

Lines, (Flying) Tigers, and Heirs, Oh My!

Grade Level: 5th grade (Social Studies/Science)

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Length of Unit: Approximately five weeks

I. ABSTRACT

- A. This is a fully integrated, fifth grade unit on the Renaissance Period. The Core Knowledge textbook, *Rats, Bulls, and Flying Machines* will be used as the springboard to launch students on a journey back in time. During this unit, students will research and discover flight; study design and proportion through architecture; and view, create, and experience art from the Renaissance. Students will be introduced to Michelangelo, Leonardo, Machiavelli, and the Medici family. Through visual aids, simulations, and hands-on activities, the students will get a feel for the excitement and innovation of that time in history. Connections will be made to link the “technological renaissance” of today with the “artistic renaissance” of the past.

II. OVERVIEW

- A. Concept Objectives
1. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
 2. Students will understand and apply the basics of flight and architecture, tying together scientific concepts of the Renaissance with the technological advances made in those fields since their initial discovery.
 3. Students will view and appreciate art works from the Renaissance Period, including painted and sculptured works, noting the shift to an emphasis on humanism.
- B. Content from the *Core Knowledge Sequence*
1. The Renaissance
 - a. Islamic scholars translate Greek works and so help preserve classical civilization
 - b. A “rebirth” of ideas from ancient Greece and Rome
 - c. New trade and new wealth
 - d. Italian city states: Venice, Florence, Rome
 - e. Patrons of the arts and learning
 - f. The Medici Family and Florence
 - g. The Popes and Rome
 - h. Leonardo da Vinci; Michelangelo
 - i. Renaissance ideals and values embodied in *The Courtier* by Castiglione; the “Renaissance man”; *The Prince* by Machiavelli; real-world politics
 - j. Copernicus and Galileo: Conflicts between science and the Church; Ptolemaic (earth-centered) vs. sun-centered models of the universe
 2. Art of the Renaissance
 - a. The shift in world view from medieval to Renaissance art: a new emphasis on humanity and the natural world
 - b. The influence of Greek and Roman art on Renaissance artists (classical subject matter, idealization of human form, balance and proportion)
 - c. The development of linear perspective during the Italian Renaissance: the vantage point or point-of-view of the viewer, convergence of parallel lines toward a vanishing point, the horizon line
 - d. Observe and discuss works in different genres – such as portrait, fresco, Madonna – by Italian Renaissance artists
 - e. Become familiar with Renaissance sculpture
 - f. Become familiar with Renaissance architecture
 - g. Observe and discuss paintings of the Northern Renaissance

C. Skill Objectives (**SCIENCE**)

- a. Students will read from *What Your Fifth Grader Needs to Know* the section on Renaissance Architecture, pages 240-244, making notes (Cornell style, as required in our school), on important facts.
- b. Students will gain understanding of vocabulary and concepts in architecture and the architectural process.
- c. Students will identify architectural styles and periods visually.
- d. Students will use an unusual medium to learn about a famous person from our world's history.
- e. Students will work with application of proportion and scale to create a mini-project as homework.
- f. Students will recognize the practical application of mathematics skills and concepts in an authentic setting, architectural design.
- g. Students will demonstrate basic understanding of scale and proportion.
- h. Students will demonstrate ability to transfer written ideas to scale-model drawings representing it.
- i. Students will write a brief summary of what they saw on the video today; they may take notes during the film to use when they write their summaries.
- j. Students will be able to create scale drawings and scale models after first working as part of a group to plan and design a simple structure for a specific use.
- k. Students will demonstrate ability to apply both prior and recently acquired knowledge in realistic situations.
- l. Students will gain a basic understanding of Bernoulli's principle of [lift], thrust, drag, and weight.
- m. Students will learn the basic parts of a plane and the function of each.
- n. Students will experiment using simple materials in order to gain understanding of lift, drag and thrust as related to flight.
- o. Students will understand concepts of yaw, pitch and roll in flight.
- p. Students will utilize trial-and-error to design and fly paper airplanes using the knowledge they have gained about how planes fly.
- q. Students will understand the basics of rotary wing flight.
- r. Students will understand how the simple principle "heat rises" can power a manned balloon.
- s. Students will understand that air currents move a hot air balloon.

D. Skill Objectives (**SOCIAL STUDIES**)

1. Students will gain understanding of when the Renaissance took place in relationship to other previously studied time periods.
2. Students will label maps of Italy with city-state names and important cities.
3. Students will read for understanding in a textbook.
4. Students will utilize note-taking skills.
5. Students will work cooperatively with a partner.
6. Students will recognize the importance of Machiavelli, the Borgia Family and Castiglione during the Renaissance.
7. Students will sketch for detail.
8. Students will learn how to draw with perspective.
9. Students will compare different artists' styles.
10. Students will write about Michelangelo's work and compare it to other artists.
11. Students will write a comparison paragraph with clarity.
12. Students will make connections to today's world.

III. BACKGROUND KNOWLEDGE

A. For Teacher

1. SCIENCE

- a. Lane, Bill and Azriela, Jaffe. *The Complete Idiot's Guide to Flying and Gliding*
- b. Frensch, Helen. *Flight*
- c. *Architecture: Boy Scouts of America Merit Badge Series Handbook*

2. SOCIAL STUDIES

- a. NGS Picture Pack- *The Renaissance* (Overhead Transparency Set), National Geographic Society
- b. Prum, Deborah Mazzotta. *Rats, Bulls, and Flying Machines*

B. For Students

1. **SCIENCE:** Most of the material will be introduced for the first time. It is helpful if students have *some* ideas about how planes fly, even paper airplanes. In our area of Colorado, much construction has taken place over the last few years and is continuing even now. Students are very aware of the construction process as many of them live near "works in progress" such as new homes, schools, and office complexes being constructed in our county. Some of what students will learn in the flight section of this unit will serve as background next year when they study space and space travel.
2. **SOCIAL STUDIES:** Students will connect the Rome unit from third grade and the Medieval unit from fourth grade to put the Renaissance period in time perspective.

IV. RESOURCES

(See Bibliographies for complete listing of materials. There are separate listings for social studies and science, as well as an Internet resource listing for science in Appendix M.)

V. LESSONS: SCIENCE

Lesson One: ARCHITECTURE: Introduction

A. Daily Objectives

1. Concept Objectives
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
 - b. Students will understand and apply the basics of flight and architecture, tying together scientific concepts of the Renaissance with the technological advances made in those fields since their initial discovery.
2. Lesson Content
 - a. Introduce architecture
 - b. History of architecture
 - c. New vocabulary
3. Skill Objective(s)
 - a. Students will read from *What Your Fifth Grader Needs to Know* the section on Renaissance Architecture, pages 240-244, making notes (Cornell style, as required in our school), on important facts.
 - b. Students will gain understanding of vocabulary and concepts in architecture and the architectural process.

B. Materials

1. Piece of construction paper for each student
2. Copies of Appendix A for each student
3. Copies of *What Your Fifth Grader Needs to Know* for each student, or photocopies of pages 240-244
4. Science notebooks and pencils
5. Overhead projector

6. Blank transparencies and fine-point Vis-à-vis markers
- C. *Key Vocabulary*
1. Architect – one who designs spaces for human use
 2. Architecture – the creation of space for human use
- D. *Procedures/Activities*
1. Ask students what they already know about architects and architecture. Ask if they can name any famous architects from any period in history.
 2. Distribute construction paper and unit folder covers (Appendix A). Have students glue covers onto construction paper to make a folder to hold their materials for this unit.
 3. Tell students that this unit will include information on architecture and architects from the earliest of times, through the Renaissance Period they are studying concurrently in Social Studies, to modern times. The unit will culminate in a project in which they will work in teams to plan, design and build a model of their idea of the perfect new school building.
 4. Give notes and background, including vocabulary, for the unit using an overhead projector and blank transparencies. Tell students that there will be a “Viz-Quiz” (visual quiz) later in the week on styles of architecture and some architectural forms that they will see in Lesson Two tomorrow.
 5. Ask students to think about what an architect does and why mathematics would be an important skill to have. What other skills might be necessary? [Sense of proportion, balance, aesthetics, etc. Accept reasonable answers.] Discuss proportion and demonstrate scale using graph paper or a graph board. (Example: have 1” or 1 unit equal to 1 foot) Ask why scale is important in architectural drawing.
- E. *Assessment/Evaluation*
1. Students will be assigned reading from *What Your Fifth Grader Needs to Know*, pages 240-244. As homework, they are to make notes of important facts from their reading. These will be handed in for a daily grade the following day.

Lesson Two: Architectural Styles throughout History and RENAISSANCE RAP

A. *Daily Objectives*

1. Concept Objectives
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
 - b. Students will understand and apply the basics of flight and architecture, tying together scientific concepts of the Renaissance with the technological advances made in those fields since their initial discovery.
2. Lesson Content
 - a. Visuals of several famous structures from throughout history. Many are available via the Internet, as well as from many books and other publications (see Bibliography). Students will have a Viz-Quiz on ten of these items at the end of the week, in which they will be required to identify the PERIOD from which the structure came. (Example: The Acropolis = Greek Period)
 - b. RENAISSANCE RAP will be introduced (Appendix B)
3. Skill Objectives
 - a. Students will identify architectural styles and periods visually.
 - b. Students will use an unusual medium to learn about a famous person from our world’s history.

B. *Materials*

1. Rhythm machine or recorded rhythms
2. Science notebooks and pencils
3. Overhead projectors

4. Student handouts for visuals (Appendix C)
 5. Copies of RENAISSANCE RAP (Appendix B)
- C. *Key Vocabulary*
1. Ionic column – an architectural column characterized by its spiral designs atop the column
 2. Doric column – an architectural column characterized by ribbed columns topped with a plain tiered square platform
 3. Corinthian column – an architectural column characterized by very ornate palm-like designs atop the column; an example would be the columns in front of the U. S. Supreme Court Building in Washington, D. C.
 4. Cathedral – a large, ornate church building, particularly popular during the Gothic period of architectural construction and design. An example would be the cathedral at Notre Dame in Paris
 5. Dome – a rounded vault (SEE VAULT)
 6. Vault – an arch-shaped structure used as the ceiling of a room or other form of enclosed space
 7. Arch – a curved architectural structure spanning an opening, as in a doorway arch
- D. *Procedures/Activities*
1. Students will be shown various structures such as the Pyramids at Giza, the Notre Dame Cathedral at Chartres, the Empire State Building, Fallingwater [The Kaufmann House], the JFK Library, the Pantheon, St. Peter’s Basilica, the Acropolis, etc., and each period will be discussed, highlighting characteristics of that period. Students will be introduced to architects/designers Leonardo, Brunelleschi, Michelangelo, I. M. Pei and Frank Lloyd Wright. Students will be asked to name other famous structures and to try to apply what they now know to place those structures into their proper periods of design. Students will be given handouts of these structures to study for their Viz-Quiz.
 2. Students will be introduced to the RENAISSANCE RAP. Teacher will demonstrate, and then slow the rhythm and begin teaching students. We will film their “performance” once all students have learned the rap. (Appendix B)
- E. *Assessment/Evaluation*
1. Teacher observation of participation by all students, including completeness of notes.

Lesson Three: SCALE AND PROPORTION

A. *Daily Objectives*

1. Concept Objective
 - a. Students will understand and apply the basics of flight and architecture, tying together scientific concepts of the Renaissance with the technological advances made in those fields since their initial discovery.
2. Lesson Content
 - a. Scale and proportion
3. Skill Objectives
 - a. Students will work with application of proportion and scale to create a mini-project as homework.
 - b. Students will recognize the practical application of mathematics skills and concepts in an authentic setting, architectural design.
 - c. Students will demonstrate basic understanding of scale and proportion.
 - d. Students will demonstrate ability to transfer written ideas to scale-model drawings representing it.

B. *Materials*

1. Pencils and erasers
2. Graph paper for each student
3. Overhead projector with graph square sheet

4. Vis a vis markers (fine point)
 5. Copies of Appendix D for each student
 6. Copies of Appendix F for each student
- C. *Key Vocabulary*
1. Scale – creating a size of a sample or model in direct proportion to the actual size of what is being modeled or sampled
 2. Proportion – the relationship of one part of a thing to the whole with respect to balance and size
- D. *Procedures/Activities*
1. Students will be asked to solve a series of design-related math equations, using knowledge they already have (Appendix F). Students may work in pairs to solve the problems after teacher reviews scale and proportion using the overhead projector and some sample problems.
 2. Students must complete this exercise in class. Homework assignment will be to use the information in Appendix D to construct a three-room structure to scale.
- E. *Assessment/Evaluation*
1. Student class work assignment
 2. Student homework assignment

Lesson Four: TOP TEN ARCHITECTURAL STRUCTURES

- A. *Daily Objectives*
1. Concept Objectives
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
 - b. Students will understand and apply the basics of flight and architecture, tying together scientific concepts of the Renaissance with the technological advances made in those fields since their initial discovery.
 2. Lesson Content
 - a. Students will continue the theme of architectural history and common structural characteristics for various periods and architects.
 3. Skills Objectives
 - a. Students will write a brief summary of what they saw on the video today; they may take notes during the film to use when they write their summaries.
- B. *Materials*
1. Video, “Top Ten Architectural Structures of the World”
 2. Pencils and paper
- C. *Key Vocabulary*
- NONE
- D. *Procedures/Activities*
1. Students will see a video called “Top Ten Architectural Structures of the World,” taking notes during the video to use to write a summary tonight of major points from the video.
- E. *Assessment/Evaluation*
1. Student homework assignment is to write a brief summary of the major points from today’s video.

Lesson Five: VIZ-QUIZ and PROJECT WORK

- A. *Daily Objectives*
1. Concept Objectives
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.

- b. Students will understand and apply the basics of flight and architecture, tying together scientific concepts of the Renaissance with the technological advances made in those fields since their initial discovery.
 - 2. Lesson Content
 - a. Students will use previous knowledge and recent instruction in concepts of scale, proportion, balance, and working together as a part of a group to create a project involving planning, design and construction of a model of a portion of a school building using the YOUNG ARCHITECTS kit. (See Bibliography)
 - 3. Skills Objectives
 - a. Students will be able to create scale drawings and scale models after first working as part of a group to plan and design a simple structure for a specific use.
TEACHER NOTE: If you have parents or others who are architects who may be available to participate in this aspect of the unit, it would be great.
 - b. Students will demonstrate ability to apply both prior and recently acquired knowledge in realistic situations.
- B. *Materials*
 - 1. YOUNG ARCHITECTS kit (Available through “Educator’s Outlet” mail order catalog, \$67.95, item number 71103A,m 1-800-315-2212)
 - 2. Graph paper for each group
 - 3. Pencils and erasers for each student
 - 4. Calculators for each group (optional)
- C. *Key Vocabulary*
NONE
- D. *Procedures/Activities*
 - 1. Administer the Viz-Quiz first. It should take about 20-30 minutes for ALL students to complete. Have students pass those papers in, or if your class time permits, correct them in class.
 - 2. Introduce guidelines for the project. Assign groups of four to six students per group. At least one person per group should be assigned to each of the following areas of responsibility: Planning, Design, Scale and Drawing, Construction, and Reporting. The duties for each are as follows: PLANNING students will be responsible for brainstorming possible ideas for design after meeting with the “client” [teacher] to establish needs and wants. PLANNERS will work closely with DESIGNERS. DESIGN TEAM members will take the information from the planners to create a working drawing (not necessarily to scale) of their assigned portion of the school building. Next, SCALE AND DRAWING team will take the design ideas and create a scale drawing of their portion of the building on graph paper. This will then be given to the CONSTRUCTION group. These students (needs to be at least three) will use the YOUNG ARCHITECTS kit to construct the 3-D model on top of the graph paper scale drawing. During the entire group process, the person(s) assigned to be the REPORTER should make themselves a part of each of the previous groups, making careful notations as to what each group did. How did they arrive at their conclusions? What math did they use? How did they decide what their structure should look like? What materials did they suggest for construction? Did they consider the natural setting of the structure? The geographical region? The REPORTER needs to be able to ask questions and gather information well. They will be the spokespersons for each class’ project groups. THIS PORTION OF THE PROJECT WILL REQUIRE A GREAT DEAL OF SUPERVISION TO KEEP STUDENTS ON TASK. USE OF PARENT VOLUNTEERS WOULD BE EXCELLENT! THIS SECTION WILL REQUIRE ABOUT THREE CLASS DAYS TO COMPLETE.

E. *Assessment/Evaluation*

1. Projects will be graded for certain parts at teacher discretion. Perhaps the best thing to do is work with students to help *them* create a rubric for this project, incorporating skills, group work ethic, quality, etc.
2. There is a written test on concepts of architecture to be given on the last day of the unit. (Day 9 or 10) (See Appendix G)

Lesson Six: Introduction to Flight

A. *Daily Objectives*

1. Concept Objective
 - a. Students will understand and apply the basics of flight and architecture, tying together scientific concepts of the Renaissance with the technological advances made in those fields since their initial discovery.
2. Lesson Content
 - a. Brief history of flight, beginning with Leonardo's drawings
 - b. Bernoulli's principle, lift
 - c. Forces on an airplane
 - d. Basic parts of an airplane and their functions
3. Skill Objective
 - a. Students will gain a basic understanding of Bernoulli's principle of [lift], thrust, drag, and weight.

B. *Materials*

1. Copies of Appendix J for each student
2. 1-gallon bucket, half full of water
3. 8 ounces of dishwashing liquid
4. Measuring cup
5. Glycerin
6. 1 eyedropper
7. Paper or plastic cups (1 for each pair of students)
8. Straws (1 for each student)
9. Index cards
10. Pencils, science notebooks

C. *Key Vocabulary*

1. Drag – the opposite physical force of thrust on an airplane, acting to slow it down
2. Lift – is created when air passing over an aerodynamic wing moves faster than air passing underneath the wing, thereby creating lower pressure on top and higher pressure underneath, lifting the plane
3. Weight – the amount that something [a plane] weighs
4. Thrust – the force that must be generated to overcome gravity and drag
5. Aerodynamics – the scientific study of the motion of air including the force air has on object that moves through it
6. Fuselage – the “body” of an airplane that holds cargo, passengers and pilots
7. Ailerons – moveable parts toward the outside edge of an airplane's wing that serve to help it turn and bank
8. Rudder – part of the tail assemble of a plane that guides it and helps control yaw
9. Propeller– part of the powerplant of a plane; aerodynamic blades that rotate to create thrust
10. Flaps – moveable parts toward the inside edge of an airplane's wings that help to slow it or to help control the pitch [attitude] of the plane
11. Rotors – on a helicopter, the rotors are long aerodynamic blades that create lift as they rotate; they also serve as the “wings” of a helicopter, in addition to controlling pitch, yaw and roll of the helicopter

12. Landing gear – the wheels that get the plane rolling down the runway for takeoff and which absorb impact upon landing
13. Empennage – the entire tail assembly of a plane that acts much as feathers on an arrow to ensure smooth flight
14. Cowling – the curved metal covering over a plane’s engine(s). It protects the engines and helps to make the plane more aerodynamic

D. *Procedures/Activities*

1. Instruction in history of manned flight. Show copies of Leonardo’s flying machine drawings. Ask students what these drawings remind them of from current times. (Hang-gliders, helicopters) Continue with review of Wright brothers, which has been covered in history class already. Ask students to brainstorm as many manned flying machines as possible (some examples: jets, private single-engine planes, helicopters, hot-air balloons, blimps, gliders, space shuttle, etc.)
2. Introduce Bernoulli’s principle [lift] using bubbles in a bucket and straws. Pair students and have one blow bubbles while the other tries to keep the bubble(s) airborne. Ask them to let some fall. Why do they fall? Gravity.
3. Distribute copies of the airplane with parts listed (Appendix J). Students will learn the basic parts of the airplane and what purpose they serve. Ask students to look at the picture and think about what they THINK each of the listed parts does to help the plane fly. This information will be covered in the next lesson.
4. For homework, or in class as a partnered activity if your class is long enough to permit it, give out a list of Important Dates in the History of Flight OUT OF ORDER. Have students construct a time line of these events, illustrating them if possible with time constraints.

Lesson Seven: Parts of an Airplane and Forces on an Airplane

A. *Daily Objectives*

1. Concept Objective
 - a. Students will understand and apply the basics of flight and architecture, tying together scientific concepts of the Renaissance with the technological advances made in those fields since their initial discovery.
2. Lesson Content
 - a. Parts of an airplane and what they do
 - b. Lift, Drag, and Thrust
3. Skill Objectives
 - a. Students will learn the basic parts of a plane and the function of each.
 - b. Students will experiment using simple materials in order to gain understanding of lift, drag and thrust as related to flight.

B. *Materials*

1. Worksheet from page 4 of *Flight*, by Helen Frensch
2. One straw for each student group
3. One long balloon for each student group
4. Masking tape for each student group
5. Kite string for each student group
6. PARTS OF AN AIRPLANE sheet (Appendix J)

C. *Key Vocabulary*

NONE

D. *Procedures/Activities*

1. Distribute the PARTS OF AN AIRPLANE sheet (Appendix J). It’s a good idea to have an overhead transparency of the sheet, because it makes it much easier to go through with the students. Ask students to name any of the parts they already know, and if they’re correct, go ahead and label those. Ask students to tell what those parts do to help

- the plane fly. Continue labeling the remaining parts as listed in the Vocabulary section, and give simple notes as to basic function.
2. Distribute copies of page 4 from *Flight*, by Helen Frensch. Go through the terms lift, drag and thrust. Demonstrate lift by crumpling a piece of paper, holding it up in your hand and letting it drop to the floor. Ask students to name the force that brought the paper wad to the floor. [gravity] Pick it up and lift it upward, not letting go. Ask students what allows the paper to rise in your hand. [lift: a force overcoming gravity] Remind students of the bubbles experiment with lift. Ask two students to come to the front of the room. Give one an empty file folder. Ask both to raise their hands above their heads and then to swing them downward and back up again. Ask the class which one seems to have the easiest time. Obviously, it will be the one without the folder, because DRAG is acting against that student's effort. Assemble student groups of 3-4, as space permits. Give each group a straw, a balloon, some masking tape, and some string about 6-8 feet in length. Ask students to thread the string through the straw. Ask them to inflate balloon, but DO NOT TIE IT OFF. Have one student hold the balloon and have another student secure the straw with the string through it to the balloon with tape. MAKE SURE THE STUDENT HOLDS THE INFLATED BALLOON THE WHOLE TIME THIS IS BEING SET UP. Secure the two ends of the string to two chairs or other immobile objects. Ask students to predict what will happen when the balloon is let go and why. Walk the balloon "rocket" to one end of the string and let it go. The thrust from the air exiting the balloon will propel the balloon along the length of the string. Allow students to repeat the process, if time permits. Students should do a complete lab journal write-up on this experiment.
- E. *Assessment/Evaluation*
1. Student lab journals
 2. Optional: short quiz on parts of plane ONLY

Lesson Eight: How Planes Fly and Maneuver

- A. *Daily Objectives*
1. Concept Objective
 - a. Students will understand and apply the basics of flight and architecture, tying together scientific concepts of the Renaissance with the technological advances made in those fields since their initial discovery.
 2. Lesson Content
 - a. How planes fly and maneuver
 3. Skill Objectives
 - a. Students will understand concepts of yaw, pitch and roll in flight.
 - b. Students will utilize trial-and-error to design and fly paper airplanes using the knowledge they have gained about how planes fly.
- B. *Materials*
1. Several sheets of paper for each student (all the same!)
 2. Paper clips for each student
 3. Copies of Appendix K for each student
 4. Copies of pages 8-9 from *Flight*, by Helen Frensch
- C. *Key Vocabulary*
1. Center of gravity – for planes, it is the place where aircraft designers consider the most of the aerodynamic force to be concentrated
- D. *Procedures/Activities*
1. Pass out BASIC FLIGHT MOVEMENT sheet (Appendix K). Go through each of the moves with students, having them use their pencils to simulate each movement: level flight, downward and upward pitch, right and left banking (rolling), left and right yaw.

2. Give students their paper and paper clips. Distribute copies of pages 8–9 from *Flight*, by Helen Frensch and walk students through the construction of the planes. NOTE: If possible, this activity should be done in a gym or on a windless day on a field outside. It is NOT a good classroom activity unless you have a very large, open classroom. Have students practice these modifications several times, and see if they can create new ones that serve the same purpose.
 3. Give students another piece of paper for the LONG FLIGHT contest. Students get one piece of paper and may use their paper clips if they wish. They are to build one glider and we will measure the length of sustained flight for each. The winner receives a model kit or some other small prize.
 4. It is wise to use any aides or parent volunteers for this so that you have help measuring and supervising the “non-flying” students as they wait for their turn.
- E. *Assessment/Evaluation*
1. Lab journals

Lesson Nine: Helicopters and Hot Air Balloons

A. *Daily Objectives*

1. Concept Objective
 - a. Students will understand and apply the basics of flight and architecture, tying together scientific concepts of the Renaissance with the technological advances made in those fields since their initial discovery.
2. Lesson Content
 - a. History of rotary wing flight
 - b. What makes a helicopter fly?
 - c. What makes a hot air balloon lift off and travel?
3. Skills Objectives
 - a. Students will understand the basics of rotary wing flight.
 - b. Students will understand how the simple principle “heat rises” can power a manned balloon.
 - c. Students will understand that air currents move a hot air balloon.

B. *Materials*

1. One large rubber balloon for each class of students (DO NOT USE MYLAR!)
2. One self-addressed, stamped postcard for each class of students
3. Helium to fill the balloon (NOTE: It is best to have the balloons filled outside school and simply attach the postcards rather than trying to put them inside the balloons unless your school PTO has its own helium tanks. STUDENTS SHOULD NOT BE ALLOWED TO FILL BALLOONS!)
4. Several pictures of various kinds of helicopters and hot air balloons

C. *Key Vocabulary*

NONE

D. *Procedures/Activities*

1. Show students pictures of helicopters. Ask them to think about how a helicopter flies if it has no wings. Ask them if a helicopter does have wings. [The rotors are considered to be its wings.] If possible, invite a helicopter pilot to come to your class to talk about how his/her craft stays aloft. Show students pictures of hot air balloons. (NOTE: A great resource for this section is the Milliken Publishing Company unit called *Flight*. The ISBN number is 0-88335-338-5)
2. Explain to students the basic principles of helicopter (rotary wing) flight.
3. Explain to students the basic principles of balloon flight, reminding them that while the heat raises the balloon, air currents are primarily responsible for moving the balloon from place to place.

4. Take students and their helium filled balloon outside. Attach the self-addressed, stamped postcard to the balloon securely. (The card should read: 1. Where did you find this balloon? 2. On what date? 3. Thank you for taking the time to return this postcard to our school!) Designate a student to hold the balloon while notes are made as to weather conditions on the release date (temperature, cloudy/clear, wind, etc.). Make predictions as to where students think balloon will come down. Release the balloon. Make notes as to the direction of travel of the balloon upon its release. Prepare students for the fact that the card may not be returned if it comes down in a non-populated area or if the finder simply throws the balloon away. Remind them that not all scientific experiments are successful!
- E. *Assessment/Evaluation*
None

V. LESSONS: SOCIAL STUDIES

Lesson One: Introduction to The Renaissance

A. *Daily Objectives*

1. Concept Objective
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
2. Lesson Content
 - a. Scan first chapter of *Rats, Bulls and Flying Machines*
 - b. Discuss Classical, Middle Ages and Renaissance and the Chronological relationship of those time periods
 - c. Label city-state map of Italy
3. Skill Objective(s)
 - a. Students will gain understanding of when the Renaissance took place in relationship to other previously studied time periods.
 - b. Students will label maps of Italy with city-state names and important cities.

B. *Materials*

1. Map of Italy for each student
2. One copy of the text, *Rats, Bulls and Flying Machines*, for each student

C. *Key Vocabulary*

1. Renaissance – a period in history from 1350–1600 where a great “re-birth” of learning and the arts took place
2. Middle Ages – a period in history from 476–1350 AD, when the people of Europe lived in isolated towns and there was not much communication between areas
3. Classical Times – a period in history 500 BC–500 AD when the great civilizations of Greece and Rome flourished
4. City-states – Italy was divided into city-states that were like little individual countries; they each had their own government and it was very much like how the United States state system works today

D. *Procedures/Activities*

1. Pass out student copies of the text; allow students five minutes to look through the book. The “naked art” pages of the book will surprise them. Explain that art was very important during this time, and how they will be expected to handle the subject with maturity.
2. Have the students scan the first chapter allowing five minutes.
3. List things on the board that the students thought were important ideas about the Renaissance. Guide the discussion to review Classical period from third grade and the Middle Ages from fourth grade. Discuss the idea of “rebirth.”

4. Have the students look at the map on pg. 12, pass out student copies of the map. (I traced the map onto an overhead and ran off copies for the students.)
 5. Have students label the important city-states and cities. Have them add the map to their notebook after an adult has initialed it.
 6. Explain that their test will be an open-note test at the end of this unit. They will need to keep all of their notes and review them nightly in order to be ready for the test.
- E. *Assessment/Evaluation*
1. Student Maps

Lesson Two: Florence- Chapter 2: Part One

- A. *Daily Objectives*
1. Concept Objective
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
 2. Lesson Content
 - a. Read Chapter 2 in *Rats, Bulls, and Flying Machines*
 - b. Students will see overhead pictures of: Florence, Medici, and Savonarola
 - b. Students will fill-in notes for Chapter 2 (pg. 13-16)
 3. Skill Objectives
 - a. Students will read for understanding in a textbook.
 - b. Students will utilize note-taking skills.
- B. *Materials*
1. Textbooks for each student
 2. APPENDIX SS1: Fill-in notes for each student
 3. Renaissance Overheads 1, 4, 7 from NGS Picture Pack- *The Renaissance* (Overhead Transparency Set), National Geographic Society
- C. *Key Vocabulary*
1. Medici Family – a very powerful family in Florence, Italy during the Renaissance
 2. Savonarola – a preacher who took over the leadership of Florence in 1495; he was a severe and harsh leader
- D. *Procedures/Activities*
1. Review the three time periods and their importance with the class.
 2. Have students get out their notebooks and open to their maps. Have the students find Florence. Explain that their chapter today focuses on Florence.
 3. Pass out the fill in the blank notes for Chapter 2 (p. 13-16), APPENDIX SS1; explain how to fill them out.
 4. Students read the chapter, adding their notes to their notebooks upon completion.
 5. After all students have finished, review the chapter, go over the fill-in notes so students can self correct (I made an overhead of the notes), while reviewing the chapter put overhead images up as they become appropriate with the discussion.
- E. *Assessment/Evaluation*
1. Use the students' fill-in notes and participation in the discussion to evaluate.

Lesson Three: Rome and Venice: Chapter 2 Part 2

- A. *Daily Objectives*
1. Concept Objective
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.

2. Lesson Content
 - a. Students will read the rest of Chapter 2 with a partner, and answer comprehension questions.
 3. Skill Objectives
 - a. Students will read for understanding in a textbook.
 - b. Students will work cooperatively with a partner.
- B. *Materials*
1. Textbooks for each student
 2. APPENDIX SS2: Comprehension questions for each student
 3. Renaissance Overheads: 20, 23 from NGS Picture Pack- *The Renaissance* (Overhead Transparency Set), National Geographic Society
- C. *Key Vocabulary*
NONE
- D. *Procedures/Activities*
1. Give each pair of students a textbook.
 2. Pass out the comprehension questions (APPENDIX SS2).
 3. Have students complete and turn-in their questions. Return them to the students during the next class period to add to their notebooks.
 4. Review the second half of Chapter 2, using the overheads at the appropriate times.
- E. *Assessment/Evaluation*
1. The students' comprehension questions should be corrected for accuracy.

Lesson Four: Power and Courtesy

- A. *Daily Objectives*
1. Concept Objective
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
 2. Lesson Content
 - a. Students will listen and read Chapters 3 and 4
 - b. Students will summarize these chapters
 3. Skills Objectives
 - a. Students will recognize the importance of Machiavelli, the Borgia Family and Castiglione during the Renaissance.
- B. *Materials*
1. Textbooks for each student
 2. Renaissance overheads 25, 9 from NGS Picture Pack- *The Renaissance* (Overhead Transparency Set), National Geographic Society
- C. *Key Vocabulary*
NONE
- D. *Procedures/Activities*
1. Pass out textbooks.
 2. Read aloud Chapter 3.
 3. Discuss Machiavelli's ideas about leadership. Have the students brainstorm what qualities they think are important in leaders. Compare to Machiavelli.
 4. Read aloud Chapter 4 and discuss.
 5. Show overheads when appropriate to the discussion.
 6. Have the students write summaries of these two chapters for their notes.
- E. *Assessment/Evaluation*
1. The student summaries and participation in discussions.

Lesson Five: Women of the Renaissance

A. Daily Objectives

1. Concept Objective
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
2. Lesson Content
 - a. Students will read the rest of Chapter 5 with a partner, and answer comprehension questions.
3. Skill Objectives
 - a. Students will read for understanding in a textbook.
 - b. Students will work cooperatively with a partner.

B. Materials

1. Textbooks for each student
2. APPENDIX SS3: Comprehension questions for each student
3. Renaissance Overheads: 11 from NGS Picture Pack- *The Renaissance* (Overhead Transparency Set), National Geographic Society

C. Key Vocabulary

NONE

D. Procedures/Activities

1. Give each pair of students a textbook.
2. Pass out the comprehension questions (APPENDIX SS3).
3. Have students complete and turn in their questions. Return them to the students during the next class period to add to their notebooks.
4. Review Chapter 5, using the overheads at the appropriate times.

Lesson Six: Leonardo Da Vinci- A week in the life

A. Daily Objectives

1. Concept Objectives
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
 - b. Students will view and appreciate art works from the Renaissance Period, including painted and sculptured works, noting the shift to an emphasis on humanism.
2. Lesson Content
 - a. Students will read Chapter Six in their text
 - b. Students will build a small machine with a group
 - c. Students will draw with perspective
 - d. Students will paint a “ceiling”
 - e. Students will “write backwards”
 - c. Students will sketch small machines
3. Skill Objectives
 - a. Students will read for understanding in a textbook.
 - b. Students will work cooperatively with a group.
 - c. Students will sketch for detail.
 - d. Students will learn how to draw with perspective.

B. Materials

1. Textbooks for each student
2. APPENDIX SS4: Virtual Quiz
3. PARENT VOLUNTEERS
4. Small machines- eggbeater, tools, anything with gears, etc.

5. Finger paint, sectioned plates
 6. Plaster
 7. Paint shirts
 8. Cardboard (small sections, one for each student)
 9. Materials for small machines- rubber bands, gears, nut, bolts, cardboard-anything really
 10. Overhead transparencies-one for each student, vis-a-vis markers, tape
 11. Drawing paper
 12. Drop cloth, duct tape
 13. Folding tables
- C. *Key Vocabulary*
1. Fresco – a painting technique where plaster is applied to a small section of a wall; paint is then applied to the plaster while it is still wet; it is used on murals so that the murals become a permanent part of the wall
 2. Perspective – a painting technique that creates an illusion of depth in a flat painting
- D. *Procedures/Activities* (This is a FIVE day lesson)
1. Day One: Give the students their virtual quiz (APPENDIX SS4), correct as a class. Introduce Leonardo as the inventor of all those things.
 2. Day One: Have the students read Chapter 6 in their textbooks.
 3. Day Two: Review Chapter 6.
 4. Day Two: Discuss how Leonardo perfected writing backwards; give students an opportunity to practice. Tell them to take their writing home to check in a mirror. It should read perfect in the mirror if they did it correctly.
 5. Day Two: Discuss how Leonardo analyzed small machines and sketched them. Give each group of kids a small machine to sketch, remind the students to break down all the pieces.
 6. Days Three, Four and Five: You will need three volunteers each day!
 7. Day Three, Four and Five: You will need to split the class up into groups, this is how I did it with my 24 kids: I put them in groups of four: A, B C, D, E and F. On Day Four, groups A, B, C, and D worked on their inventions. Groups E and F did the art activities. On Day Five A, B, E, and F worked on their inventions, groups D and E went to art activities. On Day six groups D, E, F, and G worked on inventions, Groups A and B did the art activities.
 8. Day Three, Four and Five: INVENTIONS-Give each group a copy of their invention challenge, and a materials request form. Have them fill out the request and assign any pieces not available at school for group members to bring. They will have two complete class days to finish their invention. I stayed in the classroom with these groups.
 9. Day Three, Four and Five: DRAWING WITH PERSPECTIVE- Have two parent volunteers each take two students from the groups that are at the art centers for the day. Have them take the students to another area of the building with windows. Tape up the transparencies to the window, have the students draw with a marker exactly what they see-emphasizing outlines of objects. The students drawing can be copied with a copier on to white paper for coloring. This activity should take about a half an hour, then these parents will switch kids with the parent doing the ceiling painting for the last half an hour.
 8. Day Three, Four and Five: CEILING PAINTING-Have one parent take the last group that is not drawing or inventing and take them to an area where a folding table, or maybe two, has been set up. Tape a piece of cardboard under the table for each child. Mix plaster to a mud texture, add paint colors, and give each student a plate with different colors of plaster. Have the students lay down under the table-make sure they have on paint shirts. Have them paint a picture with the plaster while lying down. This group has ½hour to paint. They will switch with the drawers at the end of the half an hour.

- E. Assessment
 - 1. Visual evaluation of finished pieces

Lesson Seven: Artists of the Renaissance

- A. *Daily Objectives*
 - 1. Concept Objectives
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
 - b. Students will view and appreciate art works from the Renaissance Period, including painted and sculptured works, noting the shift to an emphasis on humanism.
 - 2. Lesson Content
 - a. Students will read Chapter 7 and Chapter 9 in their text
 - b. Students will create a mini-book of artists
 - 3. Skill Objectives
 - a. Students will read for understanding in a textbook.
 - b. Students will compare different artists' styles.
- B. *Materials*
 - 1. Textbooks for each student
 - 2. Renaissance Overheads: 11, 19, 14, 5, 15, 28, 33, 34, 35 from NGS Picture Pack- *The Renaissance* (Overhead Transparency Set), National Geographic Society
 - 3. Pictures of works of art
- C. *Key Vocabulary*

NONE
- D. *Procedures/Activities*
 - 1. Have the students read Chapter 7 and Chapter 9 to themselves or out loud.
 - 2. Discuss and show examples of the different artists' work.
 - 3. Have students create a mini-book of artists, writing a brief biography of each artist.
- E. *Assessment/Evaluation*
 - 1. The students' mini books

Lesson Eight: More Naked Art

- A. *Daily Objectives*
 - 1. Concept Objectives
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
 - b. Students will view and appreciate art works from the Renaissance Period, including painted and sculptured works, noting the shift to an emphasis on humanism.
 - 2. Lesson Content
 - a. Students read Chapter 8 in the text
 - b. Class discussion of Michelangelo's contributions to the world of art.
 - c. Add Michelangelo to mini-book
 - 3. Skill Objectives
 - a. Students will read for understanding in a textbook.
 - b. Students will write about Michelangelo's work and compare it to other artists.
- B. *Materials*
 - 1. Textbooks for each student
 - 2. Student's mini books

3. Renaissance Overheads: 21, 22 from NGS Picture Pack- *The Renaissance* (Overhead Transparency Set), National Geographic Society
 4. Posters of Michelangelo's work
- C. *Key Vocabulary*
NONE
- D. *Procedures/Activities*
1. Students read Chapter 8 in their text.
 2. After reading show posters and overheads of some of Michelangelo's work.
 3. Discuss the characteristics of his paintings and sculptures.
 4. Draw references to their "ceiling painting" experience. Discuss the "myth" of Michelangelo actually lying on his back to paint.
 5. Have the students add Michelangelo to their mini-book.
- E. *Assessment/Evaluation*
1. The students' mini-books

Lesson Nine: Comparing and Evaluating Art

- A. *Daily Objectives*
1. Concept Objectives
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.
 - b. Students will view and appreciate art works from the Renaissance Period, including painted and sculptured works, noting the shift to an emphasis on humanism.
 2. Lesson Content
 - a. Students will chose their favorite work of art studied and their least favorite
 - b. They will write a comparison paragraph about those pieces
 3. Skill Objectives
 - a. Students will compare and evaluate different artists' styles.
 - b. Students will write a comparison paragraph with clarity.
- B. *Materials*
1. Textbooks for each student
 2. Posters of different artists' work
- C. *Key Vocabulary*
NONE
- D. *Procedures/Activities*
1. Hang various works of art around the room.
 2. Review who painted/sculpted/designed those pieces.
 3. Have students pick their favorite and least favorite pieces and have them discuss their choice with another student to clarify their ideas.
 4. The students will now write a comparison paragraph about why they like and don't like the pieces they chose.
- E. *Assessment/Evaluation*
1. The students' essays

Lesson Ten: Other Art Forms - Language and Music

- A. *Daily Objectives*
1. Concept Objective
 - a. Students will understand the importance of the artistic and scientific ideas born of the Italian Renaissance and how those concepts have affected society then and now.

2. Lesson Content
 - a. Read Chapters 10/11 in their text
 - b. Discuss the impact of these artists
 3. Skills Objectives
 - a. Students will read for understanding in a textbook.
 - b. Students will make connections to today's world.
- B. *Materials*
1. Textbooks for each student
 2. Quotes from Shakespeare, quotes from Don Quixote
 3. Renaissance Overheads: 36 from NGS Picture Pack- *The Renaissance* (Overhead Transparency Set), National Geographic Society
 4. Music recordings from the time
- C. *Key Vocabulary*
NONE
- D. *Procedures/Activities*
1. Read some famous quotes from Shakespeare. Ask if they have heard them before. Discuss possible meanings of the quotes. Have the students question where they came from. Then, tell students that they are from Shakespeare.
 2. Read the chapters from the text.
 3. Read an excerpt from Don Quixote, if the class has not already read the book.
 4. Discuss the impact these two writers had on the world
 5. Listen to Greensleeves, discuss if the students have heard it before. Play other music selections. Have the students free write during the music about what the music makes them think about or how it makes them feel or what things it reminds them of.
- E. *Assessment/Evaluation*
1. Participation in the discussion, their free write can be evaluated for participation points.

VI. CULMINATING ACTIVITY (Optional)

- A. **SCIENCE:** The Final Design Project serves as the culminating activity for the Architecture portion of this section. See Section V (SCIENCE), Lesson 5, Part D, Number 2 above.
- B. **SCIENCE:** For the Flight portion of the unit, our school was fortunate to have a half-day in-school field trip program by the Denver Museum of Science and Nature. The museum is usually a wonderful resource, but this was particularly great because they had several programs about flight running during our unit. Other possibilities for field trips include airports, aircraft design/manufacturing plants, and visits to see privately owned aircraft at smaller airports, etc. If you are near a military base, perhaps their public affairs officer could assist you in planning a field trip or guest speakers. Other local museums or aeronautics groups are also a great resource. There are also on-line opportunities from time to time. Start with NASA. (NOTE: We deliberately omitted any references to space flight because of the sixth grade concentration on space and space exploration at our school.)
- C. **SOCIAL STUDIES:** This unit ends with an open note test. The student may use any materials from class, except the book. I encourage the students everyday of the unit to be reviewing their notes, so they are familiar with the content.

VII. HANDOUTS/WORKSHEETS

- A. **SCIENCE**
1. APPENDIX A: Unit folder cover
 2. APPENDIX B: Renaissance Rap lyric sheet
 3. APPENDIX C: Visual Viz-Quiz suggestions
 4. APPENDIX D: Scale and Proportion in Design Homework
 5. APPENDIX F: Scale and Proportion Math: Class Activity

6. APPENDIX G: Unit Test
 7. APPENDIX H: Architectural Column Styles
 8. APPENDIX J: Parts of an Airplane
 9. APPENDIX K: Basic Flight Movement
 10. APPENDIX M: Internet Resource Listing
- B. SOCIAL STUDIES**
1. Appendices SS1-SS5 will be passed out at the National Conference

VIII. BIBLIOGRAPHY

A. SCIENCE

1. *Architecture: Boy Scouts of America Merit Badge Series Handbook*. Boy Scouts of America, 1994. (Available at most public libraries in the children's department.)
2. *Core Knowledge Sequence*. Charlottesville: Core Knowledge Foundation, 1999.
3. Frensch, Helen. *Flight*. St. Louis, Missouri: Milliken Publishing Company, 1990, ISBN# 0-88335-338-5.
4. Griffiths, Nick. *Incredible Inventions*. Chicago: World Book, Inc., 1996. ISBN# 0-7166-7138-2.
5. Hirsch, Jr., E. D. *What Your 5th Grader Needs to Know*. New York: Dell Publishing, 1993, ISBN# 0-385-31464-7.
6. Lane, Bill and Azriela Jaffe. *The Complete Idiot's Guide to Flying and Gliding*. Indianapolis: Macmillan USA, Inc., 2000, ISBN# 0-02-863885-9.
7. Richards, Jon. *Air and Flight Easy to Make Science Experiments*. Brookfield, CT: Copper Beech Books, Aladdin Books, LTD., 1999.
8. "The Renaissance Thematic Unit," Huntington Beach, CA: Teacher Created Materials, Inc., 1994.
9. Vaden, Judy. *Flight Thematic Unit*. Huntington Beach, CA: Teacher Created Materials, Inc., 1991, ISBN# 1-55734-281-4.
10. Vignozzi, Alessandro. *Buildings*. Florence, Italy: Donati Giuduci Association, 1995, ISBN# 0-7607-0594-1.

B. SOCIAL STUDIES

1. Hart, Tony. *Leonardo da Vinci*. London, England: Aladdin books, 1994, ISBN 0-8120-1828-1.
2. Hart, Tony. *Michelangelo*. London, England: Aladdin Books, 1993, ISBN 0-8120-1827-3.
3. Herbert, Janis. *Leonardo da Vinci For Kids*. Chicago, Illinois: Chicago Review Press, 1998, ISBN 1-55652-298-3.
4. Prum, Deborah Mazzotta. *Rats, Bulls, and Flying Machines*. Core Knowledge Foundation, 1999.
5. Stanley, Diane. *Leonardo da Vinci*. New York, New York: Scholastic Inc. 1996, ISBN 0-439-12059-4.
6. NGS Picture Pack- *The Renaissance*. (Overhead Transparency Set). Washington D.C.: National Geographic Society, 1997, Product # 82730.



**Architecture:
Then and Now**
NAME _____

APPENDIX B
THE RENAISSANCE MAN RAP Lyric Sheet
By Lisa Browning

Ev'ry body say Leo! (Leo!)
Hey, Leo! (Leo)
Go, go, go Leo!
Go, go, go Leo!

Here's a story 'bout a dude named da Vinci
Down in 5th grade, we think he's pretty cinchy
Born April fif-teenth, 1452, he was a painter
Was a sculptor, was an engineer, too!
LEO! Leo!
Say LEO! Leo!

Back in the Renaissance, people put reliance
In dudes like da Vinci and other men of science
Leo did a lot of drawing parts of anatomy
I can't draw na-kie pictures or my teachers will be mad at me
LEO! Leo!
Say Leo! Leo!

He was one of the brilliant people burstin' on the scene
He even drew plans for a flying machine
Go, go, go Leo!
Go, go, go Leo!

The most famous painting of his style
Is the Mona Lisa with her fun-ky smile! Mona Lisa
Is a fav'rite among the highbrows
I don't understand why she's got no eyebrows.
LEO! Leo!
Say LEO! Leo!
Go, go, go Leo!
Go, go, go Leo!

Leo da Vinci, now HE had a plan, Leonardo da Vinci,
THE RENAISSANCE MAN!

APPENDIX C
VIZ-QUIZ Visual Suggestions List

Ionic Column
Doric Column
Corinthian Column
Tempietto of San Pietro at Montorio
Roman Coliseum
The Acropolis
The Parthenon
The Empire State Building
The JFK Library in Boston
Fallingwater (The Kaufmann House)
The Hawaii State Capitol Building
The Brooklyn Bridge
The Cathedral at Notre Dame, Paris
The Palace at Carcassonne, France
La Rotunda (Villa Capra)
U. S. Capitol Building
The Guggenheim Museum
The Smithsonian Institution
Windsor Castle
The Great Pyramids
The Washington Monument
The Eiffel Tower

OTHERS?????

APPENDIX D
SCALE and PROPORTION CLASS Homework

MATERIALS NEEDED: Rulers and/or tape measurers, pencils, worksheet

Both Leonardo and Michelangelo studied the human body extensively so that they could produce more accurate figures in their artwork. You have seen da Vinci's famous sketch of the human form in your social studies and science classes. Using the copy of the skeleton, answer these questions.

1. Measure the length of the art from shoulder to fingertips. _____
Measure the length of the leg from hip to toes. _____
What is the difference between these two measurements? _____
2. Measure the width of the shoulders. _____
Measure the width of the hipbones. _____
What is the difference between these two measurements? _____
3. Measure the length of the arm from elbow to fingertips. _____
Measure the length of the arm from shoulder to elbow. _____
Which part of the arm is longer? By how much? _____
4. Measure the length of the leg from knee to toes. _____
Measure the length of the leg from hipbone to knee. _____
Which part of the leg is longer? By how much? _____
5. Measure the entire body from the top of the skull to the tips of the toes. Use the measurements you found in questions 1-4 to answer the following, writing your answer as a fraction.
 - a. The legs are about _____ of the entire body height.
 - b. The arms are about _____ of the entire body height.
6. Measure the head and neck from the top of the head to where the neck meets the shoulders. Use the measurements from questions 1-4 to answer the following, writing your answer as a fraction.
 - a. The head and neck are about _____ of the entire body height.
 - b. The head and neck are about _____ the length of a leg.
7. Have someone measure the length of your own leg, from where it meets your hip to the tip of your toes. How long is your leg? _____
8. Have someone measure your height. _____
9. Have someone measure the length of your right arm from shoulder to fingertips. What is its length? _____
10. Your leg length represents about what fraction of your body height? _____

APPENDIX G
ARCHITECTURE UNIT QUIZ

NAME _____ HR _____

PART ONE: Matching

- | | |
|--------------------------------|--|
| _____ I. M. Pei | A. "rebirth" |
| _____ Prehistoric period | B. 16 th century architectural period |
| _____ Roman period structure | C. Paris' Cathedral of Notre Dame |
| _____ Renaissance period | D. designer of <i>Fallingwater</i> |
| _____ Corinthian, Doric, Ionic | E. Renaissance period structure |
| _____ Frank Lloyd Wright | F. The Coliseum |
| _____ La Rotunda (Villa Capra) | G. modern period structure |
| _____ "renaissance" means this | H. types of architectural columns |
| _____ Gothic period structure | I. Designer of the John F. Kennedy Library in Boston |
| _____ Empire State Building | J. basic shelter only during this period |

PART TWO: The Mathematics of Architecture

1. If the scale for an architectural drawing is $\frac{1}{4}$ ", how many FEET are represented by the following measures:
 - A. two inches _____
 - B. five inches _____
 - C. ten inches _____
 - D. 1 $\frac{1}{2}$ inches _____
 - E. 3 $\frac{1}{4}$ inches _____

PART THREE:

Name one structure from each of the following architectural period.

MODERN: _____

NATIVE AMERICAN: _____

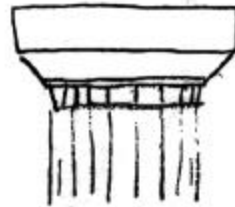
GREEK: _____

DISCUSSION: Explain how architecture changed as designers moved from the styles and purposes that were common in Greek and Roman architecture into Renaissance architecture. Use complete sentences!

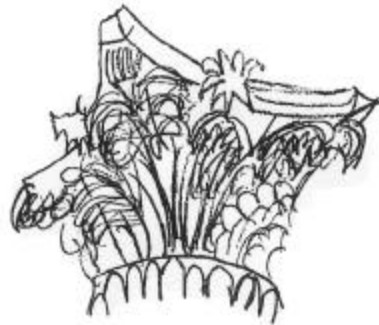
APPENDIX H
Architectural Column Styles



Ionic



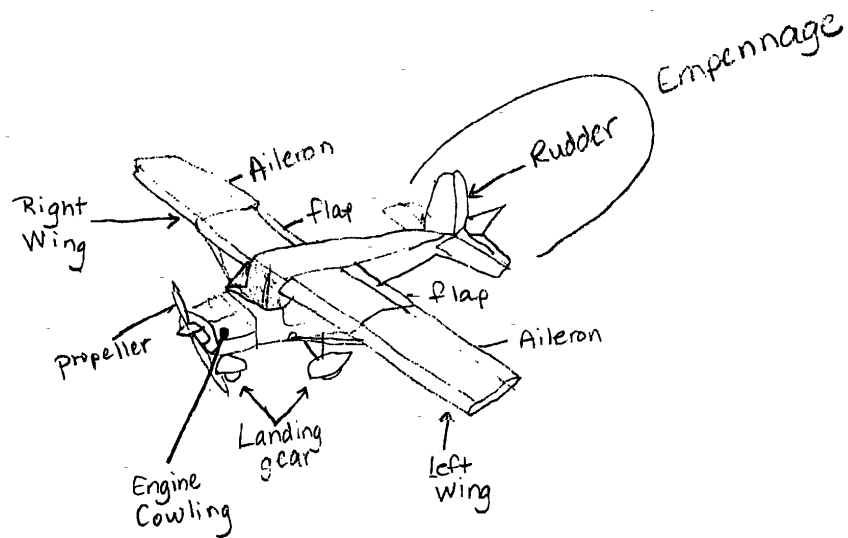
Doric



Corinthian
(See Florida Supreme
court building!)

APPENDIX J

Parts of an Airplane

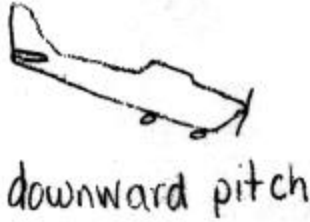


- The "body" of the plane that holds pilots, passengers and cargo is called the Fuselage.
- The area where the pilots control the plane is called the cockpit.

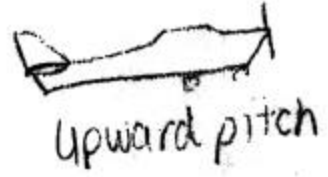
APPENDIX K
Basic Movements in Flight



Level flight



downward pitch



upward pitch



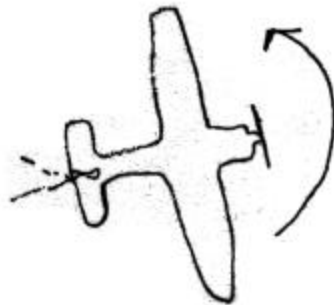
left bank



right bank



right yaw



left yaw

Yaw = nose only moves,
no loss/gain of altitude

Appendix M

Helpful Websites for this Unit

RENAISSANCE:

Two excellent sites about Italian Renaissance plus one called The Renaissance Outside Italy.

<http://viva.lib.virginia.edu/dic/colls/thumbs2www/arh102/html/>

<http://library.thinkquest.org/2838/renais.htm>

<http://britannica.com/bcom/eb/article/7/0%2C5716%2C119567+6+110517%2C00.htm>

CLASSICAL GREEK ARCHITECTURE

<http://harpy.uccs.edu/greek/classgrkarch.html>

http://buildings.greatbuildings.com/Chartres_Cathedral.html

NOTRE DAME CATHEDRAL

www.elore.com/elore04c.html

<http://www2.art.utah.edu/cathedral/paris.html>

WINDSOR CASTLE

www.royal.gov.uk/palaces/windsor.htm

Palace at Carcassonne, France

www.photo-links.com/photo-links/gallery/castles/gwilliams/carcassonne3.html

Castle at Blarney, Ireland

www.historic.irishcastles.com/blarney.htm

EIFFEL TOWER

http://wwwusers.imagenet.fr/~chouard/equation_Eiffel_tower.html

ROMAN ARCHITECTURE

www.romanconcrete.com/

OTHERS

www.mcdougallittell.com/chist/whact/U3/U3main/htm

www.vacation.net.gr/plakropoli.html

www.iei.net/~tryan/walk.htm

www.bluffton.edu/~sullivanm/bramante/bramante.htm

<http://ce.eng.usf.edu/pharos/wonders>

www.esbnyc.com (EMPIRE STATE BUILDING info. GREAT photos!)

www.greatbuildings.com/buildings/Villa_Capra.html

www.historyforkids.org

<http://users.comkey.net/daniel/brbindea.htm>

www.ds.arch.tue.nl/education/students/MultiMedia/FallingWater/

www.hawaii.gov/about/capitol/htm