What Women Want, 2000
28. Without Limits, 1997
29. You've Got Mail, 1998

V. **Poetry**
A Light in the Attic Shel Silverstein
Where the Sidewalk Ends Shel Silverstein
Falling Up Shel Silverstein
Geometry Rita Dave
The Edge of the World Shel Silverstein
Shapes Shel Silverstein
Best Witchcraft is Geometry Emily Dickinson

VI. **Drama** (Stage Productions)
Fermat's Last Tango

Proof
Arcadia
Lion King

VII. **Art Works**
Various works by M. C. Escher
Various works by Leonardo DaVinci

VIII. **Music**

1. "Geometry Park" Geometry Park USA
2. "Get Around" Beach Boys
3. "Hip to be Square" Huey Lewis and the News
4. "I Get Around" Beach Boys
5. "It's a Small World After All" Disney's Theme Park Sing Along
6. "Massacree (Alice's Restaurant)" Arlo Guthrie
7. "Polygon Rap" Mary Perrine
8. "Power of Two" Indigo Girls
9. "Round and Round" Aerosmith
10. "Signs" Tessla or Five Man Electric Band
11. "Stairway to Heaven" Led Zepplin
12. "Star Spangled Banner" National Anthem
13. "Stop in the Name of Love "Supremes
14. "Third Degree" Eric Clapton
15. "Turn, Turn, Turn" Byrds
16. "Walk Like an Egyptian" The Bangles
17. "Way Down the Line" Offspring
18. "We Are the World" USA for Africa
19. "Window Pane Blues" Tommie Bradley
20. "Yakity Yak" Coasters

IX. **Resource People / Mentors**
1. Local caricaturist/artist
2. School nurse
3. Art teacher
4. Local Architect
5. Quilt maker

X. **Field Trips**
1. Art Museum
2. Planetarium
3. Frank Lloyd house (i.e. Wescott House in Springfield, Ohio)

XI. **Other Material - (CD–ROM, Laser Disc, Internet sites, etc.)**
1. www.mcwdn.org/Geometry/GeoMain.html
2. www.gluckman.com/LongNeck.html
3. www.fotw.net/flags
4. www.mscc.cc.tn.us/webs/vyoung/songs/Tables.htm
5. www.songsforteaching.com
6. www.cut-the-knot.com
7. www.FunBrain.com
8. www.math.com
9. www.mathmadeasy.com
10. www.hotmath.com
11. www.folkart.com./hex/meaning.htm

12. www.caneandreed.com/hexsigns.html
13. www.mathgoodies.com
14. www.explorelearning.com
15. www.taj-mahal-india-travel.com
16. Tesselations (CD-rom)
17. computer drawing software
18. Polygon Game by Jax (board game)
19. Geoshapes (board game)