What were they thinking? Landmarks and mathematics

Investigation Brief:

The famous human-made landmarks of the world include amazing structures such as The Taj Mahal, The Eiffel Tower, The Sydney Opera House, The Pyramids, The Burj Al Arab, The Great Wall of China, Stonehenge and the Heads of Easter Island.

What were they thinking?

Imagine you were one of those people asked to design a famous structure or a monument that had to last for generations. Some of the thoughts in your head may have been about the purpose, the materials, the money, and the location. At some point as a designer you would have had to engage with the mathematics of your project. For example you may have thought about:

1. geometry (the shape and structure of the monument's elements)
2. measurement (the dimensions, the area and perimeter involved in selecting materials, the angles, the factors related to temperature)
3. probability (the risk of natural or human-made disaster)
4. estimation (the number of human hours needed to complete the task, the cost of labour and other resources, the wear and tear over time)

Investigate three famous human-made landmarks from a mathematical perspective. Select landmarks from different continents and with different purposes. Try to get "inside the head" of the original designers and research the landmark thinking about the areas of mathematics involved in the design.

Keep a mathematics journal (paper, scrapbook or digital such as blog/wiki) as you conduct your research: notes and calculations, sketches, photos, articles, links, thoughts about what maths the designers may have been considering.

Your investigation may lead to a more specific interest such as bridges, historical Asian structures or skyscraper design or the work of a particular architect.

Resources:

- internet access
- other resources on architecture or building design
- calculator

Prompts and Suggestions

Visit some websites such as:
http://designlike.com/2011/12/05/100-most-famous-landmarks-around-the-world/
http://www.hongkiat.com/blog/awe-inspiring-landmarks-around-the-world/
or spend some time on Google-Images looking at the shape and lines within famous landmarks

How is the purpose for the structure reflected in its geometry?

Does the "Golden Ratio" play a role in the designs you are investigating?

Create a 3-D replica, to scale, of a landmark that interests you.

Create a graph of the tallest buildings over the past 100 years and investigate how their design has changed.

Images and Links

What if a whole bunch of landmarks were all in the same place?

Can you identify them all?

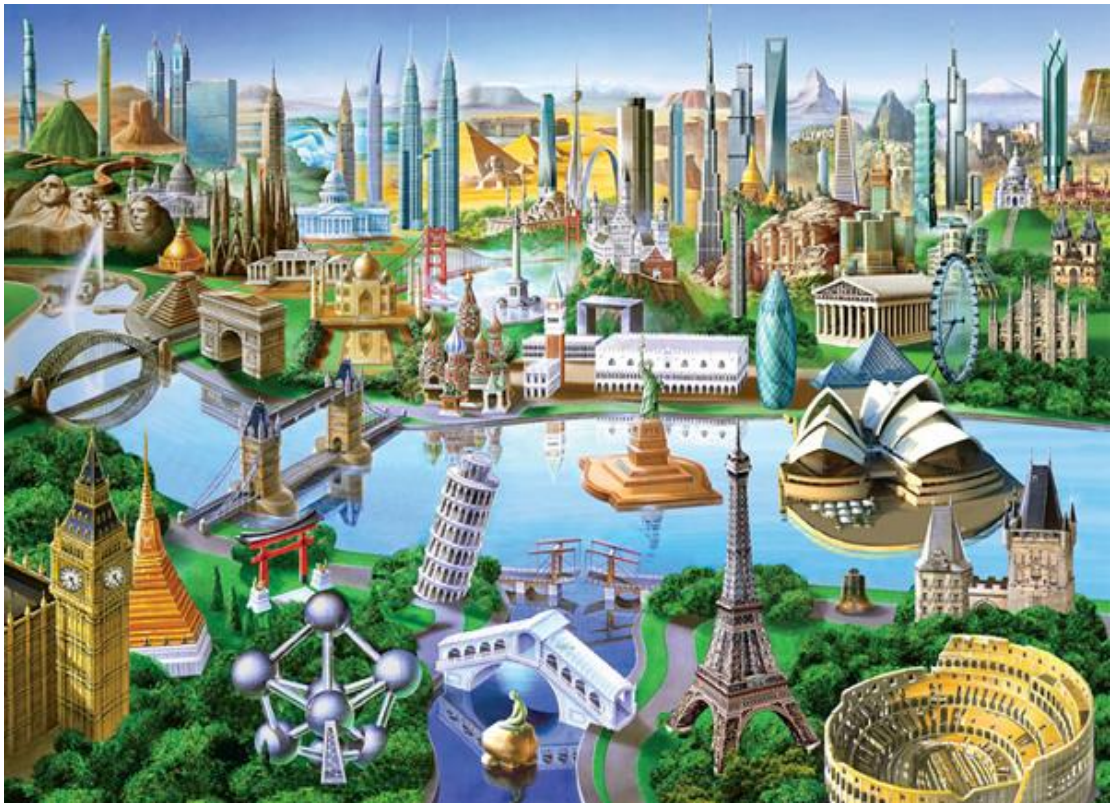

Image accessed from:
http://www.puzzlewarehouse.com/Landmarks-of-the-World-Luggage-Edition-71267mp.html