THE USE OF MATH TO CREATE AN ARCHITECTURAL GENIUS

The humanistic scholars of the Renaissance were greatly influenced by ancient Roman and Greek ideas. The classic buildings and structures of classical Rome and Greece lead to major advances in Renaissance design. Geometrically designed Palazzi, or Palaces, were commissioned by rich Italian families. Public buildings were also rebuilt or improved with the Greek and Roman classical influences of columns, domed roofs, and arches. Public areas such as plazas and churches were also influenced by these ancient ruins.

The development of mathematics and engineering also lead to the development of plans for such buildings as the Duomo di Santa Maria del Fiore in Florence. The city’s citizens started construction on this eight-sided cathedral in 1296, but were forced to leave the ceiling open because they couldn’t figure out how to create a dome top that wasn’t too heavy for the walls they’d already built.

Architect Filippo Brunelleschi’s study of ancient Roman architecture and recent studies of engineering mathematics lead to his perfect solution for the Great Cathedral’s dilemma of how to support such a large dome. He used a two-layer design for the arches. He had builders lean their tops together for support and then had giant rings of iron, brick, and wood looped around them to hold them in place. He also designed a hoist, a pulley system that raised building materials, food, and water to the workers as they completed the dome. The Duomo di Santa Maria Del Fiore was completed in 1436 and still stands today, a great Renaissance Era piece of history.

1. List three (3) ways the classic Roman and Greek structures influenced Renaissance architecture.

2. What invention/design of Brunelleschi’s made building the Great Cathedral’s dome possible? How was it used?
Florence became a hub of Renaissance society, housing artists, poets, and scholars alike. Florence’s location on the network of trade routes that led to the Silk Road made it a major trading post, hosting merchants from as far as Asia and Africa. Since many of these traders had different types of coinage, they traded them out for the Florin, the golden coin used by Italians. Large families of Florence took advantage of this need, becoming wealthy off the money exchange and later, the interest fees from loans.

The most powerful family in Florence that were bankers were the Medici Family. With their wealth from banking, the Medici’s built great government buildings, public works of art, their own Palazzi (palace), and they commissioned (paid artists) many works of art, writing, and music. Their home was a gathering place for forward thinkers and creators of the Renaissance. They became patrons, or financial sponsors, for famous Renaissance artists such as Michelangelo and Sandro Botticelli. They also built a great army to defend their wealth, city, and power.

The Medici Family are notorious for the ruthless ways they maintained their power. They often killed off any threats or competition. At the height of their rule in Florence, they were more rich than most European Kings, and they eventually owned multiple branches throughout Europe of the Medici Bank, which serviced the Catholic Church of Rome.

1. **Support with Evidence from the Text**: Support the following sentence with evidence in the form of a direct quote from the text: *The most powerful family in Florence that were bankers were the Medici Family.* Make sure to place the sentence chosen in quotes when you write it down.

2. **Describe how the Medici family spent their wealth to better Florence.**
From Barter to Coinage

During the middle ages, economy was sustained by trading of goods. At the onset of the Renaissance, the downfall of feudalism and swell of foreign trade between Europe, Asia, and Africa lead to cash driven economy. Merchants and customers used coins to pay for goods rather than bartering for trade.

Trading Routes Create Bustling Cities

As money and banking became more prevalent, cities along the trade routes grew wealthier. Genoa’s prime location along the Mediterranean Sea connected it with Eastern Europe and Asia, and made it one of the wealthiest Italian cities. This shift made craftsmen, merchants, and bankers position in society rise, and allowed this class to mingle with nobles via marriage and public favor. Guilds of craftsmen could demand and maintain higher prices and make a decent living on the prices merchants would pay for goods to take abroad and sell. Genoa was especially known for their fine offerings of gold and ivory from Northern Africa. This was due to the settling of colonies on the Island of Sicily and Muslim territories on the north African coast.

1. Although the social structure didn’t change, how did merchants and craftsmen manage to grow as wealthy as their noble counterparts?

2. Describe how Genoa became a major trade post.
Located on the Adriatic Sea, the Italian city-state of Venice is best known for its complex waterway transportation system. This lavish and navally patrolled maritime stop on the sea became well-known for its fine glass, but also boasted spices, perfume, and silks from Eastern Asia. Emerging Renaissance architects utilized Venice artisan's' glass to build elaborate windows for their public projects and private jobs for wealthy families such as the Medici's of Florence. Venice was also home to the famous merchant Marco Polo, benefiting from his exclusive business with the Mongol Empire in modern China.

**VENICE’S CONTRIBUTION TO “RENEWED” ART**

In addition to trading glass and other goods, Venice boasted it’s housing of many forward thinking artists and musicians. The most famous of these artists was Titian, who painted right onto the plaster of buildings, including biblical scenes on church walls and mythical scenes for public buildings. He was proclaimed the official painter of Venice in 1516, and also painted many portraits of royalty and noble families.

1. **Describe two famous Renaissance people that lived in Venice and what they were famous for.**

2. **List four goods that Venice was especially known for in the Renaissance economy.**
The Polo family originated from Venice, a major Italian city-state of the Renaissance era. A famous jewel merchant Niccolo Polo traveled with his brother Maffeo Polo and son Marco Polo to China while it was still ruled under the Song Dynasty. When the Mongols overtook the Song dynasty, Marco and other foreign merchants were given special trade privileges under Kublai Khan, the leader of the Mongol Empire. Kublai Khan especially took to Marco Polo, enjoying his accounts of his travels through Persia and tales of his home country.

**HOW MARCO POLO INCREASED EUROPEAN TRADE WITH CHINA**

In the 17 years Marco Polo spent in China, he observed many wonders, and was especially impressed with how massive Chinese cities were and how the Grand Canal moved the economy by transporting enough food from the agrarian south to north to feed all China’s citizens. In 1298, three years after he returned from his famous journey, Polo was captured after leading a Venetian galley into battle against the rival Italian city-state of Genoa. While in prison he encountered Rustichello of Pisa, a fellow captive who was known as a talented writer of romances. He dictated his stories to a writer, who published the work entitled *The Travels of Marco Polo in 1299*. The circulation of the book throughout early Renaissance Europe lead to the interest and eventual bolstering of Asian trade.

1. **Do you think that Europe, and especially Venice, would have increased its trade if Marco Polo hadn’t had his story written? Why or why not?**

2. **What two dynasties of China did Marco Polo experience first hand?**
Dedicating Artistry to The Papacy

One of the most famous pieces of art from the Renaissance is the ceiling of the Sistine Chapel of the Vatican in Rome. It’s painter, Michelangelo, spent over four years completing the massive masterpiece. He worked from high platforms, risking the fall to paint over 300 figures from biblical stories. What makes it so unique is that the techniques used were iconic to humanism, depth and realistic looking physique of the human body, are represented in the art pieces.

Michelangelo’s Other Famous Work: David

In addition to the Sistine Chapel, Michelangelo also created a 17 foot (base included) marble statue of the biblical hero David. The expression on David’s face tells of a young man’s mental struggle during battle, and this statue is sometimes referred to as the perfect male form. Michelangelo had been commissioned to create this statue for a niche in the Cathedral of Florence, but due to the Roman-esque style of the statue convinced Florence’s city counsel that it need to be placed in a more prominent site. It was set up in the Piazza (Plaza) della Signoria instead. Today, a replica stands where David stood in Florence. He has been moved to a museum in Florence to preserve his integrity.

1. **Use your own words to detail the main idea of the reading.**

2. **Select a portion of text that support the main idea created. Make sure to write it in quotation marks.**
Of all the art that has survived since the Renaissance, Milan houses perhaps the most valuable and well-known Christian masterpiece. **The Last Supper by Leonardo da Vinci** is a depiction of the moment Jesus Christ tells his disciples that one of them will betray him. The painting occupies a 15 foot by 29 foot section of the dining room wall in the convent of Santa Maria delle Grazie in Milan. Unlike the wet fresco (applying to wet, freshly spread lime-based plaster) painting common on most murals of this time period, da Vinci sealed the convent’s wall to dry it and used layers of tempura paint instead. This made the painting victim to nearly immediate flaking and fading. Restoration projects over the years have kept it viewable.

**Secrets in the Last Supper**

Speculation on symbolism and Renaissance code have followed The Last Supper into modern times. The number three, perhaps alluding to the Holy Trinity (God, Jesus and the Holy Spirit), are ripe in the painting. The disciples are grouped in threes and Jesus himself is very triangular (three sided). Another interesting fact is that the entire painting’s architectural invisible lines point to Christ. The table also offers some of the Renaissance’s still life art techniques perfected in northern Europe, specifically the Netherlands.

Perhaps even more interesting are the secrets some believe to be housed within it’s paint layers. Researchers have revealed significant, non religious figures when a mirror image of the painting is overlaid. An Italian musician has also claimed that the positions of the disciples hands and loaves of bread are positioned like musical notes of a composition. More recently, the food scattered across the table have been scrutinized as symbolic for anti-Christian statements.

1. **Compare and contrast wet Fresco painting and the technique that da Vinci used on The Last Supper.**
   **How are they different?**
Lavish Beginnings

As Florence grew in power due to its banking as a central trade stop during the Renaissance, the wealthy Italian families that lived there began to “renew” public buildings and build their own. In 1560, the Medici family commissioned Giorgio Vasari, one of their favorite architects and artists of the day, to design the Uffizi, Italian for “Offices”, to house the Florence government officials. This was the jewel in the crown of the Medici family, solidifying their power. In addition, the Medici’s also had Vasari design the secret corridor that connects the Uffizi to the Pitti Palace where the Medici’s lived. This corridor also ran by the church of Santa Felicita so the family could attend mass without going out into Florence’s streets.

In 1581, a private Gallery of the Medici’s statues and other precious art collection was established on in the Uffizi’s east wing’s upmost floor. The last Medici, Anna Maria Luisa, signed the Family Pact so the three centuries of art and treasures would always remain in Florence. The gallery opened to the public in 1759, and today it’s 45 halls house some of Italian Renaissance’s finest masterpieces by artists such as Titian, Botticelli, and Michelangelo (see DONI TONDO to the left.)

1. Give two reasons the Medici’s had the Uffizi built that would benefit them.
Tuscan Traveler’s Tales - Twenty Years Ago A Terrorist Bomb Shook Florence!

Twenty years ago, a little more than one hour after midnight, May 27, 1993, a massive explosion echoed throughout Florence. It was a true case of domestic terrorism.

A stolen white Fiat Fiorino van, loaded with explosives, was driven into the city center and parked under the Torre dei Pulci in Via dei Georgofili. The car bomb (280 kilograms of Pentrite and T4 (both components of Semtex) mixed with a small quantity of TNT) was detonated blasting a crater ten feet wide and six feet deep. Fragments of metal debris landed as far away as Via dei Calzaiuoli.

The explosion killed five people...Another 33 people were hospitalized for injuries.

The Uffizi Gallery was the main target of the blast. The structural damage to the museum cost more than a million dollars to repair. Although the reinforced window glass of the museum shattered, it protected most of the artworks from the full force of the blast. Three paintings were completely destroyed, thirty-three others were damaged and three statues were broken.

- The Tuscan Traveler, May 25, 2013

How to Distinguish Renaissance From Classical Art:

As you know many Renaissance artists looked to Ancient Greek and Roman artists for guidance. For this reason, many of the same techniques were used and as a result, statues look similar. There are many clues that may help you to differentiate which statues are Renaissance versus Ancient Greek and Roman. Religious depiction in statues will be a key indicator. While Renaissance artists sculpted Christian biblical figures, Ancient Greek and Roman statues are mainly of heroes or mythological figures. Furthermore, statues of Ancient Greek Olympic games, adorned in togas or nude were very common. Paintings were primarily from the Renaissance era since oil paints that can stand the test of time were not invented until the early 1400s.

Your Mission at this Station:

1. Read about the Uffizi Gallery explosion! Take the pieces out of the envelope. Piece together some of the statues that have been “blown apart” in the Uffizi Gallery bombing.

2. Read about how to distinguish Renaissance from Classical art. Write down the name of the artwork, the era it was most likely from (Classical or Renaissance) and, if possible, the artist.

Students: Note that these were not the same artworks that were damaged in the Uffizi Gallery explosion, but were selected as key artworks of the Renaissance or classical period.
Teachers: Cut up each piece of artwork into four-six random pieces each and place them in an envelope at the station.
“The motions of the different parts of the face, occasioned by sudden agitations of the mind, are many. The principal of these are, Laughter, Weeping, Calling out, Singing, either in a high or low pitch, Admiration, Anger, Joy, Sadness, Fear, Pain, and others, of which I propose to treat. First, of Laughing and Weeping, which are very similar in the motion of the mouth, the cheeks, the shutting of the eyebrows, and the space between them; as we shall explain in its place, in treating of the changes which happen in the face, hands, fingers, and all the other parts of the body, as they are affected by the different emotions of the soul; the knowledge of which is absolutely necessary to a painter, or else his figures may be said to be twice dead.”

A TREATISE ON PAINTING By Leonardo da Vinci

1. Paraphrase Leonardo’s quote below.
2. Draw a realistic eye or hand using techniques of Renaissance art such as Leonardo describes above. Use the examples from the Sistine Chapel below to help.
BRUNELLESCHI’S DOME AND ARCHITECTURE

List three (3) ways the classic Roman and Greek structures influenced Renaissance architecture.

______________________________________                  __________________________________________
______________________________________

What invention of Brunelleschi’s made building the Great Cathedral’s dome possible? How was it used?

________________________________________________________________________________________
________________________________________________________________________________________

THE MEDICI FAMILY - POWERFUL PATRONS

Support with Evidence from the Text: Support the following sentence with evidence in the form of a direct quote from the text: “The most powerful family in Florence that were bankers were the Medici Family.” Make sure to place the sentence chosen in quotes when you write it down.

________________________________________________________________________________________
________________________________________________________________________________________

Describe how the Medici family spent their wealth to better Florence. __________________________

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

What two major factors made Florence a prime location for banking and trading?

________________________________________________________________________________________
________________________________________________________________________________________

TRADE THAT SUPPORTED THE RENAISSANCE ECONOMY

Although the social structure didn’t change, how did merchants and craftsmen manage to grow as wealthy as their noble counterparts?

________________________________________________________________________________________

DON’T FORGET TO DO THE “PIN YOUR LOCATION” ACTIVITY AS YOU GO!
Describe how Genoa became a major trade post.

________________________________________________________________________________________

THE QUEEN OF THE ADRIATIC

Describe two famous Renaissance people that lived in Venice and what they were famous for.

________________________________________________________________________________________
________________________________________________________________________________________

List four goods that Venice was especially known for in the Renaissance economy.

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

MARCO POLO INSPIRES TRADE WITH ASIA

Do you think that Europe, and especially Venice, would have increased its trade if Marco Polo hadn’t had his story written? Why or why not? __________________________________________________________________________

________________________________________________________________________________________

What two dynasties of China did Marco Polo experience first hand? ____________________________________________

________________________________________________________________________________________

THE SISTINE CHAPEL

Use your own words to detail the main idea of the reading.

________________________________________________________________________________________

Select a portion of text that support the main idea created. Make sure to write it in quotation marks below.

________________________________________________________________________________________

________________________________________________________________________________________

LEONARDO DA VINCI - DISSECTING THE LAST SUPPER

In the space provided on the next page, compare and contrast wet Fresco painting and the technique that da Vinci used on The Last Supper.

DON’T FORGET TO DO THE “PIN YOUR LOCATION” ACTIVITY AS YOU GO!
THE UFFIZI

Give two reasons the Medici’s had the Uffizi built that would benefit them.

_________________________________________________________________________________________
_________________________________________________________________________________________

PIECE THE ARTWORK TOGETHER!

List two reasons how Classical Period artwork and Renaissance artwork are similar and different.

SIMILARITIES:  
•  
•  

DIFFERENCES:  
•  
•  

<table>
<thead>
<tr>
<th>NAME OF ARTWORK</th>
<th>ARTIST NAME</th>
<th>RENAISSANCE OR CLASSICAL? EXPLAIN WHY.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DESTINATION MILAN: BACK TO BASICS DRAWING— 1. Paraphrase Leonardo’s quote below:

___________________________________________________________________________________________
___________________________________________________________________________________________

2. Use the back of this sheet to draw a realistic eye or hand.

DON’T FORGET TO DO THE “PIN YOUR LOCATION” ACTIVITY AS YOU GO!
Did you know that you can pin your location on most mobile device maps?

Dropping a pin helps people to navigate to an exact destination! First, drop (draw) a pin on the places you visit in Italy. Then, match the locations mentioned at different stations to the corresponding facts.

1. Marco Polo’s hometown ______ A. Genoa
2. The Sistine Chapel’s home. ______ B. Venice
3. A colony of Genoa. ______ C. Florence
4. The banking capitol of Renaissance Italy. ______ D. Island of Sicily
5. Source of Iron and ivory for Genoa. ______ E. Rome
6. Site of Brunelleschi’s Dome. ______ F. Milan
7. Where THE LAST SUPPER was painted. ______ G. North Africa

If you could visit any of the places you’ve pinned in real life, where would you go and why?
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

Copyright © 2016 Instructomania