Topic: Architecture  
Suggested Grade Level: 5  
Conceptual Lens: Discovery  
Supporting Concepts: discovery, relationships, patterns, influence time, change, traditions, patterns, choices, culture, structure  

Please have students to visit this website at some point during this unit:  
http://www.architecture-student.com/architecture/7-reasons-why-you-should-study-architecture/

Process Skills: observing, identifying trends, evaluating solutions, gathering data, analyzing data, making inferences, making predictions, developing questions, compare/contrast, listening, sequencing, observing, identifying trends, evaluating solutions, draw conclusions, make inferences, categorizing, identifying a point of view, classifying, presenting, researching, critical thinking, designing, creating, and discussion

Vocabulary:
- architecture- The science and art of planning buildings.
- architect- Someone who designs buildings.
- asymmetry- a form of arrangement that is not the same on both sides.
- axis- A straight line around which an object turns.
- bilateral- Having 2 sides
- degree- A unit of measuring an angle or part of a circle.
- gable- The triangular upper part of a wall under a slopping roof.
- horizontal- Parallel to the horizon.
- intersect- To met and cross at a point.
- module- One of a set of standardized units that make up a larger whole.
- neoclassical- Relating to a revival of the classical style of Italian Renaissance or ancient Greece or Rome.
- organic- Of or relating to living things.
- prefabricate- To make sections of a building at a factory, so its construction only requires putting the sections together.
- pyramid- A solid figure with a square base and 4 triangular sides that meet in a point at the top.
- reflection- An image that is repeated or reflected, as in a mirror.
- Renaissance- The name for a period in Italy from the 1300s to the late 1500s when there was a revival of ancient Greek and Roman art and architecture. The name comes from a French word that means “rebirth”.
- rotational- Turning around a center point or axis.
- similarity symmetry- Having the same shape but different size.
- spiral- A curved shape that starts at a center point and curls out from it in wider and wider arcs.
- spire- A tall, narrow pyramid atop a tower or pillar.
- stability- The strength to remain whole or upright for a long time.
- symbol- Something that stands for something else.
- symmetrical transformation- The change a shape or figure undergoes when it is flipped, turned, or slid from one position to another.
- symmetry- An even arrangement of parts on opposite sides of a line or around a center point. Also two identical or similar shapes in different positions.
- vertical- Straight up and down, perpendicular to the horizon.
Overview (for the teacher): Architecture in its basic sense means the art and science of creating buildings and structures. Planned architecture usually influences space, dimensions, consistency, luminosity, shadow, or abstract components in order to attain satisfying aesthetics.

In the stream of building architecture, the expertise demanded of an architect vary from the further complex, such as for a hospital or a stadium, to the actually simpler ones like planning and designing residential houses. It is a must that an architect has excellent calculation skills which are vital for any sort of construction. Architects today must also be able to work with computer generating programs as the old method of hand drafting has been replaced through modern technology.

This unit on architecture only presents a small amount of the enormous amount of information that students can learn from studying architecture. This unit presents the ideas of how architecture is influenced by culture leading to distinct styles of architecture; the whimsical side of roadside architecture (novelty architecture); knowledge of “the Father of American Architecture”, Frank Lloyd Wright, and how his style of architecture influenced America’s architecture; and how math and patterns are related to architecture.

Note: If the students have not been introduced to persuasive speech or writing, the teacher will need to give instruction to the students before they can do the culminating performance task.

Preassessment: Show students some pictures of architectural styles from either your area or some from the Internet then ask them if they know what architecture is and what styles of architecture are present in the pictures shown to them. Be sure that you obtain pictures that reflect both modern and vintage architectures since the unit will require the students to produce a time line of architecture as well as discuss the past 100 years in American architecture. Also ask students to look closely at the pictures and tell you if they see any geometric shapes in the construction of the building. Ask students if they know any famous architects. Begin a KWL chart that you will post somewhere in the classroom so students can see if they are attaining the knowledge they wanted to know. Another method would be having the students create the KWL chart on the Smartboard and save the file so it can be opened and posted at appropriate times.

Culminating Performance Task: Your recent graduation has given you a Masters degree in Architecture. Now it is time to get out in the world and find a job. You have decided to move to New York City. In order to get a job with a big architectural firm named March & Drum, you have to design a building that reflects a new style of architecture. Your client just recently purchased property that was condemned and torn down. It is on Seemore Street and in-between other buildings. The building will be a two story structure that will house a clothing store on the first floor and the owner’s home on the second story. The size of the lot is 100 yards deep and 50 yards wide. The owner has a wife, one male child and a cat. Cost is no problem according to the owner. The owner also purchased the rights to a small parcel of land one mile away from Seemore Street and would like to have you design a small building that is to be roadside architecture to convince people to really want to come to his store. He has not decided yet what to name his store and has asked for your advice to name it. Remember that you are designing this structure along with five other new architects who are all trying to get the one job position that is open at March & Drum Architectural Firm. You will have to make a presentation to the company’s top officers convincing them that your design is better than your competitors. The presentation is to be done in any digital manner (Prezi, PowerPoint, Web2) you desire, or you may make a professional portfolio with all the information neatly organized on large 11 X 14 sized papers.

May the best architect win!
# CPT Rubric

Here is your rubric on which your design will be graded by your teacher and your peers when you make your presentation.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>4 Specialist</th>
<th>3 Achieving</th>
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<td><strong>Function</strong></td>
<td>Structure functions extraordinarily well, holding up under atypical stresses.</td>
<td>Structure functions well, holding up under typical stresses.</td>
<td>Structure functions pretty well, but deteriorates under typical stresses.</td>
<td>Fatal flaws in function with complete failure under typical stresses.</td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td>Accurate information taken from several sources in a systematic manner.</td>
<td>Accurate information taken from a couple of sources in a systematic manner.</td>
<td>Accurate information taken from a couple of sources but not systematically.</td>
<td>Information taken from only one source and/or information not accurate.</td>
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<td><strong>Presentation</strong></td>
<td>Presentation was very informational and understandable. Students showed that they learn knowledge through their research and project.</td>
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<td>Presentation was unacceptable. Student showed no interest in their research or project.</td>
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TOPIC: Architecture

CONCEPTUAL LENS: Discovery

Critical Content

FACTS
See teacher overview and background information with each unit.

SKILLS
Observing
Identifying trends
Evaluating solutions
Gathering data
Analyzing data
Making inferences
Making predictions
Developing questions
Comparing/contrasting
Listening
Sequencing
Observing
Identifying trends
Evaluating solutions
Drawing conclusions
Making inferences
Categorizing
Identifying a point of view
Classifying
Presenting
Researching
Thinking critically and creatively
Designing
Creating
Discussing

CONCEPTS
Discovery, Relationships, Patterns, Influence, Time, Change, Traditions, Patterns, Choices, Culture, Structure
Essential Understandings

EU1: Culture influences architecture leading to the discovery of distinct styles of architecture that can be related to certain time periods.
EU2: The relationship of a building’s form and function has a great influence on roadside architecture.
EU3: Frank Lloyd Wright influenced American architecture which resulted in architectural change over time.
EU4: Architectural structures include many different applications of math and patterns.

Essential Questions

EQ1: How does culture influence architecture leading to the discovery of distinct styles of architecture that can be related to certain time periods?
EQ2: How does the relationship of a building’s form and function have a great influence on roadside architecture?
EQ3: How has Frank Lloyd Wright influenced American architecture which resulted in architectural change over time?
EQ4: How do architectural structures include many different applications of math and patterns?

Culminating Performance Task

Create original architecture in the form of a city building and a roadside structure in order to understand Cultural influence on architecture leading to distinct styles during time periods, Changes and influences in American architecture over time, or Math and patterns in architecture and The relationship of a building’s form and function has a great influence on roadside architecture.

Your recent graduation has given you a Masters degree in Architecture. Now it is time to get out in the world and find a job. You have decided to move to New York City. In order to get a job with a big architectural firm named March & Drum, you have to design a building that reflects a new style of architecture. Your client just recently purchased property that was condemned and torn down. It is on Seemore Street and in-between other buildings. The building will be a two story structure that will house a clothing store on the first floor and the owner’s home on the second story. The size of the lot is 100 yards deep and 50 yards wide. The owner has a wife, one male child and a cat. Cost is no problem according to the owner. The owner also purchased the rights to a small parcel of land one mile away from Seemore Street and would like to have you design a small building that is to be roadside architecture to convince people to really want to come to his store. He has not decided yet what to name his store and has asked for your advice to name it.

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| Content Knowledge/Standards | **Conceptual Lens:** Architecture  
**Concepts:** structure, patterns, discovery, relationships  

**Lesson 1 (EU1):** Historical Architecture  
**EU1:** Cultural influence on architecture leading to distinct styles during time periods.  
**EQ1:** How does culture influence architecture leading to the discovery of distinct styles of architecture that can be related to certain time periods? (Place a copy of the EQ on the wall as a focus.)  

**ALCOSS:**  
**English Language Arts (2007)**  
5.1: Demonstrate reading vocabulary knowledge, including recognition of multiple-meaning words.  
5.11: Use search strategies in the research process to identify reliable current resources and computer technology to locate information.  
6.13: Utilize resource materials for supporting evidence in composition  
6.14: Use organizing and paraphrasing in the research process.  
6.17: Use listening skills for remembering significant details, directions, and sequences.  
7. 4: Apply strategies that include setting purposes for reading, distinguishing fact from opinion, making generalizations, and reviewing to comprehend informational and functional reading materials.  
7.12: Cite sources used in the research process.  
7.13: Apply steps in the research process to identify a problem or issue, locate resources and information, and present findings.  
7.14: Present findings from inquiry and research using a variety of resources.  
8:8: Write in narrative, expository, and persuasive modes with attention to descriptive elements.  
8. 13: Combine all aspects of the research process to compose a report.  
8.13: Demonstrate paraphrasing, quoting, and summarizing of primary and secondary sources and various methods of note taking.  

**Social Studies**  
7. 9: Analyze environmental consequences of major technological changes in human history for both intended and unintended outcomes.  
7.12: Describe problems involved in balancing the impact of human habitation on the environment and the need for natural resources essential for sustaining human life.  
8:4: Identify cultural contributions of Classical Greece, including politics, intellectual life, arts, literature, architecture, and science. |
Geography
7. 4.) Locate cultural hearths in Europe, Asia, and Africa on maps, globes, and satellite images.
7. 5: Identify physical, economic, political, and cultural characteristics of selected regions in the Eastern Hemisphere, including Europe, Asia, and Africa.

World Geography-Human
9-12.2: Explain the interaction between humans and their physical environment

Arts Education-Visual Art
6-8.1: Create works of art utilizing a variety of traditional and nontraditional media and techniques.
Level I
7-12. 9: Compare works of art with functional and natural objects, aesthetic components, and formal qualities.
Level II
7-12. 8: Describe stylistic characteristics of selected works of art and architecture.
Level III
7-12. 7: Explain purpose, function, and meaning of selected works of art from a variety of cultures, times, and places.
7-12. 9.) Organize research about art, artists, cultures, times, and places into a product or presentation.

Career Clusters Exploration
7-8. 3: Demonstrate oral presentation skills that sustain listeners' attention and interest including eye contact, clear enunciation, and use of visual aids.
7-8. 4: Apply active listening skills to obtain and clarify information.
7-8. 5: Summarize written materials from various career sources clearly, succinctly, and accurately

Career Cluster Technology I
7-8. 3: Describe relationships and connections among technologies and other fields.
7-8. 5: Summarize the cultural, social, economic, environmental, political, and historical effects of technology.
7-8. 7: Identify creative attributes of design, including brainstorming, modeling, testing, evaluating, and modifying.
7-8. 17: Identify advances and innovations in construction technologies.

Career Cluster Technology II
7-8. 7: Describe the attributes of design.
7-8. 8: Explain attributes associated with engineering design.

**Character Education (1995)**
K-12. 6: Respect for others
K-12. 8: Cooperation
K-12. 10: Self-control
K-12. 11: Courtesy
K-12. 20: Respect for the environment
K-12. 22: Creativity
K-12. 25: Perseverance

**Information Literacy (1998)**
K-12. 1: The student who is information literate accesses information efficiently and effectively.
K-12. 2: The student who is information literate evaluates information critically and competently.
K-12. 3: The student who is information literate uses information accurately and creatively.
K-12. 6: The student who is an independent learner is information literate and strives for excellence in information seeking and knowledge generation.
K-12. 9: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.

**Technology Education**
3-5. 8: Collect information from a variety of digital sources
6-8. 9: Practice responsible and legal use of technology systems and digital content.

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<td><strong>Pre:</strong> KWL chart asking students about their knowledge of architecture and culture; group discussion, discussion and listing answers on the board, and word wall. <strong>Post:</strong> After students have gain the required knowledge from their research they will create on a long sheet of white paper, a timeline of architectural eras as a group. Pairs of students will work together on one era and all students are responsible to complete their section. The timeline will include printed images of the structures that fit the era. Students will also create a structure in scale to be placed on the timeline therefore the structure must be light enough to be attached to the paper timeline. Students will share with their classmates through an oral report what time era they made their product from. The timeline will be placed outside our classroom on the paper hanger so other students can observe it in hopes that we can share our new knowledge. The vocabulary words will be moved to the hall above the timeline.</td>
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**Rubric:** Time line/Build a Structure/Oral Report: Architect Unit

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**Cooperation**

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<tr>
<td>Cooperation</td>
<td>Great team work with both members responsibilities</td>
<td>Good team work with minimal about sharing the responsibilities.</td>
<td>Acceptable team work with several about sharing the responsibilities</td>
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**Introduction**

**Overview of the Unit:** This lesson is designed to teach students the basic terminology used by architects and what an architect does. They will discover the various eras that produced the varying styles of architecture of the ages. Students will also be aware of what a culture is and how a culture can influence something. Through research and cooperative work, students will work as researchers by making a timeline and a structure of the era of architecture in scale to fit on the timeline.

**This unit includes:** research, organizing, technology, cooperation

**Unit Pacing:** 4-5 meetings (once a week)

**Background Information for the teacher:** The profession of architecture involves everything that influences the way in which the built environment is planned, designed, made, used and maintained. People with architecture degrees can go into, ranging from landscape architects to designers of skyscrapers and major public structures. Architecture-related professionals generally work in office settings, reviewing designs and construction materials. They may also travel to sites to conduct surveys.
and help plan different phases of design or construction. Educational requirements for these professionals vary. While architects must complete either a bachelor or master of architecture degree program and several years of practical training, architectural technicians and drafters may typically enter the workforce after completing a 2-year associate's degree program in architectural design, engineering or drafting.

To contract themselves within the U.S. 50 states, architects must be licensed. Licensing requirements generally include earning an architecture degree, gaining field experience and passing the Architect Registration Examination through the National Council of Architectural Registration Boards. States outline the required continuing education classes to complete for architects to maintain their license. Architects work with engineers, technicians and clients to design safe and functional structures ranging from dams to homes. These professionals meet with clients to determine the parameters, needs and functions of proposed projects. Accordingly, they may play a role in generating project bids and budgets. Once both parties have agreed on all aspects, architects begin the design phase. This may include planning the layout of electrical, plumbing and mechanical systems. Architects generally use computer-aided design and drafting (CADD) software to facilitate the design process and make modifications easier. These professionals are also responsible for ensuring that designs meet building codes, city ordinances and government regulations.

**Definition:** Architecture is the study of design and the construction of buildings, bridges and other structures.

### Teaching Methods

**Direct Instruction:** Small groups and whole group discussion, computer research, recording information, KWL chart, create word wall, webbing, creating, drawing, and listing.

**Inquiry-Based Instruction: (Type I Activity):** Students will research on the computer to learn the vocabulary associated with architecture. Students will be asked to acquire the definition of chosen architectural words from [http://www.libraryweb.org/rochimag/architecture/vocabulary.htm](http://www.libraryweb.org/rochimag/architecture/vocabulary.htm) for a word wall. (The teacher is at liberty to choose the words he/she desires).

A great website for students to learn about the basics and more of architecture is [www.archkidecture.org/learn.html](http://www.archkidecture.org/learn.html).

Students will also visit Oracle Think Quest’s, Our world of architecture-to the next level; to learn about the styles of architecture over time. [http://library.thinkquest.org/C005594/](http://library.thinkquest.org/C005594/)

**Careers:** Architectural Designer, Renovator, Historic Preserver, Landscape Architect, Industrial Designer, Civil Engineering, Building Inspector, Renovator, Urban Planner, Historic Preserver, Green
### Architect

**EU1:** Cultural influence on architecture leading to distinct styles during time periods.

**EQ1:** How does culture influence architecture leading to the discovery of distinct styles of architecture that can be related to certain time periods? (Place a copy of the EQ on the wall as a focus.)

**SQ1:** What is architecture and what are some of the words associated with architecture?

**Skills:** critical thinking, identifying a point of view, researching

- **Activity:** Teacher asks the students “What is architecture?” Teacher and students discuss the vocabulary word, architecture. Architectures is the art of building in which human requirements and construction materials are related so as to furnish practical use as well as an aesthetic solution. Architecture is essentially abstract and nonrepresentational and involves the manipulation of the relationships of spaces, volumes, planes, masses, and voids. Time is also an important factor in architecture, since a building is usually comprehended in a succession of experiences rather than all at once. In most architecture there is no one vantage point from which the whole structure can be understood. The use of light and shadow, as well as surface decoration, can greatly enhance a structure.

- **Activity:** Teacher will ask students “What words do you think are associated with architecture?” Teacher will create a KWL chart as students offer the words associated with architecture. Then students will research on the computer to learn the vocabulary associated with architecture. Students will be asked to acquire the definition of teacher chosen architectural words (according to student ability) from [http://www.libraryweb.org/rochimag/architecture/vocabulary.htm](http://www.libraryweb.org/rochimag/architecture/vocabulary.htm) to create a word wall to be placed close to the EQ.

- **Resource:** [http://www.factmonster.com/](http://www.factmonster.com/) (for addition background information) and [http://ethemes.missouri.edu/themes/1704](http://ethemes.missouri.edu/themes/1704)

**SQ2:** What is culture and how can culture influence architecture?

**Skills:** making predictions, draw a conclusion, observing, critical thinking, listening

- **Activity:** Teacher asks students “What is a culture and how would you describe your culture?” Students will work in small groups to list things they feel represent the word
culture in their journals. Then the students will self reflect to determine how they will describe their own culture in their journal. In whole group the teacher or a student will list them on the board. Groups cannot repeat an item from another group. This requires groups to listen to each other.

- **Culture** - The total way of life held in common by a group of people, including technology, traditions, language, and social roles. It is learned and handed-down from one generation to the next by non biological means. It includes the patterns of human behavior (i.e. ideas, beliefs, values, artifacts, and ways of making a living) which any society transmits to succeeding generations to meet its fundamental needs.
- **Culture areas** - Regions with shared cultural traits (e.g., sub-Saharan Africa).
- **Culture hearth** - An area where a distinctive set of cultural traits develops, such as the Fertile Crescent and the Nile River Valley.
- **Culture region** - A portion of the Earth's surface that has one or more common cultural elements.

**Activity:** Teacher leads students in a discussion about cultural differences (see information in following paragraph). Students will again break into small groups and list the cultural things that could influence architecture. Again in whole group the responses will be recorded on the board and group discussion will take place so students will realize the cultural factors in the following paragraph can influence architecture.

Great differences, as well as startling similarities, can be seen when comparing world cultures. People around the globe are similar in their essential humanity: we communicate with each other, we sustain ourselves with food, and when we sleep we often dream. Yet we speak different languages, eat different foods, and dream different dreams. These are what we call cultural differences. What causes them is not always obvious to the ordinary person. **Culture, here understood as the totality of what a group of people think, how they behave, and what they produce that is passed on to future generations, is what binds us together as human beings but also separates us into our different communities. In today's world, understanding both our similarities and our diversity becomes increasingly important. Through an understanding and appreciation of cultural difference, children will be better prepared to live in an ever-shrinking global community. And increasingly, our classrooms are becoming miniature models of the global community itself.**

(http://emsc32.nysed.gov/ciai/socst/grade3/whatisa.html)

In our protective cocoon of affluence, many of us do not realize — or appreciate — the fact that most of the world’s population lives very differently than we do.
Since most of the population is “not like us,” it seems wise to take a critical look at how they have responded to their built environment needs. It is likely that some future clients will be foreign and so it is important to meet the client’s needs with respect to their culture and not through the filter of our own cultural biases.

There are many factors that influence dwelling design and the most important of these are the Socio-Cultural Factors. The other factors, which serve simply to modify the design, include:

- the response to climate
- the available materials, construction, and technology
- the resources, settlement, topography, etc., of the site, including the client’s sense of attachment to the place
- the need for defense
- the level of economy: scarcity vs. conspicuous consumption
- the form, plan, and orientation of the space in respect to religion: sacred spaces, symbolic significance, etc.
- the client’s attitudes toward nature, religious, cosmological, exploitative, etc.
- the desire for comfort

It may be one thing for an architect to come up with a list of necessary aspects for a design, or, its “criticalities,” but, what is almost more important is how the architect proposes to achieve these needs in a way that is respectful to the client’s culture.

http://architectureaddiction.com/2011/12/cultural-influences/
SQ3: **What is architectural style? What are three distinct architectural styles?**

**Skills:** listening, critical thinking, compare/contrast, make inferences, researching

**Activity:** Teacher will help students through discussion about architectural style. Example questions:

- How would you define architectural style?
- How would you compare architectural style to clothing style?
- What would be the result if there was no style in architecture?
- Discuss the pros and cons of architectural style.
- How would you explain the reason that architectural style exists?
- What is the most important reason why we should study architectural style?

**Activity:** Students will research on the web “architectural styles” to find 3 styles that appeal to them. They will take the knowledge they have acquired and record it in their research notebook to be used later on the post assessment task.

**Architectural styles** are specific methods of construction, and most architecture can be classified as a chronology of styles which changes over time. These changes may reflect, for instance, changing fashions, changing beliefs and religions, or the emergence of new ideas and new technology which make new styles possible. A style is defined by the features that make it notable, and may include terms such as **form**, method of construction, **materials** and regional character.

Styles therefore emerge from the history of a society and are documented in the subject of **architectural history**. At any time several styles may be fashionable, and when a style changes it usually does so gradually, as architects learn and adapt to new ideas. The new style is sometimes only a rebellion against an existing style, such as "post-modernism" (means "after modernism") which has in recent years found its own language and split into a number of styles with other names.

Styles often spread to other places, so that the style at its source continues to develop in new ways while other countries follow with their own twist. For instance, the Renaissance began in Italy around 1425 and spread to all of western Europe over the next 200 years, with the French, Belgian, German, English and Spanish Renaissance being recognizably the same style, but with
unique characteristics. A style may also spread through Colonialism, either by foreign colonies learning from their home country, or by settlers moving to a new land. One example is the Spanish missions in California, brought by Spanish priests in the late 18th century and built in a unique style.

After a style has gone out of fashion, there are often revivals and re-interpretations. For instance, classicism has been revived many times and found fashion as neoclassicism (means "new classicism"). Each time it is revived, it is different. The Spanish mission style was revived 100 later as the Mission Revival, and that soon evolved into the Spanish Colonial Revival.

Vernacular architecture works slightly differently and is listed separately. It is the native method of construction used by local people, usually using labor-intensive methods and local materials, and usually for small structures such as rural cottages. It varies from region to region even within a country, and takes little account of national styles or technology. As western society has developed, vernacular styles have mostly become outmoded by new technology and national building standards.

http://en.wikipedia.org/wiki/Architectural_style

SQ4: What styles of architecture are related to the Gothic period, the Renaissance period, Greek period, Roman period, and the modern period?
Skills: researching, critical thinking, categorizing, identifying trends, analyzing data

Activity: Teacher will tell students that they will be learning about the various periods in architecture and the style that was commonly seen during that period. The teacher will direct the students to a ThinkQuest site (either in computer lab or on Smartboard as a group) to learn information about the periods. http://library.thinkquest.org/C005594/ Go to articles on the left and choose the historical timeline. Instruct students to pair up and decide which period they want to research, making sure that all areas of the timeline are covered. Students should record their knowledge in their research notebook. This knowledge will be used on the post assessment task.

SQ5: How and why has the last 100 years influenced the architecture seen today?
Skills: observing, listening, critical thinking, gathering data, draw conclusions

Activity: Teacher will lead a whole group discussion about how and why the last 100 years has influenced today’s architecture. Place all answers from students on the board using a web design.
The group should think of the many advances in technology (cars, personal energy star appliances, mass production, availability of goods, new ways to produce energy—(check out the npower PEG), energy crisis, new electronics, and the list could go on forever); health knowledge (better sanitation, better health care so people live longer therefore their house must last longer, etc.); new views (due to population growth we need taller buildings, how we look at the world—as thinking green, climate change, pollution, etc.), different cultures (the global blending since the world is “getting smaller” due to technology, the fact that people travel all over the world, the blending of the architecture of the cultures that are merging, etc.

Activity: For a little fun, ask students to visit this site to see a short timeline of major buildings that have been constructed:

http://www.timetoast.com/timelines/architecture-over-the-past-100-years
| SQ6: What do you predict architectural styles will be in the year 2050 and why do you think so? |
| Skills: predicting, making inferences, drawing conclusions, designing, creating |
| **Activity:** Have students create a drawing of what they predict a building will look like in 2050. Have drawing paper and some graph paper to accommodate for each student. Some will enjoy drawing and other will enjoy the technical lay out design. |

| EQ1: How does culture influence architecture leading to the discovery of distinct styles of architecture that can be related to certain time periods? |
| **Activity:** The teacher now asks the EQ “How does culture influence architecture leading to the discovery of distinct styles that can be related to certain time periods?” Students should be able to answer the question from doing the activities in the scaffolding questions. Then debrief with the EU “EU1: Culture influences architecture leading to the discovery of distinct styles of architecture that can be related to certain time periods.” Ask students if they see the connection between the EU statement and what they are experiencing either in life or their general education class. Now replace the EQ with the EU on the wall and leave it there until the unit is completed. |

| Learning Activities | Analytical Thinking Skills: Sifting through the resources to attain the information they need to produce their products, sequencing their information |
| | **Skills:** proper computer research skills, reading to sift through the material, processing the information and placing it in the correct order, comparing and contrasting the different architectural eras |
| | **Processes:** organizing, analyzing, identifying, sequencing |

| Resources | **Print:** Research notebooks, long white paper, graph paper, drawing paper, markers, various recyclable items to make miniature structure from the eras. |
| | **Non-Print:** computers with Internet access |

| Products | A group made timeline of the different architectural eras. An Architectural word wall above the timeline outside our door. Structures from the eras made from recyclable items to be placed on the timeline. Differentiation-Booklet on famous era architects. |

| Grouping | **Whole group:** KWL chart and discussions |
| | **Small group:** partner group work |
| | **Individual:** research, analyzing, and writing information into journal |

| Extensions | Students will research and prepare a booklet on famous architects through the ages to share with their peers. |
| Differentiation/Ascending Levels of Intellectual Demand | Scaffolding as needed during research, group work, discussions, and creating the products. |
The whole timeline from 1901 to 2012 (left to right) with the word wall above the timeline.

1901-Craftsman; 1914-Carpenter Gothic; 1920-Collegiate Gothic Revival; 1920-Art Deco; 1928-Chrysler building (below timeline); 1931 Empire State Building; 1937-GoldenGate Bridge; 1940-Seattle Space Needle.........
Chrysler Building—to large to fit onto the paper timeline but looks great!
1950-Metanolism; 1953-UN Building; 1960- Twin Towers; 1963-St. Louis Arch (above timeline); 1970-High Tech; 1973-Sears Tower; 1973-Sydney Opera House (below timeline); 1974-Willis Tower; 1980- Deconstructivism; ………..
Sydney Opera House—extremely delicate and on floor now since it fell off several times!
Conceptual Lens: Architecture
Concepts: relationships, discovery, influence, choice

Lesson 2: Roadside Architecture
EU2: The relationship of a building’s form and function has a great influence on roadside architecture.

EQ2: How does the relationship of a building’s form and function have a great influence on roadside architecture? (Place a copy of EQ2 on the wall as a focus during this lesson.)

ALCOSS:
English Language Arts (2007)
5.1: Demonstrate reading vocabulary knowledge, including recognition of multiple-meaning words.
5.11: Use search strategies in the research process to identify reliable current resources and computer technology to locate information.
6.13: Utilize resource materials for supporting evidence in composition
6.14: Use organizing and paraphrasing in the research process.
6.17: Use listening skills for remembering significant details, directions, and sequences.
7. 4: Apply strategies that include setting purposes for reading, distinguishing fact from opinion, making generalizations, and reviewing to comprehend informational and functional reading materials.
7.12: Cite sources used in the research process.
7.13: Apply steps in the research process to identify a problem or issue, locate resources and information, and present findings.
7.14: Present findings from inquiry and research using a variety of resources.
8.13: Combine all aspects of the research process to compose a report.

World Geography-Human
9-12.2: Explain the interaction between humans and their physical environment

Arts Education-Visual Art
5. 6: Describe works of art according to the style of various cultures, times, and places.
5. 7: Associate a particular artistic style with an individual artist.
6-8.1: Create works of art utilizing a variety of traditional and nontraditional media and techniques.
Level II
7-12. 5: Describe various artistic contributions to environmental and social issues.
7-12. 8: Describe stylistic characteristics of selected works of art and architecture.
Career Cluster Technology II
7-8. 6: Interpret the role of society in the development and use of technology.
7-8. 7: Describe the attributes of design.
7-8. 8: Explain attributes associated with engineering design.

Character Education (1995)
K-12. 6: Respect for others
K-12. 8: Cooperation
K-12. 10: Self-control
K-12. 11: Courtesy
K-12. 20: Respect for the environment
K-12. 22: Creativity
K-12. 25: Perseverance

Information Literacy (1998)
K-12. 1: The student who is information literate accesses information efficiently and effectively.
K-12. 2: The student who is information literate evaluates information critically and competently.
K-12. 3: The student who is information literate uses information accurately and creatively.
K-12. 6: The student who is an independent learner is information literate and strives for excellence in information seeking and knowledge generation.
K-12. 9: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.

Technology Education
3-5. 8: Collect information from a variety of digital sources
6-8. 5: Use basic features of word processing, spreadsheets, databases, and presentation software.
6-8. 9: Practice responsible and legal use of technology systems and digital content.

Assessment
Pre: Group discussion on unusual structures.
Post: Working as an architect, students will design a drawing of a roadside structure for a client who wants his structure to be unusual and stand out from other nearby structures, debate, and research.

Rubric: Drawing A Road Side Structure: architecture unit

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>4 Specialist</th>
<th>3 Achieving</th>
<th>2 Developing</th>
<th>1 Needs more work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Information Gathering</td>
<td>Journal/Log - Content</td>
<td>Presentation</td>
<td></td>
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</tr>
<tr>
<td>Structure design appears that it could feasibly be built.</td>
<td>Accurate information taken from several sources in a systematic manner.</td>
<td>Journal provides a complete record of planning, modifications, reasons for modifications, and some reflection about the strategies used and the predicted results.</td>
<td>Presentation was very informational and understandable. Students showed that they learn knowledge through their research and project.</td>
<td></td>
</tr>
<tr>
<td>Structure design appears to have small flaws and would need changes before it could be built.</td>
<td>Accurate information taken from a couple of sources in a systematic manner.</td>
<td>Journal provides a complete record of planning, modifications, and reasons for modifications, and some reflection about strategies used and the predicted results.</td>
<td>Presentation was a bit rough in some areas. Student showed some learning of knowledge through their research and project.</td>
<td></td>
</tr>
<tr>
<td>Structure design has many flaws and would need considerable changes before it could be built.</td>
<td>Accurate information taken from a couple of sources but not systematically.</td>
<td>Journal provides small bit of detail about planning, modifications, and reasons for modifications with little reflection of strategies used and the predicted results.</td>
<td>Presentation was uninformative to a certain degree. Student is not able to explain what they learned through their research and project.</td>
<td></td>
</tr>
<tr>
<td>Fatal flaws in structure design which would not allow it to be built.</td>
<td>Information taken from only one source and/or information not accurate.</td>
<td>Journal provides very little detail about several aspects of the planning, with little reflection of strategies to be used.</td>
<td>Presentation was unacceptable. Student showed no interest in their research or project.</td>
<td></td>
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</tbody>
</table>

### Introduction

**Overview of the Unit:** This lesson will introduce students to roadside architecture. Many students are unaware that such things do exist or if they do they only know of a few structures they may have seen.
during their lives. Students will enjoy researching the roadside architecture images and the history behind the structures.

This unit includes:

Unit Pacing: 2-3 class periods (once a week)

Background Information for the teacher: This lesson is about the many buildings that are designed around a theme. Please view this Wikipedia informational website to learn more about Novelty architecture.
http://en.wikipedia.org/wiki/Novelty_architecture

Another helpful website to gain information for the teacher is a National Parks lesson plan site. You may get additional ideas and tweak this lesson for a better fit for your students.
http://www.cr.nps.gov/nr/twhp/wwwlps/lessons/6roadside/6roadside.htm

Definition: Roadside architecture is structural designs based on themes, such as a water tower which is shaped like a peach for the area of Chilton County, Alabama. There are many images that will make this a most enjoyable learning experience for both students and the teacher.

Teaching Methods

Direct Instruction: Discussion, research and debate.

Inquiry-Based Instruction: (Type I Activity): Tell students that they are to assume the role of an architect and have been asked to design a drawing of a roadside structure for a client who wants his structure to be unusual and stand out from other nearby structures. Teachers could allow students to choose what the structure would be or the teacher could have students pull cards from some ideas the teacher makes up. Examples: a dentist office, a bowling alley, a fruit stand, a bait shop, etc. In order to prevent students from replicating the same structures, have students tell what they desire to do, writing them on the board, so no two are alike. Be sure that students write what the structure is so others will understand their drawing. After they are presented to their classmates, post them outside the room for others to enjoy.


EU2: The relationship of a building’s form and function has a great influence on roadside architecture.

EQ2: How does the relationship of a buildings form and function have a great influence on roadside architecture?
SQ1. What is road side architecture and why does it exist? (also called novelty architecture)

Skills: researching describing, observing, analyzing data, listening

Novelty architecture has its roots in googie architecture, though the two are notably different. Googie architecture ended in the 1960s, but novelty architecture still exists today. Architects consider novelty architecture as anything that takes on a humorous or exaggerated appearance. Help students understand the definitions of roadside and programmatic architecture. Tell them that roadside architecture was aimed to be eye-catching, and that programmatic refers to buildings that are designed to look like their products. You can also point out that this architectural style is sometimes called mimetic architecture.

A good example is the headquarters of The Longaberger Company in Newark, Ohio which looks like one of the giant baskets the company's known for. The point of novelty architecture is to advertise a company or business. The buildings have an extremely unusual shape and seldom resemble traditional buildings. A specific type of novelty building is the larger than life versions. These buildings look like a specific item, but are created on a larger scale such as the Longaberger building. Other buildings look like animals, produce or mimic the look of a famous building on a smaller scale. Novelty architecture often has a fantasy or vintage slant to it. A separate form of novelty architecture is known as programmatic architecture. This type of architecture takes a typical item and blows it up into the shape of a building. Coffee shops that look like a giant coffee pot or buildings created to look like animals are all examples of programmatic architecture. Some also call this mimic architecture or mimetic architecture. Novelty architecture first became popular during the 1930s as a way to attract new customers and advertise new or existing businesses. The popularity of cars and other automobiles had people moving to other areas and taking longer vacations. These roadside attractions caught their attention and were more popular than traditional hotels and gas stations. Route 66 was once home to thousands of novelty architecture buildings and roadside attractions. Hotels, restaurants, gas stations and other businesses used novelty styles to attract customers. The use of neon was extremely popular, as was the use of unusually shaped buildings. A good example is the hotel that sprung up shaped like teepees, where customers could actually sleep in a teepee. Novelty architecture includes more than just buildings; it also encompasses different types of objects. Water towers and sculptures are examples of this. In Circleville, Ohio the water tower is painted to look like a giant pumpkin, a nod to their annual and famous pumpkin festival. This type of attraction is fairly popular in smaller towns. Novelty water towers resemble corn cobs, teapots, ketchup bottles and even fruits like peaches and strawberries. http://voices.yahoo.com/a-guide-novelty-architecture-2971961.html
**Activity:** Teacher asks students if they have ever seen any unusually shaped structures. Most students from Alabama will typically say “the peach water tower in Clanton”. Perhaps you will have some students who have seen several. Allow the students to describe the structures in whole group discussion. Then allow students to get onto the Wikipedia site (or it can be done as a group on the Smartboard) and explore all the images there. Have students read all the information, look at the images and choose 10 of their favorite structures. They are then to draw a rough sketch of each and a description of what it is suppose to represent (or what it is used to sell) in their research notebooks.

The teacher could get a video clip of the cone motel form the movie “Cars” to show to the class or create a Prezi on various water tower structures.

Students will go on the Internet to research starting with **Roadside Architecture Home Page**
www.agilitynut.com/roadside.html

Students will record in their research composition notebooks the 10 most interesting structures to them.

Another good site but has lots of ads (teacher should use only if the students are able to navigate sites with ads) is:
TLC Family "Roadside Architectural Wonders"
tlc.howstuffworks.com › ... › Vacation Ideas › Places of Interest

Have a class discussion on what students found through their research.
ttp://en.wikipedia.org/wiki/Novelty_architecture

**SQ2. Does the location of the roadside architecture have anything to do with its surroundings? Why?**

**Skills:** observing, compare/contrast, identifying a point of view

The fact that these fanciful buildings became popular as car travel became popular explains why they are examples of roadside architecture. From about the 1930s to 1950s, roadside architecture was very popular in the United States. All along the roadsides of America, you could find unusual buildings that drew motorists in with their wacky designs and humorous shapes. These buildings not only did a great job of showing drivers what they sold – they were also effective advertisements!

Los Angeles was among the first cities to be built up with the automobile in mind. As a result, L.A. was unique with its large number of buildings featuring roadside architecture. At one time in L.A., you could find a lemonade stand shaped like a lemon and a coffee shop shaped like a...
Developed by Patti Mizell
pmizell@ozarkcityschools.net

coffee pot. Many of these unusual buildings are gone now, but some people are working hard to save the ones that are left. They are a keen reminder of how the car and advertising both have helped to shape our nation.


Activity: Teacher will continue with the information in SQ1 to lead a group discussion on the relationship of the location and the surroundings. Students will use their research notebooks to assist with their answers. Example questions: (try not to let students duplicate any)

1. Using one of the 10 structures you researched, tell how you would define it in terms of how it looks and what function is has and why do you think it was built and for what purpose?
2. What can you infer from the structure’s image?
3. How would you change the structure to make it more appealing?
4. What explanation do you have for the image’s structure?
5. Through roadside architecture, how would you portray a store that sells pajamas?
6. What is your opinion of roadside architecture?

SQ4: Is roadside architecture an expression of art? Why?

Skills: identifying a point of view, observing, making inferences, drawing conclusions

Activity: Have students to discuss then write an answer to the SQ4. After all are done have a group discussion or debate concerning who thought it is art and who did not think it is art.

SQ5: What makes roadside architecture unique?

Skills: gathering data, observing, identifying trends, critical thinking

Activity: Copy the activity below and have students answer the questions. Then allow students to research on their own to find even more unique images and write them and the URL in their research notebooks. If time permits, in group time the sites could be visited to see the many different images of roadside architecture the students found.

EXPLORING THE INTERNET ACTIVITY
Check out these websites for more great examples of programmatic architecture. Can you guess what the purpose of each building is?
1. www.worldslargestthings.com/easterntour/basketbuilding.htm
What kind of business is this?

2. www.state.ky.us/agencies/khc/bondrnt.htm
What kind of business is this?

What kind of business is this?

4. www.sca-roadside.org/galleries/shell.html
What kind of business is this?

Here are other websites to check out for more fun examples of roadside architecture:

**Luke’s Roadside Attractions: Mimetic Architecture**
Go to “Roadside Attractions” at [www.lukecole.com](http://www.lukecole.com)


Society for Commercial Archeology: [www.sca-roadside.org](http://www.sca-roadside.org)


**EQ2:** How does the relationship of a building’s function have a great influence on roadside architecture?

**Activity:** The teacher now asks the EQ “How does the relationship of a building’s function have a great influence on roadside architecture?” Students should be able to answer the question from doing the activities in the scaffolding questions. Then debrief with the EU “EU2: The relationship of a building’s function has a great influence on roadside architecture.” Ask students if they see the connection between the EU statement and what they are experiencing either in life or their general education class. Now replace the EQ with the EU on the wall and leave it there until the unit is completed.

**Learning Activities**

**Analytical Thinking Skills:** Sifting through the resources to attain the information they need to create their products.

**Skills:** proper computer research skills, reading to sift through the material, processing the
Developed by Patti Mizell  
[pmizell@ozarkcityschools.net](mailto:pmizell@ozarkcityschools.net)

<table>
<thead>
<tr>
<th>Processes:</th>
<th>organizing, analyzing, identifying, creating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resources</strong></td>
<td><strong>Print:</strong> research notebooks, large drawing paper, colored pencils</td>
</tr>
<tr>
<td></td>
<td>Share the book <em>Buildings in Disguise: Architecture That Looks Like Food, Animals, and Other Things</em> by Joan Marie Arbogast (Boyd's Mill Press, 2004). This delightful book provides numerous other examples of roadside architecture and may serve as inspiration for your students</td>
</tr>
<tr>
<td></td>
<td><strong>Non-Print:</strong> computers with Internet access</td>
</tr>
</tbody>
</table>
| | *Wikipedia* informational website to learn more about **Novelty architecture.**  
| | **Roadside Architecture Home Page**  
[www.agilitynut.com/roadside.html](http://www.agilitynut.com/roadside.html) |
| | **TLC Family "Roadside Architectural Wonders"**  
[tlc.howstuffworks.com › ... › Vacation Ideas › Places of Interest](http://tlc.howstuffworks.com/vacation-ideas/places-of-interest) |
| **Products** | Students’ drawings of their own design of a novelty architectural structure. |
| **Grouping** | **Whole group:** discussion, choosing of individual products  
**Small group:** peer discussion  
**Individual:** research, processing, writing information learned |
| **Extensions** | Students could create a Power Point, Prezi, or Web2 of Roadside architecture to present to other students thus teaching a lesson on unusual structures to a class. |
| | Students could walk through a historical area in their community and create a digital presentation including the history of the buildings through interviews with the owners or through literature written about the area if it is available. |
| **Differentiation/Ascending Levels of Intellectual Demand** | Scaffolding as needed during research, group work, discussions, and creating the products. |
| Content Knowledge/Standards | **Conceptual Lens:** Architecture  
**Concepts:** Change, influence, time, discovery, culture  

**Lesson 3:** Changes and influences in American architecture over time  
**EU3:** Frank Lloyd Wright influenced American architecture which resulted in architectural change over time.  

**EQ3:** How has Frank Lloyd Wright influenced American architecture which resulted in architectural change over time?

**ALCOSS:**
**English Language Arts (2007)**  
5.1: Demonstrate reading vocabulary knowledge, including recognition of multiple-meaning words.  
5.11: Use search strategies in the research process to identify reliable current resources and computer technology to locate information.  
5.12: Demonstrate eye contact, articulation, and appropriate voice intonation with expository presentations.  
5.13: Apply strategies of a skillful listener, including maintaining eye contact, attending to the listening task, and assigning meaning to the message.  
6.13: Utilize resource materials for supporting evidence in composition  
6.14: Use organizing and paraphrasing in the research process.  
6.17: Use listening skills for remembering significant details, directions, and sequences.  
7. 4: Apply strategies that include setting purposes for reading, distinguishing fact from opinion, making generalizations, and reviewing to comprehend informational and functional reading materials.  
7.5: Recognize the use of textual elements, including main idea and supporting details, to gain information from various text formats, including graphs.  
7.12: Cite sources used in the research process.  
7. 14: Present findings from inquiry and research using a variety of resources.  
8 8: Write in narrative, expository, and persuasive modes with attention to descriptive elements.  
8. 13: Combine all aspects of the research process to compose a report.  
8. 13: Demonstrate paraphrasing, quoting, and summarizing of primary and secondary sources and various methods of note taking.  
8. 16: Evaluate a speech for use of presentation skills, including use of visual aids.  
11. 8: Write the text for an oral presentation with attention to word choice, organizational patterns, transitional devices, and tone.  
11. 13: Compare the use of oral presentation skills of self and others.
12. 12: Evaluate oral presentation skills of self and others for effectiveness.

**Social Studies**
6. 6: Identify cultural and economic developments in the society of the United States from 1877 through the 1930s.
6. 10: Identify major social and cultural changes in the United States from 1945 to 1960.
6. 14: Identify cultural and economic changes throughout the United States from 1960 to the present.
7. 9: Analyze environmental consequences of major technological changes in human history for both intended and unintended outcomes.
7. 12: Describe problems involved in balancing the impact of human habitation on the environment and the need for natural resources essential for sustaining human life.

**World Geography-Human**
9-12.2: Explain the interaction between humans and their physical environment

**Art**
7-12. 9: Compare works of art with functional and natural objects, aesthetic components, and formal qualities.

**Level II**
7-12. 5: Describe various artistic contributions to environmental and social issues.
7-12. 8: Describe stylistic characteristics of selected works of art and architecture.
7-12. 9: Identify various uses of the visual arts in business and industry.

**Level III**
7-12. 7: Explain purpose, function, and meaning of selected works of art from a variety of cultures, times, and places.
7-12. 8: Compare modes of artistic expression used in art and other academic disciplines.
7-12. 9: Organize research about art, artists, cultures, times, and places into a product or presentation.

**Career Clusters Exploration**
7-8. 3: Demonstrate oral presentation skills that sustain listeners' attention and interest including eye contact, clear enunciation, and use of visual aids.
7-8. 4: Apply active listening skills to obtain and clarify information.
7-8. 5: Summarize written materials from various career sources clearly, succinctly, and accurately.

**Career Cluster Technology II**
7-8. 7: Describe the attributes of design.
7-8. 8: Explain attributes associated with engineering design.
7-8. 9: Explain concepts associated with construction technologies.

**Character Education (1995)**
K-12. 6: Respect for others
K-12. 8: Cooperation
K-12. 10: Self-control
K-12. 11: Courtesy
K-12. 20: Respect for the environment
K-12. 22: Creativity
K-12. 25: Perseverance

**Information Literacy (1998)**
K-12. 1: The student who is information literate accesses information efficiently and effectively.
K-12. 2: The student who is information literate evaluates information critically and competently.
K-12. 3: The student who is information literate uses information accurately and creatively.
K-12. 6: The student who is an independent learner is information literate and strives for excellence in information seeking and knowledge generation.
K-12. 9: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.

**Technology Education**
3-5. 2: Use various technology applications, including word processing and multimedia software.
3-5. 8: Collect information from a variety of digital sources
6-8. 5: Use basic features of word processing, spreadsheets, databases, and presentation software.
6-8. 9: Practice responsible and legal use of technology systems and digital content.
6-8. 14: Use digital tools to generate new ideas, products, or processes.

**Assessment**

**Pre:** Read the books *Modern Buildings* (by Greg Moskai ISBN: 0-8239-8902-X) and *The Architecture of Frank Lloyd Wright* (by Jane Levy ISBN: 1-4042-5144-8). The books I have are a set of 6 each. Ask students what they found in the books that they did not know and record it in their research notebooks. Put on the board what they wrote and have a group discussion about what they learned.

**Post:** Students will spend time on the Architect Studio 3D designing houses to gain knowledge about architecture and structural drawings.
Students will also need to research the change over the past 100 years of American architecture and architecture in developing countries such as the United Arab Emirates.
Students will share their house designs with their peers from Studio 3D. Through whole group discussion, talk about whether or not Wright’s influence with nature has shown up in the architecture of the United Arab Emirates. Student products from their research of the change of American architecture over the past 100 years.

Introduction

Overview of the Unit: This lesson will bring the knowledge of American architect Frank Lloyd Wright and his contribution to American buildings. Students will learn how important Wright said it was to design a structure in tune with nature and the people that were to occupy the structure. After 72 years working as an architect who stuck to his ideas even when everyone was against him, he is remembered as “the Father of American Architecture.” Wright stated: “We must study nature. Nature can show us how the principles of form and design are the inner rhythm of all beings. A genius is a man who has an eye to see nature, a man with a heart to feel nature, and a man with the boldness to follow nature.” Students will also be exposed to the change over the past 100 years in American architecture as well as the new booming architecture that is occurring in the United Arab Emirates.

This unit includes: research, creativity, innovation, and critical thinking.

Unit Pacing: 3-4 weeks (once a week).

Background Information for the teacher: ArchitectStudio3D provides students with a unique opportunity to expand their knowledge of architecture and the design process, and to learn about Frank Lloyd Wright and his innovative work. Frank Lloyd Wright is called “the Father of American Architecture”. Designed to appeal to the interests and abilities of 11-14 year-old users, students will experience the creativity and challenge of being an architect, while at the same time gaining practice in skills related to national education standards in math, social studies, language arts, and fine art. The site allows students everywhere the opportunity to experience the "learning by doing". Addressing various learning styles and demands of curriculum, ArchitectStudio3D.org is a great teaching tool that is both challenging and satisfying.

Definition: Architecture is the designing of buildings that involves not only the structural design, the outside design but also the mechanical design, the interior design, the electrical design, the plumbing design, and the landscape design.

Teaching Methods

Direct Instruction: As a group read the two books and discuss them. Students will go to Studio 3D created by the Frank Lloyd Wright Foundation. With this program students can design a 3D structure of a house and view it. They are also able to save their designs so make sure they have their research a notebook when they go to the computer lab for this
Developed by Patti Mizell
pmizell@ozarkcityschools.net

activity to record the number their structure is given to save it. Also have them research the architectural change over the past 100 years in America and the new architectural designs on Dubai in the United Arab Emirates.

**Inquiry-Based Instruction: (Type I Activity):** Students will then be asked to create a design of their dream bedroom. Make sure to advise them about drawing to scale. Students will create the floor plan and add the arrangement of the furniture. They must have a legend on their plan to indicate what dimension each block represents. They must include door entries, windows, and furniture. All this is learned after they visit the Frank Lloyd Wright Studio 3D web site. Students will have good knowledge after working on this site for at least an hour.

**Careers:** Landscape Architect, Design Architect, Industrial Architect, Furniture Designer, Green Architect, Civil Engineer, Renovator, Building Inspector, Architectural Designer

**SQ1:** Who was Frank Lloyd Wright?
**SQ2:** How has Frank Lloyd Wright, “the Father of American Architecture” influenced American architecture?
**SQ3:** What did Frank Lloyd Wright use to show how the principles of form and design are the inner rhythm of all beings?
**Skills:** observing, listening, identifying a point of opinion, critical thinking

**Activity for SQ1, SQ2, SQ3:** View this short video on Wright at http://www.5min.com/Video/Learn-About-Frank-Lloyd-Wright-62643397
Group discussion about the video should help the students to record the answers of SQ1, SQ2, and SQ3 in their research notebooks. Have students read up on this website http://www.franklloydwrightsites.com/

**SQ4:** How did Wright use nature in his work and why did he always try to match the house to the person?
**Skills:** creating, designing, evaluating solutions

**Activity:** Give students time to explore Architecture Studio 3D at http://www.architectstudio3d.org/AS3d/index.html
On this site they will read about Wright and using his principles, will design a 3D house that they can virtually tour. Be sure they bring their research notebooks to record the number of their design if they desire to finish it later.
SQ5: How has American architecture changed over the last 100 years?
Skills: researching, gathering data, analyzing, drawing conclusions, critical thinking, designing, creating, presenting

Activity: Have students visit http://www.preservationdirectory.com/historicphotogallery/architecturalstylesgalleries.aspx

(There are other Websites that the teacher can give to the students that are listed in the resources section that follows this EU.)

Have them pick out their favorite American architecture style from 1900-2012. They are then to create through whatever means they desire (of course with teacher approval- an individual learning contract paper that students sign for teacher approval of their choice would be a good suggestion to make sure students are creating well above their potential), a presentation to their peers going into depth about the architectural style they chose. Remind students that most of the styles they will be working with came from other country’s architectural style.
* Students are to use an individual learning contract
* Students should include in their presentation why they like that particular style.
* Students should tell what architectural style they chose and explain the style and where the style originated.
* Students should give their individual point of view about their architectural style choice

SQ6: What trends do you see in other countries that are just now becoming developed countries? Do you see any of Wright’s influence in these new structures?
Skills: researching, identifying trends, making inferences, drawing conclusions

Activity: Students will research the booming architecture of the United Arab Emirates at www.designboom.com/contemporary/dubai1.html. Then they will have a group discussion to answer SQ6 questions. The teacher may ask students to research other countries architecture

EQ3: How has Frank Lloyd Wright influenced American architecture which resulted in architectural change over time?
Activity: The teacher now asks the EQ3 “How has Frank Lloyd Wright influenced American architecture which resulted in architectural change over time? Students should be able to answer the question from doing the activities in the scaffolding questions.
Then debrief with the EU “EU3: “Frank Lloyd Wright influenced American architecture which resulted in architectural change over time.” Ask students if they see the connection between the EU statement and what they are experiencing either in life or their general education class. Now replace the EQ with the EU on the wall and leave it there until the unit is completed.

| Learning Activities | Analytical Thinking Skills: thinking about how to design a house for a client  
Skills: analyzing, critical thinking, researching, sequencing  
Processes: organizing, processing, drawing to scale, |
| Resources | Print: Research notebooks, graph paper, colored paper  
Non-Print: Design a house with Frank Lloyd Wright and share it with the world on this interactive architectural design Web site. Students will be able to look at their design in 3D. Be sure to check out the teacher page.  
www.architectstudio3d.org/  
If you want to learn more about the architect here is the home page.  
**Architect Studio 3D, from the Frank Lloyd Wright Preservation Trust**  
architectstudio3d.org/AS3d/home.html  
To research the architectural boom in the developing country of the United Arab Emirates view this website:  
www.designboom.com/contemporary/dubai1.html  
You could also do a Google search to find more sites.  
To research the history of the past 100 years of American architecture view these Web sites:  
This website gives over 100 years of American architectural styles. Remind students to make sure they are looking at the styles that are in the twentieth century 1900s to present:  
1880-1920 was the period of Beaux Arts which was an expression of the academic neoclassical architectural style.  
http://en.wikipedia.org/wiki/Beaux-Arts_architecture#Beaux-Arts_in_the_United_States  
Modernism started after WWII view this site for modernism:  
http://en.wikipedia.org/wiki/Modern_architecture |
This Website shows the top 10 architectural designs over the past 100 years in the world: [www.essential-architecture.com/TEN/TEN-100.htm](http://www.essential-architecture.com/TEN/TEN-100.htm)

1,000 years of architectural changes: [http://architecture.about.com/od/greatbuildings/tp/greatest.htm](http://architecture.about.com/od/greatbuildings/tp/greatest.htm)

<table>
<thead>
<tr>
<th>Products</th>
<th>Student’s presentation of their favorite period house of the past 100 years of American architecture. Students design of their dream bedroom. Students house design on Studio 3D.</th>
</tr>
</thead>
</table>
| Grouping | **Whole group:** Instruction for the website and instructions for the product.  
**Small group:** Students will confirm with their peers on what their dream bedroom is going to be like. Teacher will need to work in small groups to make sure students understand their task  
**Individual:** Working on the website to build a house or two. Researching architecture in America over the past 100 years. |
| Extensions | Students could create an Editorial Essay, a collage, a bulletin board, or a mural depicting the change of American architecture over the past 100 years. |
| Differentiation/Ascending Levels of Intellectual Demand | Scaffolding as needed during research, group work, discussions, and creating the products. |

| Content Knowledge/Standards | **Conceptual Lens:** Architecture  
**Concepts:** structure, patterns, discovery, relationships  

**Lesson 4:** Math and patterns in architecture.  
EU4: Architectural **structures** include many different applications of math and **patterns**.  

EQ4: How do architectural structures include many different applications of math and patterns?  

**ALCOSS:**  
**English Language Arts (2007)**  
5.1: Demonstrate reading vocabulary knowledge, including recognition of multiple-meaning words.  
5.11: Use search strategies in the research process to identify reliable current resources and computer technology to locate information.  
5.13: Apply strategies of a skillful listener, including maintaining eye contact, attending to the listening task, and assigning meaning to the message.  
6.17: Use listening skills for remembering significant details, directions, and sequences.  
7. 4: Apply strategies that include setting purposes for reading, distinguishing fact from opinion, making
generalizations, and reviewing to comprehend informational and functional reading materials.
7.5: Recognize the use of textual elements, including main idea and supporting details, to gain information from various text formats, including graphs.
7.12: Cite sources used in the research process.
7.13: Apply steps in the research process to identify a problem or issue, locate resources and information, and present findings.
7.14: Present findings from inquiry and research using a variety of resources.

Math (2010)
(When using the resource “The Math of Homes and Other Buildings” some of the activity pages ask student to make conversions from one unit to another.)
5.18: Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multistep, real-world problems. [5-MD1].
8.16: Verify experimentally the properties of rotations, reflections, and translations: [8-G1]
G.40: Use geometric shapes, their measures, and their properties to describe objects [G-MG1]
9-12.9: Analyze works of visual art and architecture for mathematical relationships. (Alabama)

Career Clusters Exploration
7-8.4: Apply active listening skills to obtain and clarify information.
7-8.5: Summarize written materials from various career sources clearly, succinctly, and accurately

Character Education (1995)
K-12.6: Respect for others
K-12.8: Cooperation
K-12.10: Self-control
K-12.11: Courtesy
K-12.20: Respect for the environment
K-12.22: Creativity
K-12.25: Perseverance

Information Literacy (1998)
K-12.1: The student who is information literate accesses information efficiently and effectively.
K-12.2: The student who is information literate evaluates information critically and competently.
K-12.3: The student who is information literate uses information accurately and creatively.
K-12.6: The student who is an independent learner is information literate and strives for excellence in information seeking and knowledge generation.
K-12. 9: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.

**Technology Education**

3-5. 2: Use various technology applications, including word processing and multimedia software.
3-5. 8: Collect information from a variety of digital sources
6-8. 9: Practice responsible and legal use of technology systems and digital content.

**Assessment**

**Pre:** Determining if students have the appropriate knowledge of basic geometric shapes to make patterns.

**Post:** Students will work with geoshapes, construct columns, make patterns; Students will create a geometric picture of patterns as they design the floor to a new mall.

**Rubric: Patterns and Math:**

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</table>
some reflection about the strategies used and the results.

Presentation

Presentation was very informational and understandable. Students showed that they learn knowledge through their research and project.

Presentation was a bit rough in some areas. Student showed some learning of knowledge through their research and project.

Presentation was uninformative to a certain degree. Student is not able to explain what they learned through their research and project.

Presentation was unacceptable. Student showed no interest in their research or project.

Introduction

**Overview of the Unit:** Students will find basic geometric shapes in architecture and nature. Students will discover patterns that are made with the shapes and how they can be used to create a very stunning effect for a building.

This unit includes:

**Unit Pacing:** 3-4 class periods (once a week)

**Background Information for the teacher:** Mathematics is essential to the study and practice of Architecture. Every detail, neither big nor small should have exact measurements. The angles of the roof, the thickness of a wall, the amount of materials that will be used, calculating the exact location of a building and even the number of detail, these all includes math. Math, just like language, is one of the most vital subjects required for survival. Without a strong knowledge of math in this new day and age, life would be very difficult. Math is an essential in the real world and architecture is dependent on math skills not only for building but making aesthetic and pleasing structure with patterns of math shapes. More complex mathematics have made possible the unthinkable a century ago; sending men to the moon, building structures that defy logic, computers, television and radio transmissions, and the list goes on. Architecture is combination of math, science, and arts. It is said that an architect should have the skills of an artist, business man and also a scientist.

| Teaching Methods | **Direct Instruction:** Making sure students have a firm foundation of geometric shapes. Students will create a pattern from the Archiscapes, discussions, design a picture with geoshapes, and construct columns,  

**Inquiry-Based Instruction:** (Type I Activity): Your architectural firm has just won the bid for a new mall that is going to be built in your city. The owners want the entrance floor to be reflective of Frank Lloyd Wright’s use of geometric shapes placed into patterns. The owners have requested that you use no less than three different colors and no more than seven. The size of the entrance is 30 feet wide and 60 feet long. Place your pattern on graft paper and be sure to give a legend of the scale. Present your design to your classmates.  


**EU4:** Architectural structures include many different applications of math and patterns.  

**EQ4:** How do architectural structures include many different applications of math and patterns?  

**SQ1:** What applications of mathematics would be needed to build and decorate a building?  
***Skills:* researching, identifying trends, gathering data, analyzing data, draw conclusions critical thinking  

**Activity:** Have students read this Web site (it also explains about Pi) and write in their research notebooks what they learned in order to answer This activity is only for introducing the student to the correlation of math and architecture.  

http://www.learner.org/interactives/dailymath/decorating.html  

**SQ2:** What geometric shapes are used in building? Are there geometric shapes in nature?  
***Skills:* observing, gathering data, making predictions, categorizing  

**Activity:** Ask students what geometric shapes they know. If they are weak in this area, the teacher may have to review the basic material: Geometry is a branch of mathematics to study different shapes, figures, measurement of angles etc. Here is a way to teach basic geometric shapes in an easy and natural way. Students should be able to recognize, name, and explore the properties of basic geometric shapes and identify geometric shapes present in surroundings.
Teaching Basic Geometric Shapes: Teaching different geometric shapes is very easy as these shapes are present in our surroundings. Examples of basic geometric shapes are present in large number around us, at our home, in school; in parks etc. e.g. in buildings, traffic lights, sun, etc. There are six basic geometric shapes:

1) Circles
2) Triangles
3) Rectangles
4) Squares
5) Polygons
6) Oval

Place these geometric shapes on the board and discuss them with students. If students are unsure of any one, the teacher needs to provide instruction to clarify the student’s knowledge.

Outdoor Activity: Have students look at ten various objects in nature to tell you if they see geometric shapes in them. Have students to draw the object in their research notebook. If weather does not permit an outdoor trip, nature objects can be brought by the teacher to place on a table for the students.

Activity: Cut out different geometric shapes from cardboard. Color them. Display them on the class board and write down the names below each figure. Discuss about each shape with students.

- After introducing about basic geometric shapes and their properties give chart papers to every student.
- Tell them to draw a picture or paint a picture using different shapes taught in the class. You can help your students by telling them that they can make house by using triangle, square and rectangle. In the same way they can show clouds in their painting by using circles and oval shapes.
- Tell them to color the shapes to make it astatically pleasing.
- When all the students finish their drawings, let them share their drawing with a fellow student. Tell them to discuss the shapes with each other. How they have made their drawings? Which different shapes they have used in their paintings? This will help in understanding the concepts better.

http://www.brighthub.com/education/k-12/articles/35715.aspx

Activity: Students should go to the Building Big website to use the interactive site to study about shapes.
They can also do the other labs on forces, materials, and loads. Students should write in their research notebooks what they learn through doing the interactive labs. Follow with a group discussion to ensure all students got the basic information from the site.

http://www.pbs.org/wgbh/buildingbig/lab/forces.html

(The Building Big website is a powerhouse of information where a teacher could continue on with this unit by adding the building of bridges, domes, tunnels, skycraper, etc.)

**Activity:** Students will then be given 4 different colors of colored pencils and a sheet from the Archiscapes book to color a pattern. Display the pages in the hall for other students to see. Discuss whether students found it easy or hard to keep the pattern going. Ask if students have seen any buildings that have patterns of shapes in them.

(If you do not have the book, you can have students to create patterns using 2, 3, 4, or more shapes, and then color them in creating a second pattern.)

**SQ3:** Do you think that measurement, data collection, problem solving, and mathematical analysis are necessary for the practice of architecture?

Skills: critical thinking, analyzing, identifying a point of view, drawing conclusions

Have a group discussion on student’s ideas. Then have students to put the answers to SQ3 to work by having them do a column construction.

Students will design a column following specific construction guidelines.

One resource you could use from the Internet is

http://www.salvadori.org/curriculum/aobc/combined_column.pdf


**SQ4:** Why is it that in past cultures the architects were mathematicians?

**Skills:** discussion, analyzing data, evaluating solutions, draw conclusions, identifying a point of view

Historically, architecture was part of mathematics, and in many periods of the past, the two disciplines were indistinguishable. In the ancient world, mathematicians were architects, whose constructions -- the pyramids, ziggurats, temples, stadia, and irrigation projects -- we marvel at...
today. In Classical Greece and ancient Rome, architects were required to also be mathematicians. When the Byzantine emperor Justinian wanted an architect to build the Hagia Sophia as a building that surpassed everything ever built before, he turned to two professors of mathematics (geometers), Isidoros and Anthemios, to do the job. This tradition continued into the Islamic civilization. Islamic architects created a wealth of two-dimensional tiling patterns centuries before western mathematicians gave a complete classification.

Medieval masons had a strong grasp of geometry, which enabled them to construct the great cathedrals according to mathematical principles. It is not entirely fair to dismiss the middle ages as being without mathematics: their mathematics is built into structures instead of being written down. The regrettable loss of literacy during those centuries was most emphatically not accompanied by a commensurate loss of visual or architectural patterns, because patterns (as opposed to the abstract representations of a written script) reflect processes that are inherent in the human mind. [http://math.utsa.edu/ftp/salingar.old/ArchMath.html](http://math.utsa.edu/ftp/salingar.old/ArchMath.html)

**Activity:** Through a group discussion, the teacher will lead the students to the answer to SQ6. If time permits students could research the construction of the pyramids, ziggurats, temples, stadia, and irrigation projects.

**EQ4:** How do architectural structures include many different applications of math and patterns?

**Activity:** The teacher now asks the EQ4 “How do architectural structures include many different applications of math and patterns?” Students should be able to answer the question from doing the activities in the scaffolding questions.

Then debrief with the EU “EU4: Architectural **structures** include many different applications of math and **patterns**.” Ask students if they see the connection between the EU statement and what they are experiencing either in life or their general education class. Now replace the EQ with the EU on the wall and leave it there until the unit is completed.

**Learning Activities**

**Analytical Thinking Skills:** critical thinking, divergent thinking  
**Skills:** observing, analyzing, sequencing, making inferences  
**Processes:** taking geometric shapes to make patterns as are used in many buildings, training their brain to keep a pattern repeating, designing aesthetic patterns

**Resources**


**Non-Print:** computer with Internet access
| **Products** | A scale drawing of a mall entrance floor reflecting Frank Lloyd Wright’s use of patterns using geometric shapes. Presentation of geometric shapes in architecture and nature, presentation on symmetry in architecture and nature |
| **Grouping** | **Whole group:** Discussion of shapes in nature and patterns of shapes in architecture  
**Small group:** Peer discussion while looking for shapes in nature.  
**Individual:** Drawing their ten shapes in nature and drawing the product. |
| **Extensions** | Choosing any method of presentation, students could research about finding hexagons in nature, and then relate that knowledge to architecture with examples. Students could create a presentation on symmetry and how it occurs in nature and relates to architecture. The method of presentation should be approved by the teacher. |
| **Differentiation/Ascending Levels of Intellectual Demand** | Scaffolding as needed during research, group work, discussions, and creating the products. |
# Time line/Build a Structure/Oral Report: Architect Unit

**Teacher Name:** ___________________________  **Student Name:** ___________________________

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<tr>
<td><strong>Construction - Materials</strong></td>
<td>Appropriate materials were selected and creatively modified in ways that made them even better.</td>
<td>Appropriate materials were selected and there was an attempt at creative modification to make them even better.</td>
<td>Appropriate materials were selected.</td>
<td>Inappropriate materials were selected and contributed to a product that performed poorly.</td>
</tr>
<tr>
<td><strong>Function</strong></td>
<td>Structure functions extraordinarily well, holding up under atypical stresses.</td>
<td>Structure functions well, holding up under typical stresses.</td>
<td>Structure functions pretty well, but deteriorates under typical stresses.</td>
<td>Fatal flaws in function with complete failure under typical stresses.</td>
</tr>
<tr>
<td><strong>Information Gathering</strong></td>
<td>Accurate information taken from several sources in a systematic manner.</td>
<td>Accurate information taken from a couple of sources in a systematic manner.</td>
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<td>Journal provides a complete record of planning, construction, testing, modifications, reasons for modifications, and some reflection about the strategies used and the results.</td>
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Cooperation | Great team work with both members responsibilities | Good team work with minimal about sharing the responsibilities | Acceptable team work with several about sharing the responsibilities | Unacceptable team work with students continually in conflict about sharing the responsibilities

**Rubric: Drawing A Road Side Structure: Architecture Unit**

Teacher Name: ___________________________  Student Name: ___________________________

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<td>Design</td>
<td>Structure design appears that it could feasibly be built</td>
<td>Structure design appears to have small flaws and would need changes before it could be built</td>
<td>Structure design has many flaws and would need considerable changes before it could be built.</td>
<td>Fatal flaws in structure design which would not allow it to be built</td>
</tr>
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<td>Information Gathering</td>
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<td>Journal/Log - Content</td>
<td>Journal provides a complete record of planning, modifications, reasons for modifications, and some reflection about the strategies used and the predicted results.</td>
<td>Journal provides a complete record of planning, modifications, and reasons for modifications, and some reflection about strategies used and the predicted results</td>
<td>Journal provides small bit of detail about planning, modifications, and reasons for modifications with little reflection of strategies used and the predicted results</td>
<td>Journal provides very little detail about several aspects of the planning, with little reflection of strategies to be used</td>
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# Rubric: Patterns and Math

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EXPLORING THE INTERNET ACTIVITY

Check out these Web sites for more great examples of programmatic architecture.
Can you guess what the purpose of each building is?

1. www.worldslargestthings.com/easterntour/basketbuilding.htm
What kind of business is this? ____________________________________________________________________________

2. www.state.ky.us/agencies/khc/bondrnt.htm
What kind of business is this? ____________________________________________________________________________

What kind of business is this? ____________________________________________________________________________

4. www.sca-roadside.org/galleries/shell.html
What kind of business is this? ____________________________________________________________________________

Here are other websites to check out for more fun examples of roadside architecture:

Go to “Roadside Attractions” at www.lukecole.com

Roadside Peek: Roadside Vernacular: www.roadsidepeek.com/archit/vernac/

Society for Commercial Archology: www.sca-roadside.org