Incorporating Cultural and Thematic Reflections in a Math History Study Abroad Program

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In January 2011 I led Whitworth's first Math History in a Cultural and Historical Context study abroad program to Europe. As with most study abroad programs the first rendition of the course focused more on logistics and basic curriculum. The second Math History study program took place in January 2013. In the intervening years I had attended several FORUM for Education Abroad Conferences, had participated in Whitworth's Study Abroad Task Force, and had read several books on intercultural competencies and their place in study abroad programs. I decided that with the second, and subsequent iterations of the Math History study abroad program that I would be more intentional in helping the students become aware of the cultures and worldviews, present, as well as historical, of the cities and countries we visited. If mathematics is truly constructed and conceived in a cultural and historical context, then I wanted the students to be aware of cultural differences as well as historical events that shape how mathematics is done. I wanted to prepare the students for what they would be seeing and experiencing, and then give them opportunities to analyze and reflect on what they had seen during their travels.

In the fall prep course I focused on two general areas: background preparation for the specific sites they would be visiting while abroad and development of some basic intercultural competencies. In our Math History Fall Prep course the students worked through Jeff Suzuki's book entitled *Mathematics in a Historical Context*. The class met weekly to discuss the readings and listen to student presentations on specific mathematical topics from the book. In addition the students prepared a City Report for each major city would be would be visiting while abroad. These City Reports entailed reading documents or watching videos that either highlighted a mathematical theme we would be exploring or were short video tours of specific sites we would be visiting. The students therefore had a preview of the places we would be visiting, some specifics things they should look for at each place, and how those tied in to the major themes of the course. The students had copies of their individualized City Reports with them on the trip so they could recall what they learned and what they were anticipating to see. While on the trip the students then filled out Site Reports for each city. These Site Reports took the themes highlighted in the City Report, and now actually seen by the students, and asked the students to make connections between ideas in mathematics, centered on particular themes. For example, in the London City Report the students previewed sites illustrating the importance of scientific instruments, church architecture and design, and cryptography. They wrote a report on what they had learned and what they anticipate seeing on site. Then for their London Site Report they wrote on three different themes, integrating material from different museums and cultural centers we visited in the London area. These particular themes were 1) Scientific Instruments, 2) Science in the Eighteenth Century and 3) Cryptography. I developed similar City Reports and corresponding Site Reports for Berlin and Gottingen, Florence, and Rome.

I also wanted the students to become more aware of cultural differences and worldviews of the different countries would be traveling to. Because the Math History Study Program visits three different countries: England, Germany and Italy, the students would have an opportunity to experience three very different cultures. The awareness of these culture differences would help the students reflect on different worldviews that exist, even in Western cultures, and on their own worldviews. Awareness of different cultural viewpoints and values is important in understanding the mathematicians and mathematical ideas we studied – each of these was impacted, in some way, by the cultural values of the country they lived in. To help develop the intercultural competency of the students, I had the students do some pre-trip exercises in intercultural competency. I used online resources from University of the Pacific, entitled "What's Up With Culture?" http://www2.pacific.edu/sis/culture/. In the student travel packet I included four more of these cultural awareness activities. One focused on *Preparation* – to be done on the plane to Europe. The second one focused on *Cultural Shock and Travel Fatigue* – to be done midway through the trip. The third was on *What I learned and Thoughts for reentry* – to be done on the plane ride home. A final activity on *Next Steps* – how to use your study abroad experience in terms of personal growth, reexamination of worldview and vocational decisions, was completed a couple of weeks after reentry. In addition to these intercultural activities from the University of the Pacific, the students also completed Cultural Reports for each city they visited. These Cultural Reports focused on a description of the city (layout, neighborhoods, monuments, architecture, transportation, signs), people (nationalities, dress codes, gestures, dialogues between people, facial expressions), free time (cultural activity the students participated in and what they observed), churches (religious symbolism, architecture, monuments within the church, church services), eating (types of restaurants, clientele, cuisine, eating hours, length of meals). We took time during the trip (usually over meals or waiting for transportation) to discuss what they had observed.

A description of these items, which were in the student's packet, follows, along with copies of each assignment. Note that each student's packet was individualized to contain their specific pre-trip City Reports and write-ups of what they had learned and what they were expecting to see. As we traveled, students read, as in the previous January 2011 iteration of the program, related articles on the history of mathematics, correlated to the country we were visiting. Also, as we traveled, the students did oral presentations on a specific mathematician or mathematical idea. Each student prepared a handout for his or her presentation. One side of the handout gave a pictorial representation of their topic and the backside contained an outline with the major points of their presentation. They made copies for all the other students on the trip so that each student could add these specific topics to their reading packet.

Student Learning Outcomes

To assess the students' learning outcomes I asked each student three questions: What did they learn about mathematics as a result of this study abroad program that they wouldn't have learned in a regular math history classroom? How, if at all, did their worldview

change? How did they change as a person? Student responses to the mathematical connections question included the following observations: saw historical connections between math and science – usually don't see these overlaps in regular university classes; understood much better the work of some famous mathematicians because of the visual dynamics of being able to see how their inventions worked; understood better the follow of mathematic ideas/thinking from country to county; being able to connect ideas to instruments in person; elucidated connections between mathematical progress and discovery and the mathematicians who worked on the problems of their times; seeing architectural wonders and being able to understand the enormity of the mathematical challenges in their construction; learned about math has played a central role in politics; seeing the actual work and situation mathematicians worked in made their work seem more purposeful and real.

In terms of worldview perspectives, the students responded with the following comments: realized that in all these wildly different cultures and environments that people are just going about their normal lives - they are people just like we are in our home town; struck by all the cathedrals around in the different countries - how Christianity is really global - being able to pray, worship and connect with God all over; became fascinated with different traffic styles; appreciated different cultures approaches to life - taking time for lingering and socializing over dinner with friends (Italy); have more global appreciation and better understanding of world perspective such as economic issues; understanding of the power of faith behind colossal buildings; have gained a new appreciation for how a people can grow after tragedy such as in Germany after the wall came down; one of the big things I noticed was different concepts of time and how it ought to be spent - in Italy, for example, dinner was expected to last 2 hours at least; understanding that there is a much bigger world out there that is amazing and has a lot more to tell; other ways of living - as their ways seem odd or different to us, ours do to them; knowing what it's like and having empathy for visitors to the U.S.; after this trip I feel like the American way of doing things is really not as universal as I thought; all human beings are essentially the same but how they interact with the world depends on their culture and environment.

Finally, in terms of personal change the students reported that they developed self-confidence, became more adventurous and willing to try new things, go outside their comfort zone. Many expressed a desire to travel again. They also became aware of cultural values – their own desire for personal space, how Americans interact with each other, what kind of services and courtesies they expect and what limited number of lifestyles they tolerate. Some fell deeper in love with mathematics. Several expressed a desire to incorporate values of simple living, being in the present, taking time for people, into their lives.

While these are anecdotal assessments, and I don't have parallel data from the first trip to compare with these responses, my conversations with the students definitely were more reflective and analytical in nature. The students were much more conscious of the culture around then, observing it, reflecting on it, comparing it to their own worldview perspectives. They were also seeing mathematics as a product and influencer of cultural ideas. I plan to continue these thematic and cultural reflections on future trips. As we

develop more formal assessment techniques for our university's study abroad programs I will be able to obtain more concrete data on student growth and intercultural competencies. But anecdotally, through my in-trip and post-trip conversations with the students, I am pleased at the results these changes to the program have made.

List of items in students' packets:
1. Syllabus and itinerary
2. Cultural Awareness Exercise 1 (to be done on plane to Europe) – Preparation http://www2.pacific.edu/sis/culture/ Section 1.1 If you are Going Abroad Soon; Sec. 1.5.4 Sources of U.S.-American Culture; Section 1.6 Communication Across Culture: What Are They Trying to Say?
3. London Cultural Report
4. Mathematical Readings – articles and questions highlighting relevant mathematical topics to that particular country's mathematical history.
5. London City Report (Copy of that student's report completed in the Fall Prep class)
6. London Site Reports – Thematic analysis/reflection of mathematical topics
7. Berlin and Gottingen Cultural Reports
8. Mathematical Readings (for Berlin and Gottingen) and questions
9. Berlin/Gottingen City Report (from Fall Prep class)
10. Berlin/Gottingen Site Reports - Thematic analysis/reflection of mathematical topics
11. Cultural Awareness Exercise 2 (to be done midway through trip) – Cultural Shock and Travel Fatigue http://www2.pacific.edu/sis/culture/; Section 1.7 Surprises and Shocks
12. Florence Cultural Report
13. Mathematical Readings (Florence) and questions
14. Florence City Report (completed in Fall Prep class)
15. Florence Site Report -Thematic analysis/reflection of mathematical topics
16. Rome Cultural Report
17. Mathematical Readings (Rome) and reading questions
18. Rome City Reports (completed in Fall Prep class)
19. Rome Site Reports
20. Cultural Awareness Exercise 3 (to be completed on the plane ride home); http://www2.pacific.edu/sis/culture/ Section2.2 If you are preparing to return home soon
21. Cultural Awareness Exercise 4 (to be done after return home); http://www2.pacific.edu/sis/culture/ Section 2.3 Home: Neither Here Nor There; Section 2.3.4 Ten Top Challenges for Returnees at Home; Section 2.4 What Did You Learn Abroad

London

Cultural Report

As we travel from country to country you will see many cultural aspects that seem familiar to you – we are going to Western Europe after all – but also some that will seem somewhat unfamiliar. I also want you to pay attention to changes from country to country.

Cities:
Describe things you observed about the city itself. Things to consider are the following: Layout of the city, the roads/streets, parks, placement of signs, neighborhoods, monuments, types of buildings and architecture, residential vs. commercial, what kinds of stores and items in the stores, transportation system, ebb and flow of traffic and what kind of traffic – public/private, etc. Feel free to add more to list depending on what you notice.

People:
Different nationalities, dress code, gestures, eating practices, behavior on public transportation, facial expressions, dialogues between people, behavior between patrons and shop owners/restaurant staff, etc. Again, feel free to add more items to the list depending on what you observe.

Free time:
Describe a cultural activity – play/music event/site-seeing that you did in your free time. Why did you choose this? What did you gain from the experience?

Churches:
Look for religious symbolism as you walk around the city; read billboards of churches – what are they promoting? Where are the churches located? What types of churches do you see?
Attend a church service. How is the church service you attended different from what you have experienced or might see in America? What kind of religious symbolism is within the church?

Eating:
What kinds of eating establishments did you see around the city? Which seem to be the most popular? Who are the clientele of the different eating establishments? Which seem to be the most popular hours to eat? Where did you eat and what type of cuisine did you have?

London

City Report

Longitude

Watch the NOVA Program *Lost at Sea – The Search for Longitude*
I have a copy you can borrow. It is also available on Netflix:
http://movies.netflix.com/movie/Lost_at_Sea_The_Search_for_Longitude/70085431
Program Overview:
NOVA chronicles the seventeenth-century journey to determine longitude.

- In 1714, following a maritime disaster, British Parliament offers £20,000 for the first reliable method of determining longitude on a ship at sea.
- It is known that longitude can be found by comparing a ship's local time to the time at the port of origin. The challenge is finding a clock—a chronometer—that can keep time at sea, where temperature changes, humidity, gravity and a ship's movement affects accuracy.
- Early attempts are based on the assumption that astronomy can solve the problem.
- Self-taught clockmaker John Harrison believes the answer lies in large mechanical clocks. Through careful observation and experimentation, he invents many adaptations to improve clock accuracy. After decades of work, he realizes pocket watches are a better choice and redirects his efforts to pursue this smaller technology.
- In 1764, Harrison's watch proves accurate in helping determine the longitude on a six-week voyage to Barbados.

Answer the following questions:
1. It was commonly believed in the 1700s that the secret to finding your longitude at sea was the ability to know the time in two places: Your ship's port of origin and its current location. Explain how knowing the time in two places can help determine longitude.
2. What were some of the various methods people tried to determine longitude?
3. What obstacles did Harrison face in getting his method accepted and winning the prize?
4. What was the role of instrument makers in 18th century Europe? Which instrument maker/clockmaker did Harrison work with? (You will encounter him in one of your on-site readings.)

On our trip to Greenwich Royal Observatory you will see the Harrison clocks.
http://collections.rmg.co.uk/collections/objects/79139.html

Preview the sites we will see in London

Science Museum - London
Check out these links:
Home Page: http://www.sciencemuseum.org.uk/
There are 3 galleries in particular that I want you to visit: Computing, (http://www.sciencemuseum.org.uk/onlinestuff/museum_objects/computing.aspx)Mathematics (http://www.sciencemuseum.org.uk/onlinestuff/museum_objects/mathematics.aspx), and Science in the 18th Century (http://www.sciencemuseum.org.uk/onlinestuff/museum_objects/science_in_18th_century.aspx).
Note the special exhibit celebrating the centenary of the birth of Alan Turing: http://www.sciencemuseum.org.uk/visitmuseum/galleries/turing.aspx

British Museum – London
Plan on doing the: 1 Hour Visit to the Museum: http://www.britishmuseum.org/visiting/planning_your_visit/1_hour_at_the_museum.aspx plus the Enlightenment Gallery (also encourage you to see Clocks/Watches and Scientific Instruments and Prints and Drawings)
Galleries: http://www.britishmuseum.org/explore/galleries.aspx

St. Paul's Cathedral – London
Read about the history of the cathedral: http://www.stpauls.co.uk/Cathedral-History/Cathedral-History
Explore the Cathedral: http://www.stpauls.co.uk/Cathedral-History/Explore-the-Cathedral

Westminster Abbey:
Westminster Abbey differs from St. Paul's in terms of architecture and focus (it's like a museum of British history). Check out these links to get a feel for the difference.
History of the Abbey: http://www.westminster-abbey.org/our-history/abbey-history
Architecture of the Abbey: http://www.westminster-abbey.org/our-history/the-architecture-of-westminster-abbey
Famous people either buried at the Abbey or who have a monument dedicated to them at the Abbey: http://www.westminster-abbey.org/our-history/people

Bletchley Park
Virtual Tour: http://www.codesandciphers.org.uk/bletchleypark/

London

Site Reports

Theme 1 – Scientific Instruments (Greenwich, Royal Society or Science Museum)
Choose 3 instruments you saw and learned about that furthered advances in navigation or astronomy. Draw a picture or the instrument and then describe the basic functions of the instrument. Finally describe the influence or important of that instrument for furthering the knowledge about navigation or astronomy.

Theme 2 – Science in the Eighteenth Century (British Museum Enlightenment Gallery or Science Museum – 18th century exhibit)
Some of the new disciplines or focuses of the 18th century were: Religion and ritual; Trade and discovery; Birth of archaeology , Art history, Classification, Decipherment of ancient script, Natural history, Collecting artifacts from around the world and establishing museums, and Instrument making. Choose 3 of these and describe what you saw and learned about these areas. Include any objects, famous people involved, and ways these influenced developments in science.

Theme 3 – Cryptography (Bletchley Park, Science Museum's Turing exhibit)
Describe something new you learned about cryptography and code making and breaking. Include the persons involved, politics of the situation/time period, and machines involved.

Theme 4: Churches (St. Paul's, Westminster Abbey, and any other churches you attended or went into during your stay in London)
Compare the architectural features of St. Paul's and Westminster Abbey including the layout, lighting, ornamentation, monuments/tombs/side altars. Who were the architects involved in each? How did their religious beliefs affect their design? If you visit any other churches, compare the architecture and design of those churches to St. Paul's and Westminster Abbey.

Berlin and Gottingen

Cultural Reports

(You may write a separate report for each city or combine the reports. If you do the latter, please indicate which observation applied to something in Berlin, and which to something in Gottingen.)

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People:
Different nationalities, dress code, gestures, eating practices, behavior on public transportation, facial expressions, dialogues between people, behavior between patrons and shop owners/restaurant staff, etc. Again, feel free to add more items to the list depending on what you observe.

Free time:
Describe a cultural activity – play/music event/sightseeing that you did in your free time. Why did you choose this? What did you gain from the experience?

Churches:
Look for religious symbolism as you walk around the city; read billboards of churches – what are they promoting? Where are the churches located? What types of churches do you see?
Attend a church service. How is the church service you attended different from what you have experienced or might see in America? What kind of religious symbolism is within the church?

Eating:
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Berlin

City Report

Watch the video: *Einstein's Big Idea*
I have a copy you can borrow or you can watch it on Netflix:
http://movies.netflix.com/movie/Einstein-s-Big-Idea/70041655

Program Description: Over 100 years ago, Albert Einstein grappled with the implications of his revolutionary special theory of relativity and came to a startling conclusion: mass and energy are one, related by the formula E = mc^2. In "Einstein's Big Idea," NOVA dramatizes the remarkable story behind this equation. E = mc^2 was just one of several extraordinary breakthroughs that Einstein made in 1905, including the completion of his special theory of relativity, his identification of proof that atoms exist, and his explanation of the nature of light, which would win him the Nobel Prize in Physics. Among Einstein's ideas, E = mc^2 is by far the most famous. Yet how many people know what it really means? In a thought-provoking and engrossing docudrama, NOVA illuminates this deceptively simple formula by unraveling the story of how it came to be.

Program Overview:
NOVA explores the stories behind E = mc2 and relates how Einstein came to his startling conclusion that mass and energy are two forms of the same thing.
The program:

- Conveys the discoveries that various scientists made, the challenges they faced, and the determination with which they championed their ideas.
- Chronicles Michael Faraday's journey from bookbinder's apprentice to lab assistant and follows Faraday's quest to understand the interaction of electricity and magnetism.
- Introduces a young Albert Einstein, who was growing up at a time when new ideas about energy were being formed.
- Follows the life of Antoine-Laurent Lavoisier as he investigates the nature of matter and devises experiments that show that matter is always conserved in a chemical reaction.
- Shows the central role that Lavoisier's wife, Marie Anne, played in helping him run his lab, illustrate his experiments, and translate other scientists' work.
- Describes how James Clerk Maxwell was able to mathematically show that light is a form of electromagnetism, supporting Faraday's belief that light was an electromagnetic wave.
- Recounts Einstein's reflections on light and how he came to understand its nature.
- Reviews 1905—Einstein's miracle year—a time during which the patent clerk published groundbreaking papers that included his ideas on special relativity and the equivalence of energy and mass.
- Notes that Einstein spent four years answering queries about his ideas before his brilliance was fully recognized and he was appointed professor of physics at Zurich University.

- Relates the first confirmation of Einstein's equation in 1938 by Otto Hahn and Fritz Strassmann who, without knowing it, split the atom—an accomplishment that was realized by Lise Meitner and Otto Robert Frisch.
- Notes how the splitting of the atom was applied to the creation of the atomic bomb.
- Concludes with ways $E = mc^2$ is being applied by physicists today.

Questions:
Science is a human endeavor undertaken by many different individuals of various social and ethnic backgrounds who carry out their science in the society in which they live. As you watch the program, take notes on the following scientists or science-teams: Michael Faraday, Antoine-Laurent and Marie Anne Lavoisier, James Clerk Maxell, Emilie du Chatelet, Albert Einstein, Otto Hahn and Fritz Strassman, Lise Meitner and Otto Robert Frisch. Then answer the following questions:
1. In what social context did each scientist work?
2. How was science viewed by the society in which each scientist lived?
3. What tools and techniques were available to the different scientists?
4. How did scientists collaborate and share information in each time period?
5. What challenges did these scientists face?

Berlin and Gottingen

Site Reports

Theme 1 – Famous people
In Berlin and Gottingen you will learn about several famous mathematicians including Euler and Gauss. In London you learned about Newton. Each of these mathematicians was prolific in the amount of math he produced and each was a major influence on the mathematics of his time. Compare and contrast these three men. Include information on their personalities, work style – collaborative or solitary, their interests outside of mathematics, where they chose to live and work, their family life and their religious beliefs. How did politics, cultural or historical events affect their work and personal lives? If you could spend a day getting to know any of these three men, which one would you choose and why?

Theme 2 – Math and Engineering in Ancient Cultures (Pergamon Museum and Jewish Museum in Berlin)
In the Pergamon Museum you will see actual building constructions from Greek, Roman and Babylonian times. You will also see examples of Islamic art from the 8th to the 19th century. In the Jewish Museum you will examples of construction, design and geometry/math from the Middle Ages. Choose one of the following themes – math/engineering in ancient civilizations or geometry in design and art, and describe examples and exhibits of what you saw, some of their features, why they were built/designed in that manner, cultural influences, etc. Choose at least three exhibits illustrating the theme you have chosen. Draw a picture illustrating your description and the features of that display. What impressed you most about these exhibits?

Theme 3 – Plight of Jews and Jewish Mathematician in the first half of the 20th century (Jewish Museum, walking tour of Berlin, Gottingen readings, Concentration camp visit)
Describe the plight of the Jews in the years leading up to WWII. Name some Jewish mathematicians whose lives were uprooted or impacted by events in Europe during the first half of the 20th century. How did their colleagues respond? What impact did the persecution of the Jews have on mathematics, on society? Throughout Berlin you will see symbolic reminders of the atrocities committed against the Jews and other groups. Describe two symbols or memorials that you saw. What message do they convey?

Theme 4 – Centers of Mathematics (Readings, tour of Gottingen, Euler archives tour – ask questions!) During the 16th century Italy was a center of mathematics for Europe. This center moved to England during the 17th century thanks to the Scientific Revolution and the work of the British Royal Society. In the 18th and 19th century, the main centers of mathematics were again found on the continent, with Berlin and Gottingen being two of the premier mathematical communities. How were these two German centers of mathematics different – what were the specialties of each center, were they pure or applied, were they research or teaching focused, etc.?

Florence

Cultural Report

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Florence

City Report

Florence – the Renaissance

Watch: *Engineering an Empire – Da Vinci's World*
You can access Part 1 of 5 on YouTube: http://www.youtube.com/watch?v=xcorDOxcQRE
Follow the links to watch the other 4 parts.
Perhaps also on Netflix: http://movies.netflix.com/movie/Engineering-an-Empire/70064230

The Day the Universe Change – Episode 3 Point of View
Scientific Imagination in the Renaissance (on reserve in the library or you can watch it on YouTube http://www.youtube.com/watch?v=NWEIZThPaRw
Or Netflix: http://movies.netflix.com/movie/The-Day-the-Universe-Changed/70111629

Preview in class for trip:
Leonardo Museum in Florence:
http://www.mostredileonardo.com/site.asp?idsito=1&idLingua=10&idPagina=3

Other recommended (but not required) videos:
The Early Renaissance Part I: The rebirth of classical themes and humanistic ideas marked the Renaissance in Italy, as seen in Florentines Brunelleschi, Masaccio, Ghiberti, and Botticelli. (1:00-28:35)
The High Renaissance Part I: Da Vinci, Michelangelo, and Raphael displayed extraordinary talent working in a variety of media and elevated the status of the artist in Italian society. (1:00-28:58)
http://www.learner.org/resources/series1.html?pop=yes&pid=230

Read: The Artistic Influence of Italy, Unit 2: Art of the Italian Renaissance
http://www.outreachworld.org/resource_print.asp?curriculumid=1169
And download its lesson plan
http://www.outreachworld.org/Files/IU/Architecture_of_Italy.pdf

Reflect:
1. What factors led to the birth of the Renaissance? Why did it start in Italy?
2. Water played a big role in the prosperity of both ancient Rome and Sienna. How did each of these cities solve their water problems?
3. In 1347 the Black Death struck, wiping out almost half the population of Europe. Describe the effects of this tragedy in terms of the way people viewed life and their financial resources.
4. Who were the Medici?
5. Brunelleschi started out as a goldsmith. What competition in Florence did Brunelleschi lose to Ghiberti? After losing this competition, where did Brunelleschi spend the next two decades? What did he learn there?

6. Brunelleschi comes back to Florence in time to enter the competition for building the dome of the Florence cathedral. What traditional building methods were absent in Brunelleschi's design and methods of building his dome?
7. How did Toscanelli help Brunelleschi with the design of the dome of the Florence cathedral?
8. How did the mathematical technique of single point perspective change art and architecture.
9. Brunelleschi's "dome" was actually two domes. What role did each play? What were the advantages in using such a design? How does this compare with the domes designed by Michelangelo (St. Peter's) and Christopher Wren (St. Paul's Cathedral)?
10. What new machines did Brunelleschi invent to help him build the dome?
Brunelleschi also had to deal with structural issues in building his dome. What kind of a brick pattern did he use to displace the weight of the bricks out and down? Draw a sketch of this pattern. What did he use around the dome to keep it from pushing outward?
9. Brunelleschi is also known as the father of architecture. Why?
10. Who was Savonarola?
11. Why did the center of the Renaissance move from Florence to Rome by the early 16th century?

Some of the innovations of Renaissance art were linear perspective, aerial perspective, chiaroscuro, and portraiture. Look for these in the paintings, sculptures and buildings you will see in Florence, Rome and London. You will be asked to do site reports on some of these. Use the following as a guide. This chart can be found on the site http://www.outreachworld.org/Files/IU/Architecture_of_Italy.pdf.

The Importance of the Artist

Table of Selected Artists from the Italian Renaissance

Artist	Dates	Location	Medium	Description	Selected Works
***Leon Battista Alberti**	1404-1472	Genoa	Architecture, poetry, writing	Architecture ruled by the law of numbers; the Ancient Roman architect Vitruvius influenced Alberti's treatise, *De re Aedificatoria*, in the rightness of proportion and the comparison of buildings and the human body.	The façade of Santa Maria Novella, 1458-1470, Florence
***Fra Angelico**	c. 1387-1455	Vicchio nell Mugello	Painting	The monk's work is flavored by Gothic flatness, but also incorporates the more modeled qualities evident of Masaccio.	Any of the frescoes for San Marcos, Florence. *The Annunciation*, ca. 1449, fresco, San Marco

				Colors are brilliant and sparkle with gold. Fra Angelico's work is rich in spirituality and Christian iconography.	Monastery, Florence
***Botticelli**	1445-1510	Florence	Painting	Created luminous tempera and fresco paintings. The Medicis were prominent patrons, and Botticelli painted *Primavera* to celebrate a Medici marriage.	*Primavera,* ca. 1482 and *Birth of Venus*, ca. 1482; these and Several other Botticelli paintings are in the Uffizi Gallery, Florence. Several others are in the Accademia in Florence. At least one Botticelli painting is in the Basilica of Santa Maria Novella. Some are in the National Gallery in London
***Brunelleschi**	1377-1446	Florence	Sculpture and Architecture	Applied mathematical principles to his architecture, and innovated the use of linear perspective.	The dome for Santa Maria del Fiore, 1420-1426, Florence Basilica di san Lorenzo, Florence Pazzi Chapel, Florence

***Donatello**	1386-1466	Florence	Sculpture	Donatello studied and worked in Florence during the early Renaissance, was friends with Brunelleschi and Michelozzo, was a member in Ghiberti's workshop, and worked for the Medicis.	*David,* c. 1430, Florence, Statue of St. George, Orsanmichele Church, Florence
***Lorenzo Ghiberti**	c.1381-1455	Florence	Sculpture	Originally trained as a goldsmith, Ghiberti became one of the prominent artists of the Renaissance by winning the commission for the Baptistry doors for the cathedral of Florence.	The doors of the Baptistry in Florence: *The Life of Christ,* 1401-1425, Northern Doors; *Gates of Paradise*, 1425-52 Eastern Doors
***Domenico Ghirlandaio**	c. 1449-1494	Florence	Painting	Excellent craftsman, prosperous workshops. Michelangelo trained with him early in his career. He is known for his fresco paintings.	Fresco cycle in Santa Maria Novella in Florence.
***Giotto**	1266/7-1337	Florence	Painting	An artist ahead of his time, Giotto imbued his religious subjects with life by modeling the figures and exploring spatial constructs. He was a student of Cimabue.	*Crucifix*, Santa Maria Novella, Florence Various works in Santa Croce, Florence and in the Uffizi Gallery, Florence
***Leonardo da Vinci**	1452-1519	Florence (Vinci)	Primarily Drawing and Painting	Leonardo is the quintessential Renaissance Man – he was an accomplished artist, musician, scientist, and inventor. His *Last Supper* is often cited as the first work of the High Renaissance.	*The Annunciation*, *Adoration of the Magi, Baptism of Christ* in the Uffizi Gallery, Florence. *St. Jerome in the Wilderness*, Vatican Museum, Rome; *Virgin of the Rocks* and *Virgin and Child with St.*

					Anne and St. John the Baptist in the National Gallery, London; Manuscript: *Codex Arundel*, British Library

***Masaccio**	1401-1428	Florence (San Giovanni di Valdarno)	Painting	Masaccio's work *The Trinity* is said to be the first painting of the Renaissance. He employed principles of perspective invented by his friend, Brunelleschi.	*The Trinity*, 1427, fresco, Santa Maria Novella, Florence *The Tribute Money*, fresco, Brancacci Chapel, Florence
***Michelangelo**	1475-1564	Florence	Sculpture, Painting, Architecture and Poetry	A Renaissance man, Michelangelo could do many things well, but preferred sculpture and was quite a poet.	The *Pieta* (1499) in St. Peter's, the frescoes on the ceiling and front wall of the Sistine Chapel , the dome of St. Peter's; The *David* and *St. Matthew, Palestrina Pieta, the Slave statues* in the Accademia, Florence; Basilica of San Lorenzo, Florence; Piazza del Campidoglio, Capitoline Hill, Rome; *Bacchus,* and *Brutus* in the Bargello, Florence; *Florentine Pieta* in the Museo dell'Opera del Duomo, Florence; Several pictures in the National Gallery, London

Michelozzo	1396-1472	Florence	Architecture	Not quite the mathematical preciseness like Brunelleschi or Alberti, but Michelozzo had a simplicity and an ordering of parts	Monastery of San Marco, Florence
***Paolo Uccello**	1397-1475	Florence	Painting	Early Renaissance artist whose late Gothic influence adds decorative and detailed elements to his paintings	The three panels illustrating the *Battle of San Romano,* National Gallery, London

***Piero della Francesca**	c. 1420-92	Tuscany	Painting	Painted primarily religious works. Skilled in perspective, math, and geometry.	*Nativity and the Baptism of Christ*, National Gallery, London
***Raphael**	1483-1520	Urbino	Painting	One of the main artists of the High Renaissance. It is said that when Raphael died, painting also died, which contributed to the end of the High Renaissance	Numerous depictions of the Madonna; the "Raphael rooms" at the Vatican (the *Stanza*), the fresco of *School of Athens*, 1510-11; Vatican Museum; Other Raphael paintings are in the Uffizi Gallery, Florence and the National Gallery in London
***Giorgio Vasari**	1511-1574 (late Ren.)	Florence (Arezzo)	Architecture, Painting, and Writing	Vasari was a prolific painter and was successful as an architect, but he is best known for his contemporary biography of *Lives of the Artists*.	Artist biographies in the book, *Lives of the Artists;* Uffizi in Florence; *Self-portrait* painting

***Verrocchio**	1435-1488	Florence	Painting, Sculpture, and Architecture	Trained as a goldsmith. Perhaps studied under Donatello, worked with Botticelli, and was teacher to Leonardo da Vinci. Skilled as painter and sculpture.	Painting *The Baptism of Christ*, Uffizi, Florence ; Sculpture *The Young David*, Bargello, Florence; *Christ and St. Thoma*s, Orsanmichele, Florence
* artists in Vasari's *The Lives of the Artists*					

Florence

Site Report

Theme 1 – Influence of the Renaissance on art and architecture
Pick three examples of art, architecture or inventions that you saw in Florence that that illustrated the profound effect the Renaissance had on Florence. What discoveries in mathematics or science, or changes in worldview, contributed to their creation?

Theme 2 – City states and rulers
Look around the main piazza in Florence, the Piazza della Signoria. What buildings, statues and monuments do you see? You will hear and see the name Medici often during your time in Florence. Which of these buildings were connected with the Medici? What influence did the Medici have on the development of art, architecture and science? You read about the importance of water to the growth and sustainability of a city. How many water fountains do you see in Florence? Later on you will compare this to what you see in Rome.

Theme 3 – Galileo, Leonardo da Vinci and Michelangelo
You will see several examples of the work of these Renaissance artists and scientists. Choose one of these men and 3 examples of their work. What was special about these works? How did they reflect the culture of the Renaissance in terms of discoveries, worldviews, politics and religious beliefs?

Rome

Cultural Report

As we travel from country to country you will see many cultural aspects that seem familiar to you – we are going to Western Europe after all – but also some that will seem somewhat unfamiliar. I also want you to pay attention to changes from country to country.

Cities:
Describe things you observed about the city itself. Things to consider are the following: Layout of the city, the roads/streets, parks, placement of signs, neighborhoods, monuments, types of buildings and architecture, residential vs. commercial, what kinds of stores and items in the stores, transportation system, ebb and flow of traffic and what kind of traffic – public/private, etc. Feel free to add more to list depending on what you notice.

People:
Different nationalities, dress code, gestures, eating practices, behavior on public transportation, facial expressions, dialogues between people, behavior between patrons and shop owners/restaurant staff, etc. Again, feel free to add more items to the list depending on what you observe.

Free time:
Describe a cultural activity – play/music event/site-seeing that you did in your free time. Why did you choose this? What did you gain from the experience?

Churches:
Look for religious symbolism as you walk around the city; read billboards of churches – what are they promoting? Where are the churches located? What types of churches do you see?
Attend a church service. How is the church service you attended different from what you have experienced or might see in America? What kind of religious symbolism is within the church?

Eating:
What kinds of eating establishments did you see around the city? Which seem to be the most popular? Who are the clientele of the different eating establishments? Which seem to be the most popular hours to eat? Where did you eat and what type of cuisine did you have?

Rome

City Reports

Ancient Rome

Watch: The video *Engineering an Empire: Ancient Rome*
You can obtain this video from me (I have 2 copies) or watch it on YouTube:
http://www.youtube.com/watch?v=o3v3GfLnQX8 (This is the first of 10 parts – follow links to the other parts. I want you to watch all 10 parts)
Or Netflix http://movies.netflix.com/movie/Rome-Engineering-an-Empire/70077781

Read: The Artistic Influence of Italy, Unit 1: Architecture of the Roman Empire
http://www.outreachworld.org/resource_print.asp?curriculumid=1169
And download its lesson plan
http://www.outreachworld.org/Files/IU/Architecture_of_Italy.pdf
Ancient Rome (from History Channel topics) http://www.history.com/topics/ancient-rome

Respond:
1. The Romans were borrowers. Give examples of what kind of technology/ideas/art the Romans imported from others.
2. Why are the roads of the Appian Way dead straight?
3. What were some of the characteristics of Roman style cities? How did Roman style cities help Roman's expansion of its culture?
4. How was Roman concrete different from other concrete? How did it change building?
5. Describe the Roman system of water distribution.
6. One famous Roman architectural innovation was the arch. What was the advantage of using arches in building?
7. Where did Vespasian build the Coliseum? What statement was he making in building the Coliseum? What kinds of events were held in the Coliseum? Describe some of the design elements of the Coliseum. What was the hypogeum?
8. Trajan designed and built a new forum. What challenges did he face in its building? What parts of that forum are left today (you will see this in Rome)?
9. Who built the Pantheon? What was it used for? What is it used for today? Who is buried there? Describe some engineering issues with building its dome. Draw a sketch of the Pantheon (see The Artistic Influence of Italy webpage) with its exterior features labeled, and then a sketch of the interior of the Pantheon. Look for these architectural features when you visit the Pantheon in Rome.
10. Draw a sketch of the three types of Greek columns – Doric, Ionic and Corinthian. Which type is used in the Pantheon? Look for other examples in Rome.

Rome – the High Renaissance

Watch: Engineering an Empire: Da Vinci's World (Pt 5 of 5)
http://www.youtube.com/watch?v=TJLBPLIEja8
St. Peter's Basilica – video (9 minutes 21 seconds)
www.worldsiteguides.com/europe/italy/rome/st-peters-basilica/video
Sistine Chapel Visual Tour: http://www.vatican.va/various/cappelle/sistina_vr/index.html

Read: History of St. Peter's Basilica:
http://www.worldsiteguides.com/europe/italy/rome/st-peters-basilica/
Respond:
1. What is a basilica? What was a Roman basilica used for? Draw a floor plan for a Roman Basilica. (Note: In the Roman Forum you will see the Basilica Julia and the Basilica of Maxentius and Constantine.) How was the basilica adapted for Christian use? Draw a floor plan on a Christian Basilica.
2. When was the first St. Peter's Basilica built? Who built it? Give the time period over which the second St. Peter's Basilica was built. Who were the main popes involved in its building? Name some famous artists who worked on St. Peter's (the building itself or interior artwork) and describe their contributions.
3. What is the significance of the obelisks you see around Rome?
4. Explore the frescoes of the Sistine Chapel using the Sistine Chapel Visual Tour. What Bible stories and figures do you see? Compare the size of the figures on the ceiling – are they all equally visible? When was the ceiling painted? When was the Last Judgment fresco painted?

Download: the following podcasts to bring with you on the trip:
Sr. Wendy's Audio Guides: (You can find the link to these of the website:
http://saintpetersbasilica.org/People/SrWendy/VaticanoAudio.htm
St. Peter's Basilica:
http://saintpetersbasilica.org/People/SrWendy/27%20st%20peter's%20square%20&%20colonnade.mp3
http://saintpetersbasilica.org/People/SrWendy/28%20inside%20st%20peter's%20basilica.mp3
Rick Steves' podcasts : http://www.ricksteves.com/news/audio-tours.htm
Download the ones for Rome and Florence, including the Jewish Ghetto Walk

Rome

Site Report

Theme 1 – Ancient Engineering Wonders (Pantheon, Roman Forum, Coliseum)
Choose one of the following – the Pantheon, buildings in the Roman Forum, or the Coliseum – and unique aspects of Roman engineering inherent in its construction. Describe any architectural, engineering, or design features that impressed you. What message(s) was each of these constructions conveying about the role of Rome in the empire?

Theme 2 – Water
Compare the availability of public water – drinking fountains and public fountains – in Rome with Florence. What factors contributed to this difference? How did it effect the impact that each could have in terms of population and empire building?

Theme 3 – St. Peter's and Christendom
Compare your drawing of a Roman basilica and a Christian basilica (pre-reading assignments) with the floor plan of St. Peter's Basilica. In your London site report you compared the designs of St. Paul's and Westminster Abbey and described the worldview each represented. Now do the same for St. Peter's. Name some of the design features of St. Peter's, describe its artworks, monuments and side altars. What values are being promoted?

Theme 4 – Domes
You have seen 4 famous domes – the dome of St. Paul's Cathedral, the Duomo in Florence, the Pantheon in Rome and now St. Peter's dome. How are these domes related (think about the architects)? What engineering tricks were used in the construction of each?