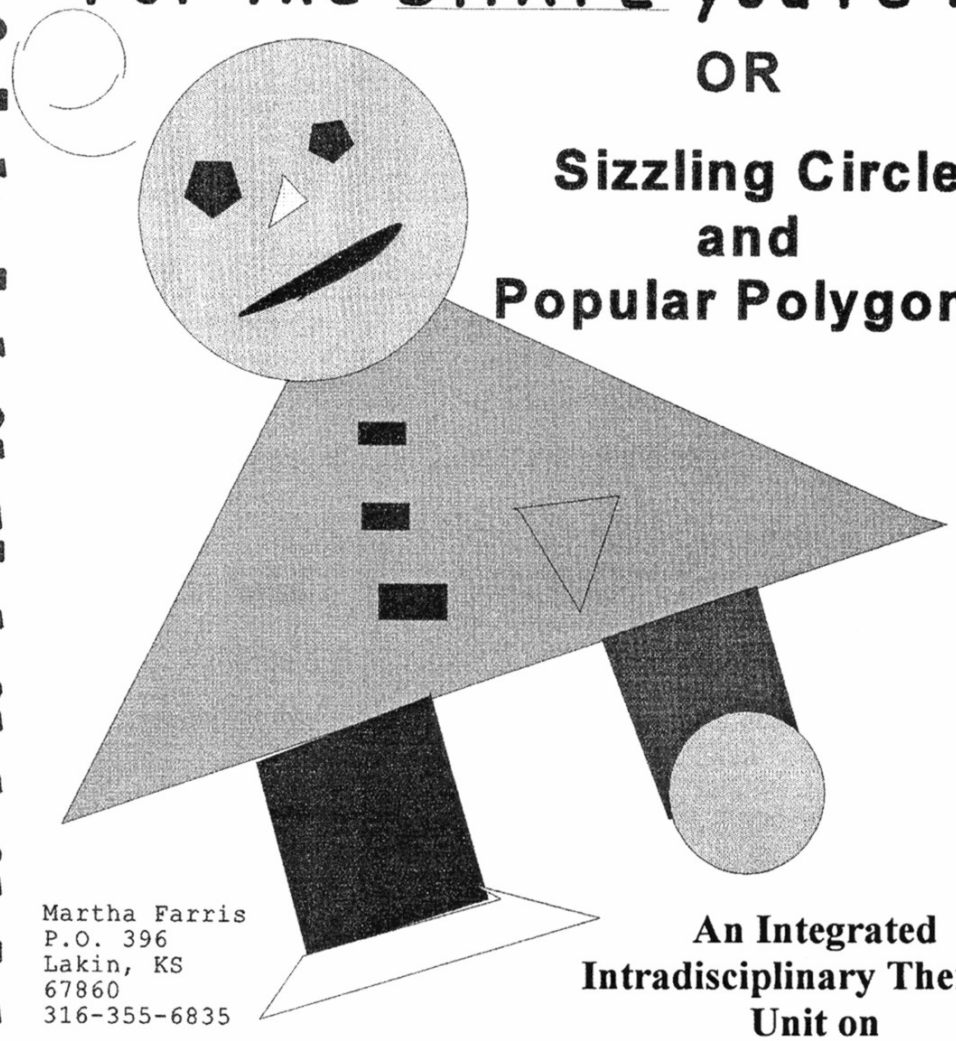
You're a great doll baby
For the SHAPE you're in!
OR
Sizzling Circles and Popular Polygons



An Integrated Intradisciplinary Thematic Unit on Geometric Shapes

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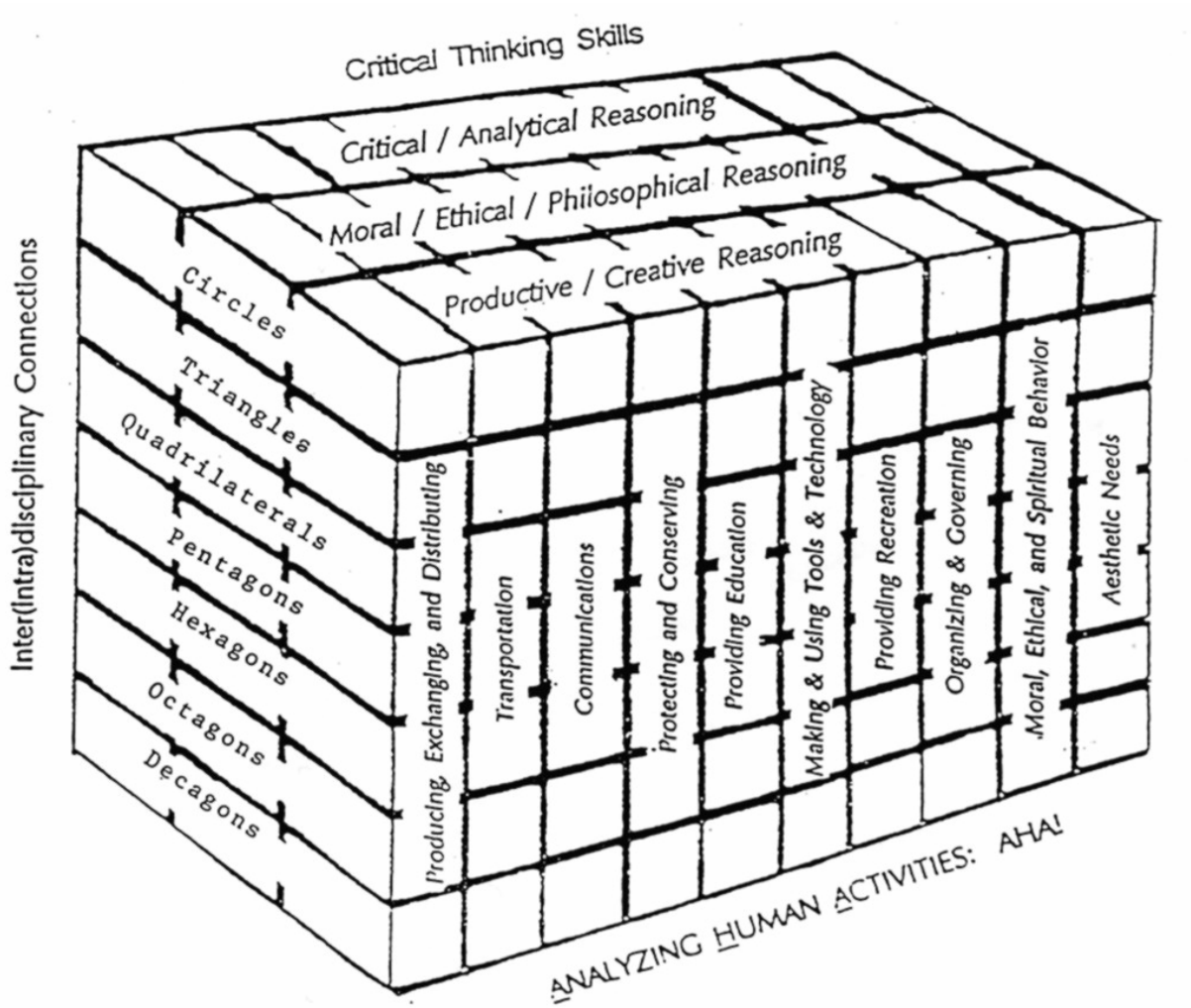
YOU'RE A GREAT DOLL BABY FOR THE SHAPE YOU'RE IN

OR

Sizzling Circles and Popular Polygons

An Integrated, Intradisciplinary, Thematic Unit on Geometric Shapes



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AHA!
INTERDISCIPLINARY/INTEGRATED THEMATIC UNIT WRITING PLAN

OVERVIEW

I. CONTENT: (Why is this unit important?)
The brain is a pattern seeking organ. This interdisciplinary integrated thematic unit is designed to teach students to recognize various geometric shapes and show relationships between shapes and patterns in human culture. Students will learn that patterns and shapes are in all facets of life. Culture expresses itself through shapes and patterns.

II. PROCESS: (How are the thinking skills developed?
Students will be guided through various hands-on activities where geometric discoveries will be made. They will view art, architecture, and other objects around them in a geometric frame of mind. They will look at the geometric patterns that form our world. These activities will develop critical and creative thinking skills, research skills, problem-solving skills, and interpersonal skills.

III. PRODUCT: (What will kids do/know as a result of this unit?
At the completion of this unit students will:

Recognize shapes by name.
Be able to do various problems with circumference, perimeter, and area.
Perceive patterns involving shapes that relate to the world in which we live.

Unit Overview Alignment with State/District Pupil Performance Outcomes

GOAL 1:
Students will demonstrate an increased knowledge of the computations of perimeter, circumference, and area of circles and polygons.

GOAL 2:
Students will recognize relationships within a given shape as well as between two or more different shapes.

GOAL 3:
Students will research, evaluate, and integrate information from multimedia sources.

GOAL 4:
Students will be aware of patterns formed from various shapes.

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I-SEARCH INDEPENDENT RESEARCH PROJECTS
FOR GIFTED AND TALENTED STUDENTS

State each research project with an investigative focus and a "hands-on" product to show research outcomes.

1. **PARADOXES:**
   Bigger is better has been a commonly held notion. Container shapes and sizes can be deceptive.
   PROJECT: Create a display that bigger shapes can contain as much as or less than a smaller shape.

2. **ATTRIBUTES:**
   Triangles and squares are often used in construction of bridges and buildings to hold weight.
   PROJECT: Construct two towers, one built using triangles and one built using squares.
   Test each for strength using weight. Compare the strength of each shape.

3. **ANALOGIES:**
   Construction of columns has changed over time. Compare Egyptian, Greek, and Roman columns with columns used in today's construction.
   PROJECT: Make a detailed illustration showing these changes.

4. **DISCREPANCIES:**
   After looking at an artist's rendition of a DNA ribbon and studying actual DNA analysis charts, students will synthesize what geneticists can say for sure about patterns in the biology of DNA. Research the state of the art in what geneticists are trying to do in scientifically altering these patterns, e.g., to eliminate genetically linked syndromes and diseases, Changing size and shape of fruit.
   PROJECT: Debate the pros and cons of genetic engineering.

5. **PROVOCATIVE QUESTIONS:**
   The patterns in 3-D pictures are often intricate and difficult to perceive. Research possibilities as to why some can easily see the picture and others cannot. Survey a large sampling of people using three different 3-D pictures. Graph results and form a conclusion.
   PROJECT: Write a three-page paper on your research conclusions.

6. **EXAMPLES OF CHANGE:**
   Analyze at least twelve complex machines and determine what parts are using the six basic machines.
   PROJECT: Choose one of the twelve and create a timeline of modifications. Add a new modification.

7. **EXAMPLES OF HABIT:**
   Traditionally, classrooms have been arranged with desks in a row in a quadrilateral room.
   PROJECT: Write an editorial essay for rearranging the classroom to improve learning.

8. **ORGANIZED RANDOM SEARCH:**
   Research the use of geometric shapes in the clothing styles and fabric.
   PROJECT: Create a family tree through at least four generations depicting a family member dressed appropriately for the time period when each was 18 years old.

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9. **SKILLS OF SEARCH:**
Research the ways navigation has progressed through history using stars, compasses, sextants, etc., to the GPS.
PROJECT: Write a science fiction story where an event in the past was changed by using the GPS.

10. **TOLERANCE FOR AMBIGUITY:**
The world's population is increasing as is the need for natural resources. We will need to have room to house this increase in population as well as enough land to produce food for them without depleting our natural resources.
PROJECT: Create a diorama illustrating the kinds of buildings and dwellings that will be required to efficiently and adequately provide for future population.

11. **INTUITIVE EXPRESSION:**
Research three artists who have used basic geometric shapes to express emotions.
PROJECT: Put together an art gallery which portrays an appeal to each of the senses.

12. **ADJUSTMENT TO DEVELOPMENT:**
In the past coins have been used for the value of a dollar, such as the silver dollar and the Susan B. Anthony dollar. These attempts have met with failure.
PROJECT: Create a petition in support of minting a coin worth a dollar.

13. **STUDY CREATIVE PEOPLE AND PROCESS:**
Research how M.C. Escher progressed through math to the creation of a new art form.
PROJECT: Write a journal from Escher's point of view about the process he went through to develop tessellations.

14. **EVALUATE SITUATION:**
A variety of shapes are used to store grain. Decide on a possible shape.
PROJECT: Prepare a working hypothesis to present to your class on the best possible shape for storing grain.

15. **CREATIVE READING SKILL:**
Locate writings about Fibonacci and his contributions to math.
PROJECT: Write a song detailing his contributions.

16. **CREATIVE LISTENING SKILL:**
Investigate the effect shape has upon sound, e.g., different shaped guitars.
PROJECT: Produce a multimedia presentation to share your results.

17. **CREATIVE WRITING** SKILL:
There are many different font styles used in printing. Consider the basic purpose for the use of the various fonts for communicating ideas and information.
PROJECT: Create an animated movie using different font styles as the characters in the story. Convey the characters' personality through the font style used.

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18. **VISUALIZATION SKILL:**
Stamps throughout history have used a variety of shapes and sizes to illustrate significant people, places, things, and events.
PROJECT: Create a commemorative postage stamp collection for ten different shapes.

CRITICAL THINKING SKILLS
[ACADEMIC]
ANALYZING HUMAN ACTIVITIES! (AHA!)
(The 10 Foundational Activities of Humans)

1. **PRODUCING, EXCHANGING, AND DISTRIBUTING** [ECONOMICS]
Anticipatory Set: Watch the clip from "Oliver" where they divide up the money in the attic.
Sing "We're in the Money."
View a clip from the movie "Jerry McGuire" where he yells "show me the money."
Activity: Brainstorm all the shapes that could be found on a one, five, ten and twenty dollar bill, e.g., pyramid, oval, etc.
Product: List all shapes that can be found on the one, five, ten and twenty dollar bills.

COMPREHENSION:
Explain the impact of the U.S. Mint's decision to produce the Susan B. Anthony coin and how the choice of its shape affected its use. E.g., similar size and shape of quarter.

APPLICATION:
Anticipatory Set: View a clip of the documentary about an artist named Money who designs his own money as art to use as legal tender.
Activity: Design a money system using at least three different geometric shapes. Explain the value and impact of the shapes.
Product: Make an etching of one of your money designs.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
What problems might a visitor from Melbourne, Australia experience when using United States currency and coins?

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or
VOCATIONAL/TECHNICAL LINK:
How will vending machines be changed if new shapes are used for coinage?

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: Read the allegory "Erewhon" by Samuel Butler where musical banks give money with spiritual, rather than monetary value.
Activity: If our coinage were in six different shapes, what spiritual value would you assign to each shape and why?
Product: Design a project cube labeling each side with a different shape. Explain the value of each shape. Create a game to use the cube as a die.
NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

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INDIVIDUAL JOURNAL ASSIGNMENT:
If the shape and size of the quarter were changed, how would life as a teenager change?

HOMELINK:
Ask an older member of your family how currency or coins have changed in their lifetime?

2. **TRANSPORTATION**

KNOWLEDGE:
Anticipatory Set: Sing "Signs Signs."
Activity: Name all shapes to communicate and regulate traffic and the meaning of those shapes, e.g., a rectangle is informational, a triangle is cautionary.

COMPREHENSION:
Discuss with your group various terms related to transportation and polygons, e.g., triangle, tricycle.

APPLICATION:
Anticipatory Set: Sing the song "Round and Round"
Activity: Choose a major airline and mark on a map the flight path from its hub. Describe the shapes and patterns formed. e.g., Delta from Atlanta, Southwest from Dallas, United from Los Angeles.
Product: Develop a string art design based on your flight path pattern. Display and explain.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
View a movie clip from "National Lampoon's European Vacation" where the family is caught driving around and around a turnaround in Paris.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK
and/or VOCATIONAL/TECHNICAL LINK:
Research the origin of prefixes used in the first twelve polygons.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: Sing: "On the Road Again."
Activity: Invent names for modes of transportation using the same prefixes as polygons,
e.g. triangle, tricycle.
Product: Create a puppet show, which will teach the use of the new names.
NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
Why or why not should shapes of signs be internationally universal?

HOMELINK: Discuss with your family a time when they were lost because of misinterpreting or misreading a traffic sign.

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3. **COMMUNICATIONS**

KNOWLEDGE:
Anticipatory Set: Sing "Feelings."
Activity: Using a square, circle, lazy s, and a triangle, each individual will choose the shape best representing them by playing Four Corners. The students will share with the group as to why they chose that particular shape. A group will form a consensus as to what feelings are represented by their shape, e.g., square = proper, circle = whole.

COMPREHENSION:
Communications relay for four students: the first, second, third, and fourth persons are in different locations. The first team member is given a drawing of at least three geometric shapes. The first member gives I information to the second, who relays the information to the third. The third member tells the fourth who will draw the information. If the fourth member has any questions, they may relay the question back to the first member. The resulting drawing should match the original in shape, size, and location on the paper. The instructions are verbally relayed to the second and third members while the fourth one draws the original drawing, e.g.,

APPLICATION:
Anticipatory Set: Sing "Don't Fence Me in."
Product: References to shapes are used in conversation, e.g., "on the ball," "boxed in." Create a comic strip using phrases referring to shapes.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
Create signs for your community to welcome people from three different countries. The sign needs to include four different shapes.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or
VOCATIONAL/TECHNICAL LINK:
View paintings by Picasso, Caulder, and Mondrian. Identify shapes used.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: View a display of pictures of Hopi Indian line drawings.
Activity: Hopi Indians used line drawings, which form shapes to communicate stories about their life, e.g., symbol for Mother Earth. Design a line drawing that will form a shape, which will communicate something about the area in which you live.
NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
Reflect on why calling someone a "square" may or may not be hurtful.

HOMELINK: Discuss with your family the shapes in your home that communicate warmth.

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4. **PROTECTING AND CONSERVING**

KNOWLEDGE:
Sing: "Circle of Life" by Elton John.
Show a film clip of pioneers "circling their wagons" from "The Way the West Was Won."
Activity: List ways that circles are used for protection, e.g., "nests," elephants, a beaver dam, egg.

COMPREHENSION:
Explain how the circle would be more useful for defense than other polygons, e.g., circling the wagons.

APPLICATION:
Experiment with various eggs. Apply pressure to both ends of uncooked eggs. Discuss its strength and why it is important to have this shape, e.g., protection of an embryo, ease of laying. Develop a demonstration that will show the strength of a circle.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
Dances are used to protect traditions and customs in various countries. Learn a circle dance.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
Investigate the shapes of protective packing materials. Discuss why certain shapes might be chosen.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: Show a film clip where the "squared" the wagons from "Going East" starring John Candy.
Activity: Choose a shape and prepare an oral defense for using that shape for protection.
NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
What does the phrase "circle of friends" mean to you?
HOMELINK: Teach members of your family a Spanish dance. Explain its meaning.

5. **PROVIDING EDUCATION**

KNOWLEDGE: All patterns of nature are always circular and triangular!
Anticipatory Set: View a display of items from nature, e.g., fruit, cones, nuts, etc.
Activity: Shapes are repetitive and regular in our world. Brainstorm what regular shapes teach us about nature. Give at least three examples of repetitive and regular shapes in nature.

COMPREHENSION:
Activity: Brainstorm three examples, e.g., outside of a pineapple, inside of an apple, that could be repetitive and regular in shape from nature.

APPLICATION:
Anticipatory Set: Sing "I Feel the Earth Move Under My Feet."
Activity: Trace grids of platonic solids and fold into shapes (cube, octahedron, icosehedron, do decahedron, and (tetrahedron) Product: Create a platonic solid mobile.

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MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
Research each of the associations the five polyhedra represented in the Greek culture.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
The ancient Greeks constructed the Parthenon, a temple which was dedicated to the Goddess of Wisdom. Locate a picture of the Parthenon and find four parts of the temple that are regular polygons.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: Guest speaker---a person who has toured Greece.
Activity: Appraise the importance of order and regularity in the Greek world.
Product: Produce a travel brochure with pictures focusing on Greek architecture that illustrates order and regularity. Distribute copies to two of your neighbors.

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
State your opinion about the importance of regularity in U.S. architecture.

HOMELINK:
With your family find three buildings in your community that represents regular architecture similar to the Greeks and video them. Present this videotape to the class.

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

KNOWLEDGE:
Anticipatory Set: View a movie clip of Stonehenge from "National Lampoon's European Vacation," and the clip from "Cleopatra" of the Pyramids.
Activity: View six basic machines and determine what shapes are formed, e.g., screw, lever, wedge, inclined plane, block and tackle, and a pulley.

COMPREHENSION:
List all the shapes and patterns that were used to create Stonehenge and the Egyptian Pyramids. How do the shapes compare to the six basic machines, e.g., triangles to the inclined plane?

APPLICATION:
Anticipatory Set: Take a field trip to a local grain elevator. Weigh students until 2000 pounds is reached on the scale.
Activity: Estimate how many classmates equal one ton. Calculate how many people are required to equal the weight of one bottom slab of a pyramid.
Product: Create a slide show showing a possible mishap while trying to move a 50-ton slab while building a pyramid.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
The Egyptian culture used the Pyramids as tombs for their kings. Compare the burial practices of the Egyptian culture to the present day U. S. burial practices.

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MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
Sing "King Tut"
Dance "Walk Like an Egyptian"

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: Overhead of a "Far Side" cartoon.
Activity: Speculate about the possible technology the Egyptians used to transport the slabs to create the pyramids.
Product: Build a prototype of a pyramid with dominoes/sugar cubes. Compare the theoretical technology similar to that the Egyptians used. Build a clay sculpture of Stonehenge.

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
Write a new law addressing the safety standards in tool use during the time of building the pyramids.

HOMELINK:
Discuss with your family why you believe Stonehenge was built.

7. **PROVIDING RECREATION**

KNOWLEDGE:
Anticipatory Set: Read "Casey at the Bat" to the class.
Activity: Match the racket, a bat, the ball, etc. to the correct athletic playing fields/court, e.g., hockey stick, ice rink; baseball bat, baseball diamond.

COMPREHENSION:
Given the rules of High School athletic games, e.g., basketball, from 1950 to 1997, discuss within your group what changes in shape and size of courts/fields have been made and speculate why the rules were changed.

APPLICATION:
Anticipatory Set: Show highlights of baseball, basketball, tennis, and football from ESPN.
Activity: Given the dimensions of various playing surfaces, figure the perimeter and area of the various shapes, e.g., cones of the baseball field, a three-point arc of the basketball court.
Product: Chart showing areas and perimeters of various fields (shapes).

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
Compare area of a European football field to the American football field.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
Write a newspaper article on how moving the three-point arc in men's professional basketball will affect the game.

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HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: Read how baseball and basketball were invented by Doubleday and Naismith.
Activity: Using a playground ball and a circle shaped playing field, create a new game to be played. Include rules of how to play, number of players, and method of scoring.

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
Write a letter to State High School Athletic Association defending the addition of your new game to the association competitions.

HOMELINK:
Survey your family to discover their favorite sports.

8. **ORGANIZING AND GOVERNING**

KNOWLEDGE: How patterns have governed our lives
Anticipatory Set: View a movie clip from "How to Make an American Quilt."
Read "The Quilt" by Ann Jonas
Activity: Examine a display of quilts, identifying the shapes and the patterns that have been created, e.g., Double Wedding Ring, circle; Log Cabin, rectangle.

COMPREHENSION:
Activity: Brainstorm factors that effect the shape of things, e.g., time effects the shape of buildings, weather effects roof design. Convert a circle into a square, a rhombus, triangle, trapezoid, and a pyramid by folding a circle. Convert a square into five isosceles right triangles, one square, and one parallelogram.

APPLICATION:
Anticipatory Set: Read "Story of Tan"
Activity: Using the set of tangrams, create a square, triangle, parallelogram, and trapezoid.
Product: Create a mosaic using the shapes of the tonogram.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
Discuss the origin of mosaic.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
Use pattern blocks to create a functional object, e.g., chair.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: Sing "Will the Circle Be Unbroken."
Activity: Design a quilt pattern that reflects your accomplishments.
Product: Make a mug rug using your quilt design.

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

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INDIVIDUAL JOURNAL ASSIGNMENT:
Reflect on how patterns impact our daily lives.

HOMELINK:
Ask your family members if you have a family quilt. Discuss its history.

9. **MORAL, ETHICAL, AND SPIRITUAL BEHAVIOR**

KNOWLEDGE: How people express religious concepts in patterns.
Anticipatory Set: Show aerial view of the round table from "First Knight" which expresses unity; everyone is equal.
Activity: List as many religious symbols and their geometric shapes that you can think of, e.g., Star of David, Cross.

COMPREHENSION:
Activities: Give the implied religious value for each of these symbols and tell origin of geometric shape, e.g., Star of David--Eight tribes of Israel, Cross--Crucifix, Egyptian Ankh--Eternal Life and Reincarnation.

APPLICATION:
Anticipatory Set: Display several Pop-Up books and student works completed in previous classes.
Product: After viewing the display, create pop-up books of religious symbols around the world. Present pop-up books to class.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
Read "Power of Myth" by Joseph Campbell.View religious patterns around the world connected to religious symbols.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
Identify corporate logos by shapes, e.g., Mercedes, General Mills.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: View a movie clip from "The Gods Must Be Crazy" when the Coke bottle falls from the sky.
Product: Create a mythological story of a belief system with a mythological icon, e.g., Zeus' Bolt of Lightning, Liar's Liar, of this of this new belief system.

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
Reflect on non-verbal facial and hand signals that you and your close circle of friends use in a communicative way that is immediately understood without anyone saying anything. Are any of these signals a possible geometric pattern?

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HOMELINK:
Discuss with your family non-verbal patterns that have evolved over time so that everyone knows when it is time to do something in the family: which of these are reinforcing positive and negative behavior in the family.

10. **AESTHETIC NEEDS** (Textbook and Database: ?The Joy of Mathematics? by Theoni Pappas)
KNOWLEDGE:
Anticipatory Set: Sing "Vincent" (Starry-Starry Night)
Activity: View various paintings, e.g., "Composition with Yellow," 1936 by Mondrian, and "Bathers" by French impressionist George Seurat, that use the Golden Ratio, 1.618. The students will draw three Golden Rectangles of varying sizes, and locate the Golden Rectangles in the paintings.

COMPREHENSION:
Take a field trip around the school building to locate examples of the Golden Rectangle, e.g., doors, windows, license plates, etc.

APPLICATION:
Anticipatory Set: Show pictures of the Parthenon in Athens, Greece, and the United Nations Building in New York. Each student will draw a building encompassing the Golden Rectangle and contribute the art work to a class mural.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
View Japanese art work and check for the use of the Golden Rectangle.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
Why do you think the Greeks wanted to use the Golden Ratio to design the bodies and faces of statues of their gods and heroes?

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: Sing "Macho, Macho Man"
Activity: Compare, using the Golden Ratio, the Classic Greek Body such as the "Spear Bearer" by Playkleitos to Don O'Brien, the Olympic gold medalist in the Decathlon. Make a labeled diagram of the comparison.

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
Write how you would feel living in Greece and not having the Classic Greek Body.

HOMELINK:
Measure your family members and decide who has the most "Classic Greek" face and body.

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11. **CIRCLES**

KNOWLEDGE:
Anticipatory Set: Sing "Circle Game" by Jonie Mitchell.
Activity: Circles are everywhere. Think of all the words that have to do with circles and label the following parts on a circle, e.g., radius, diameter, circumference, chord, tangent, arc, and secant lines.
COMPREHENSION:
Activity: Measure the circumference and diameter of circles of various sizes using a string and a measuring stick. Graph the results showing circumference vs. diameter. Calculate the slope, and discover pi. Extend to circumference and area of circles.

APPLICATION:
Anticipatory Set: Sing: "Sing a Song of Sixpence."
Activity: The ancient Egyptians calculated the area of a circle by taking 8/9 of the area of a square circumscribed about the circle. Use this technique and the formula $A=\pi r^2$ to find the Egyptian value for pi.
Product: Write a recipe for "pi."

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
Locate Egypt on a map using circular measures of latitude and longitude.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
Create a cartoon illustrating the Egyptian discovery of the value of pi.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: Show a clip of the bikers shifting gears in Tour de France in the movie "Breaking Away."
Activity: Explain the function of a derailleur as it relates to the ratio of the number of teeth in a gear to the amount of power to move the bicycle forward. On a bicycle, if you could have a two-foot sprocket in front and a two-inch sprocket in back, could it go 200 m.p.h.? Design a working model to show your answer in a controlled setting.

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
Reflect on the significance of the circle.

HOMELINK:
Survey family members for examples of when they have used the knowledge of the area of a circle.

12. **TRIANGLES**

KNOWLEDGE:
Anticipatory Set: View documentary on "Unsolved Mysteries," The Bermuda Triangle.
Activity: Name the different types of triangles and give examples of each from your environment, e.g., gables of a roof, cupolas of a barn, etc. Draw each kind of triangle and estimate how many squares an inch on a side would fit into each.

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COMPREHENSION:
Activity: View a kaleidoscope. What types of triangles are represented?

APPLICATION:
Anticipatory Set: Sing "See the Pyramid along the Nile: I Belong to You."
Activity: Design a mind map of the different kinds of triangles and display as a poster in the classroom.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
On a world map, pinpoint the sites of famous structure based on the triangle, and attach pictures of the structures.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
Anticipatory Set: View a movie clip "Bridge Over River Kawai"of the building of the bridge.
Activity: Build a bridge using toothpicks to show the strength of the triangular structure as used in construction.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: View a clip of the movie? Independence Day? where the aliens are located by triangulation.
Activity: Students will demonstrate the use of a Global Positioning System and a sextant. Compare and contrast GPS, sextant, and laser surveying tools.
Product: Invent an instrument from found materials as accurate as a sextant or GPS using stars or other natural objects.

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
Write a short play about a boat or plane that disappeared in the Bermuda Triangle.

HOMELINK:
Discuss the number of different seating arrangements for your family around a triangular table.

13. **QUADRILATERALS**

KNOWLEDGE:
Anticipatory Set: Sing "I'm Looking Over a Four-Leaf Clover"
Activity: In three minutes, name as many quadrilaterals as possible, e.g., square, rectangle. Draw all these quadrilaterals along with their diagonals. Write the formula for the area of all those figures that are rectangles.

COMPREHENSION:
Explain how the formulas for the area of a triangle and the area of a rectangle are related and why they are related, e.g., every rectangle consists of two triangles.

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APPLICATION:
Anticipatory Set: Sing "Little Boxes."
Read "Building a House in Mozambique."
Activity: Go outside with four stakes and a roll of string. Stake out a rectangular house with measurements of your choice. Be sure to check the accuracy for the right angles at the corners. Build a model to scale of your house.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
Using a Venn diagram, compare how people from North America and people in Mozambique build houses so they are ecologically sound.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
You are a contractor and have built a rectangular house ten meters by eight meters. You discover the right front corner is 91 degrees. Use graph paper and draw a diagram showing how much the back of the house would be lengthened.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: Sing "This Old House" by Tennessee Ernie Ford.
Activity: Roger and Susy do not want a thatched roof hut in the shape of a trapezoid. Explain how they can be sure they will not end up with a trapezoid.
Product: Write a poem that tells their wishes and explains in the poem how not to have a trapezoid-shaped house.

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
Write about the materials included in the construction of your house and make a list of the materials that are directly from the earth.

HOMELINK:
Thank your parents for the home they have provided for you.

14. **PENTAGONS**

KNOWLEDGE:
Anticipatory Set: Show a movie clip from "Broken Arrow" showing the Pentagon.
Activity: Name articles or symbols and their connections that are pentagonal, e.g., pentagon, Chrysler.
Product: Draw a pentagon and triangulate it.

COMPREHENSION:
Summarize how you could find the area of any pentagon. Make a statement about how the number of sides of a pentagon is related to the number of triangles in the triangulation. State the pattern, e.g., a pentagon separates into three triangles.

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APPLICATION:
Anticipatory Set: View a movie clip from "Independence Day" of the Pentagon.
Activity: Compute the area of the Pentagon of the United States of America.
Product: Give an oral report about the specifics of the Pentagon building. Every time you use the word Pentagon in your report, students must stand and salute!

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
Research the pentagonal shape and discover which culture first popularized the shape.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
Explain why the shape of a pentagon might have enough appeal to human beings that they would use it as a symbol.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: Sing "He's Got the Whole World in His Hands."
Activity: Circumscribe a pentagon in a circle using a compass. Draw all possible diagonals, creating a pentagram.
Product: With the newly generated pentagon, create another pentagram. Continue to create pentagrams until it's impossible to continue. Find as many golden triangles as possible, and name them by labeling your picture. Create a puzzle from your pentagram and challenge your classmates to put it together.

INDIVIDUAL JOURNAL ASSIGNMENT:
Write a riddle comparing yourself looking at yourself in a mirror with a mirror with the pentagram you created.

HOMELINK:
Survey as many family members as you have access to and find out if they know why the Pentagon is called the Pentagon. Report your findings to the class.

15. **HEXAGONS**

KNOWLEDGE:
Anticipatory Set: Listen to "Flight of the Bumblebee" played by Harry James. Brainstorm all geometric terms associated with bees and other social insects, e.g., make a beeline for home, a bee in your bonnet. Identify the predominant geometric shape found in the honeycomb in beehives.

COMPREHENSION:
Why do bees organize their comb in hexagonal shapes rather than circles, e.g., efficiency in volume storage?

APPLICATION:
Anticipatory Set: Sing "Honeycomb."
Activity: Students will find other hexagonal shapes in human engineering for space and rigidity, adapted from bees in their natural habitat, the beehive; e.g., chicken wire, Asics sport shoes, furnace filters.
Product: Create a 3-D bulletin board to display hexagonal examples found in the environment.

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MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
Discuss why Swedish barns were made in hexagonal shapes. Create a prototype of a hexagonal structure.

MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
Give examples of the newest torque screwdrivers and discuss why engineers are moving to torque screws rather than a Phillips or traditional slot screws. How are torque screws like bolts?

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Sing "High Hopes." Discuss human adaptations of animal behavior in engineering besides hexagons and beehives. Create a new technology from insect or animal engineering that has not yet been invented, e.g., frog/tongue. Illustrate this by performing a skit.

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
If you were a bee, what kind of bee would you be?

HOMELINK:
Have a "honey of a celebration." Bring in (locally produced) honey with a hexagonal comb. Discuss with your parents the miracle of that product. Enjoy discussing other geometric shapes found in nature.

16. **OCTAGONS**

KNOWLEDGE:
Anticipatory Set: Sing "Stop in The Name of Love" (by Diana Ross and the Supremes)
Activity: Brainstorm items that have to do with the number eight, e.g., octopus, spider.
Do folding activity to make an octagon (Paper & Scissors, Polygons and More, Dale Seymour Publications)

COMPREHENSION:
Look at the list of brainstormed items. What prefix is used for eight, e.g., "octa" from octopus and octagon? Make up a name for an animal that walks on eight legs using the prefix, e.g., octaped.

APPLICATION:
Anticipatory Set: Sing "I'm Henry the Eighth I Am."
Activity: Research the Roman calendar year to find out if the prefix in October means eight.
Product: Make a crossword puzzle (including grids and clues) using words having to do with the number eight.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
Find as many ways as the number eight is represented in other languages, e.g., 8, VIII, and make a "collage" transparency.

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MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
A very old pattern for tile floors is a semi-regular tessellation made of four octagons and five squares. Shipping and handling square tiles often caused the corners to break off. This pattern was developed to make use of tiles with damaged corners. Make a tessellation pattern that may be used. What changes in construction have allowed less damage in shipping? (Reference: Paper & Scissors, Polygons and More)

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: View the Coca-Cola commercial which shows the new music group that uses everyday items to create music, e.g., trash cans. Listen to recordings of bowed piano from Colorado College.
Product: Make a musical instrument using an octagon in its construction and play the first notes of "America the Beautiful."

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
Think of yourself as an octagon. What eight qualities make you whole?

HOMELINK:
Have your family help you to find octagons around and in your home. Discover how you can cut eight pieces from a round cake with three straight slices of a knife, without moving any of the pieces? (Thought Provokers by Doug Rohrer)

17. **DECAGON** (Textbook: Paper, Scissors, Polygons and More by Sevey and Taylor)
KNOWLEDGE:
Anticipatory Set: Display a counter, an odometer, a measuring wheel, a multiplication table, a picture of someone counting something, stained glass window.
What numerical system do all these things have in common? Brainstorm as many systems as you can which are based on the number ten, e.g., money, counting, and bowling.

COMPREHENSION:
List words that use the prefix deca. Explain what relationship to the number ten each word has, e.g., a decade refers to ten years.

APPLICATION:
Anticipatory Set: Sing "Ten Little Indians"
Activity: Triangulate a decagon. Predict how many triangles the triangulation of 15, 20, and 25 sided polygons would yield.
Product: Make a table showing the pattern formed; include the name of the figure, number of triangles in the triangulation, area, and number of sides. Use a pentagon, decagon, and a 15 sided, 20 sided, 25 sided, and n sided figure. Present the information to the class in the form of a lesson.

MULTICULTURAL and/or ESL and/or BILINGUAL LINK:
List words for the number ten in ten different languages. Use these words on decagons to create a picture story for children.

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MATHEMATICS/SCIENCE LINK and/or HUMANITIES LINK and/or VOCATIONAL/TECHNICAL LINK:
Read Cathedral by David Macaulay.

HIGHER ORDER THINKING SKILLS (H.O.T.S.):
Anticipatory Set: View pictures of stained glass windows, e.g., Rose Window from Chartres Cathedral.
Activity: Discuss why does the Catholic Church have a "Rose of Sharon Window" somewhere in each of their churches?
Product: Using a compass, a straight edge, and a pencil, design an original "Rose Window" from a decagon. Using your design, make a model of a stained glass window.

NOTE: Additional critical thinking skills sequences may be added based on state or district learner outcomes.

INDIVIDUAL JOURNAL ASSIGNMENT:
Reflect on the significance of the symbol of the "Rose of Sharon Window."

HOMELINK:
Locate and visit a "Rose of Sharon Window" in your community.

MORAL/ETHICAL/SPIRITUAL REASONING AND DILEMMAS

TEN SCENARIOS *(Must be set in context of unit, but must also relate to the lives of today's students)*

1. Producing, Exchanging, and Distributing [Economics]
   DILEMMA:
   The Student Council owns the pop machine in the lobby of our high school. The proceeds go toward a scholarship to a graduating senior. A student put $.50 in the vending machine and received two cans of pop and the $.50 back. At the lunch table you remark to your friends of the incidence with the pop machine. Several of them remark that this has happened for a long time. What do you do?

2. Transportation
   DILEMMA:
   You and your friends have gone to the show and are taking the shortcut on the country roads home. Your friend talks you into taking a stop sign because some college friends have one. You and your buddies knock the sign down and one of them takes it home. The next morning you hear of an accident at that intersection that involved injuries but no fatalities. What do you do?

3. Communication
   DILEMMA:
   Your best friend reports to the office that the vending machines were not working properly(giving extra cans of pop and the entire amount of change back). The group of students that you run around with has started making fun of your best friend, calling your friend a "square." What do you do?

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4. Protecting and Conserving

   DILEMMA:

   The PE instructor invited a guest to teach a Mexican Circle Dance. This is a dance that you and your family enjoy. Your group of friends refused to participate in the "stupid dance." What do you do?

5. Providing Education

   DILEMMA:

   The city has hired an architect to design a new community center. The architect has presented the benefits of the building concerning natural resource conservation, economic to build and maintain, and accessibility to the City Council. However, it does have an unusual, progressive design. You, as a council member, agree with the architect on the economic benefits but your constituents are adamantly opposed to the physical appearance. How do you vote? Explain.

6. Making and Using Tools and/or Technology

   DILEMMA:

   In the movie "The Ten Commandments" an old woman was on the "assembly line" to build pyramids. Her job was to grease the path to make the stone easier to move. Her skirt was caught under the stone and she begged the foreman to stop the momentum of the stone before she is crushed. In a Detroit assembly line, as foreman, would you pay compensation of one million to an employee who is in eminent danger of losing a body part, or do you stop the assembly line at a cost of ten million? What do you do?

7. Providing Recreation

   DILEMMA:

   You are a member of the high school track team participating in shot, discuss, and javelin. All season you have been winning first place and setting school and league records in all three events. At the regional meet, the implements are weighed and found to be several ounces light. This makes all of the records set this season false. What do you do?

8. Organizing and Governing

   DILEMMA:

   You are a master Navaho rug weaver working on the most beautiful pattern that you have ever woven. The spirit of your people and God is running through you and you have a beautiful starburst pattern on the weaving loom. In your tradition there must always be a weaving mistake made so not to appear arrogant before the gods. The value will be diminished and not authentic, but too beautiful to make an observable error in the rug. What do you do?

9. Moral, Ethical, and Spiritual Behavior

   DILEMMA:

   The night before graduation, gang symbols and graffiti were painted on the walls of the school. You are a school board member and your daughter has confided in you that she knows who participated in the vandalism. What do you do?

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10. Aesthetic Needs

DILEMMA:

You overhear your PE teacher questioning your best friend about her recent weight loss. The friend says that nothing is wrong and she is feeling fine. After lunch, you find your friend in the girls' bathroom purging. What do you do?

PRODUCTIVE THINKING SKILLS
DIVERGENT/CREATIVE THINKING

1. BRAINSTORM MODEL

A. BRAINSTORM ALL OF THE ___:

AHA #1. round coins you can think of.
AHA #2. shapes used in jewelry.
AHA #3. feelings you have in a room without curves.
AHA #4. shapes used for protection.
AHA #5. repetitive shapes that are found in nature .
AHA #6. tools an ancient Egyptian would use.
AHA #7. games played using a rectangle.

B. BRAINSTORM AS MANY _____AS YOU CAN THINK OF.

AHA #8. quilt patterns
AHA #9. songs as you can think of with circles in them
AHA #10. golden things
AHA #11.things in nature that are round
AHA #12. styles of houses
AHA #13. famous bridges
AHA #14. famous buildings in Washington D.C.

C. HOW MANY WAYS CAN YOU COME UP WITH TO ___?

AHA #15. eat honey
AHA #16. to know that its Fall
AHA #17. to count to ten

2. VIEWPOINT MODEL (Human or Animate) (Use Cultural Literacy Terms)

A. HOW WOULD _____ LOOK TO A(N) _____?

AHA #1. a counterfeit coin	a real coin
AHA #2. a stop sign	yield sign
AHA #3. a circle	sphere
AHA #4 a square	circle
AHA #5. a picket fence	cloud
AHA #6. a crane	lever
AHA #7. Sega	Mancala
AHA #8. a crazy quilt	wedding ring quilt

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B. WHAT WOULD A _____ MEAN FROM THE VIEWPOINT OF A(N)_____?

AHA #9.	Holocaust	Star of David
AHA #10.	denominator	numerator
AHA #11.	poem	ratio
AHA #12.	Brooklyn Bridge	triangle
AHA #13.	Pagoda	Muslim
AHA #14.	Pentagon	Pythagorean
AHA #15.	hexagon	bee
AHA #16.	octagon	musician
AHA #17.	Cathedral of Notre Dame	Rose Window

C. HOW WOULD __Pythagoras___ VIEW THIS?

1. Pentagon in Washington
2. G.P.S.
3. Empire State Building
4. geodesic dome
5. Golden Gate Bridge
6. space ships

3. INVOLVEMENT MODEL (Personification/Inanimate brought to life)

A. HOW WOULD YOU FEEL IF YOU WERE___?

AHA #1. a quarter
AHA #2. a stop sign
AHA #3. a square
AHA #4. one of the wagons on the wagon train
AHA #5. the Parthenon
AHA #6. a pyramid
AHA #7. the puck used in the Stanley Cup finals

B. IF YOU WERE A _____, WHAT WOULD YOU (SEE, TASTE, SMELL, FEEL)?

AHA #8. double wedding ring quilt
AHA #9. the Nike swish
AHA #10. the Greek statue "The Spear Bearer"
AHA #11. the Olympic rings
AHA #12. the rack on a pool table
AHA #13. thatched hut
AHA #14. hood ornament

C. YOU ARE A _____. DESCRIBE HOW IT FEELS.

AHA #15. honeycomb
AHA #16. cup in an egg carton
AHA #17. stained glass window

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4. CONSCIOUS SELF-DECEIT MODEL

A. SUPPOSE YOU COULD _____. WHAT ____ COULD YOU _____.

AHA #1. mint your own coins? What are the things that might happen?
AHA #2. What would happen if they were no established flight patterns?
AHA #3. What would happen if all traffic signs were circles?
AHA #4. What would have happened if the pioneers would have squared the wagons instead of circling?
AHA #5. What would happen if circles and squares were reversed?
AHA #6. What would happen if the lever had not been invented?
AHA #7. What would happen if all balls were square?
AHA #8. Suppose your body was not symmetrical. What would you not be able to do?
AHA #9. Suppose all corporate logos were the same shape. How could you distinguish one from another?

B. YOU CAN HAVE ALL OF THE ____. HOW COULD YOU USE IT TO ____?

AHA #10.	Mondrians	improve art
AHA #11.	gears in the world	invent a bicycle
AHA #12.	triangles	build a house
AHA #13.	rhombus	build an igloo
AHA #14.	pentagons	teach puzzle solving
AHA #15.	bees	teach organization
AHA #16.	stop signs	stop crime
AHA #17.	stained glass	beautify the world

5. FORCED ASSOCIATION MODEL (Use cultural literacy terms here)

A. HOW IS _____ LIKE _____?

AHA #1. circle	economic system
AHA #2. airline traffic patterns	wheel
AHA #3. being boxed in	empty cage
AHA #4. egg	house
AHA #5. octahedron	ice cube
AHA #6. scale	teeter totter
AHA #7. ball bat	fishing pole

B. GET IDEAS FROM _____ TO IMPROVE _____.

AHA #8. farming	quilt patterns
AHA #9. stars	sportsmanship
AHA #10. ratios	appearance of our rooms
AHA #11. bees	packaging
AHA #12. snowflakes	kaleidoscope
AHA #13. beavers	strength of structure
AHA #14. porcupine	missile

C. I ONLY KNOW ABOUT _____. EXPLAIN _____ TO ME.

AHA #15. picket fences	chicken wire
AHA #16. Roman calendar	Gregorian calendar
AHA #17. Pella windows	stained glass windows

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6. REORGANIZATION MODEL

A. WHAT WOULD HAPPEN IF _____ WERE TRUE?

AHA #1. banks give money with spiritual rather than monetary value
AHA #2. only shapes of traffic signs gave directions
AHA #3. shapes were used instead of words to tell stories
AHA #4. birds built square nests
AHA #5. every shape had to be regular
AHA #6. there were no gravity
AHA #7. there were no rules

B. SUPPOSE _____ (HAPPENED), WHAT WOULD BE THE CONSEQUENCES?

AHA #8. every color had a different texture
AHA #9. everyone had the same belief system
AHA #10. everyone looked alike
AHA #11. the Egyptian had not discovered pi
AHA #12. everyone at birth had a GPS chip implanted in their body
AHA #13. there were no corners
AHA #14. no military leaders

C. WHAT WOULD HAPPEN IF THERE WERE NO _____ ?

AHA #15. bees
AHA #16. deviations in pitch
AHA #17. glass

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CULTURAL LITERACY

abstract art
Acropolis
Adonis
alliteration
All that glitters is not gold
analogy
Anglican church (Church of England, Episcopal church)
Anthony, Susan B.
Arch
Athens
Atlas
Aztecs
baptism
baroque
basilica
business cycle
can't fit a round peg in a square hole
capitalism
Capital Building
Casey at the Bat
Catholicism, Roman Catholicism
centimeter
Central America
Christianity
circle
classical mythology
constant dollars
counterfeit
copyright
cross of gold
cubism
decagon
deism
democracy
denominator
Department of Treasury
diameter
ellipse
Empire State Building
equator
ethics
exchange rate
Fagin
Federal Deposit Insurance Corporation (FDIC)
fine arts
flying buttress
functionalism
gargoyle
generator
glossary
gothic
Great Wall of China
Greek Orthodox Church
guild
hemisphere
hexagon
hieroglyphics
Holy Grail
Holy Roman Empire
hydraulic
hypotenuse
idiom
igloo
imagery
Ionic (architecture)
Jesus Christ
Judaism
kilometer
Knights of the Round Table
Lancelot, Sir
latitude/longitude
legal tender
lever
Library of Congress
linear momentum
logarithm
lowest common denominator (LCD)
macho
mean (statistics)
median
meridian
metaphor
meter
metric system
Michelangelo
momentum
Monet. Claude
Monticello
mythology
Muslim
Notre-Dame cathedral
obtuse angle
orbit
octagon
parabola
parallelogram
Parthenon
pentagon
percentage
perimeter
physics
Picasso, Pablo
plane geometry
poetry
prime numbers
prism
Pyramids, The
Pythagorean
quadratic equation
quadrilateral
quill
rate
rhetorical question
right angle
right triangle
Roman Empire
Roman Numerals
Rose window
run of the mill
Saint Paul's Cathedral
Saint Peter's church
sarcasm
sect
secular
sign of the cross
simile
sitcom (situation comedy)
sphere
statistics
Stone Henge
Synagogue
tangram
tangent
There is no joy in Mudville
trapezoid
triangle
unilateral
vector
Washington Monument

RESOURCES

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The Dictionary of Cultural Literacy E.D. Hirsch, Jr., Joseph F. Kett, James Trefil
The Book of Video Lists Tom Wiener
The Literature Teacher's Book of Lists Judie L.H. Strouf
The Timetables of Science Alexander Hellemans and Bryan Bunch
The Green Book of Songs by Subject Jeff Green
VideoHound's Golden Movie Retriever Visible Ink Press
The Reader's Catalog Geoffrey O?Brien
The MacMillan Visual Dictionary MacMillan Publishing Company
The Timetables of History Bernard Grun

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The Timetables of Technology Bryan Bunch and Alexander Hellemans
Basketball: It's Origin and Development James Naismith
How Baseball Began Ron McCulloch
The Joy of Mathematics Theoni Pappas
Art of Painting, Sculpture, and Architecture Frederick Hartt
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Paper and Scissors, Polygons and More Linda Silvey/Loretta Taylor, Dale Seymour Publications
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Explore the World of Man-Made Wonders Adams/Biesty
Tangrams: 330 puzzles Ronald C. Read
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Multicultural Science and Math Connections Beatrice Lumpkin/Dorothy Strong
The Math Teacher's Book of Lists Judith A. Muschla/Gary Robert Muschla
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Geometry Problems: One Step Beyond Reuben Schadler
Math Projects: Organization, Implementation, and Assessment Katie DeMeulemeester
Activities from the Mathematics Teacher Evan M. Maletsky and Christian R. Hirsch, NCTM
Classic Math: History Topics for the Classroom Art Johnson, Dale Seymour Publications
The Chicken from Minsk Yuri B. Chernyak & Robert M. Rose

Films/Videos/ TV clips

"Breaking Away"
"Broken Arrow"
"Bridge Over River Kawai"
"Cleopatra"
"First Knight"
"Going East"
"How to Make an American Quilt"
"Independence Day"
"Jerry McGuire"
"National Lampoon"s European Vacation"
"Oliver"
"The Gods Must be Crazy"
"The Way the West was Won"

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Coca-Cola commercial
The Bermuda Triangle "Unsolved Mysteries"
ESPN Highlights
PBS documentary about the artist named Money

Literature/Language Arts/Poetry

Anno's Sundial Mitsumasa Anno
Building a House in Mozambique
"Casey at the Bat" Ernest Thayer
Cathedral David Macauley
"Erewhon" Samuel Butler
"Shapes" Shel Silverstein
The Quilt Ann Jonas

Art Works

"Composition with Yellow" 1936 Mondrian
"Bathers" George Seurat
Various works from Picasso, Caldor, Mondrian

Music/Songs/Recordings

"Circle Game" Jonie Mitchell
"Circle of Life" Elton John
"Don't Fence Me In"
"Feelings"
"Full Circle" Dolly Parton
"Flight of the Bumblebee"
"He's got the Whole World in His Hands"
"High Hopes"
"Honeycomb"
"I Feel the Earth Move Under My Feet"
"I?m Henry the Eighth I am"
"I'm Looking Over a Four Leaf Clover"
"King Tut" Steve Martin
"Little Boxes"
"Macho Man" Village People
"On the Road Again" Willie Nelson
"Round and Round"
"See the Pyramid Along the Nile: I Belong to You"
"Signs Signs"
"Sing a Song of Sixpence"
"Stop in the Name of Love" Diana Ross & the Supremes
"Ten Little Indians"
"This Old House" Tennessee Ernie Ford
"Vincent" Starry Starry Night
"Walk Like an Egyptian"
"We're in the Money"
"Will the Circle be Unbroken"
Bowed piano by Colorado College

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