



# Silk Road

**Bianca Elliot**

Silk Road - Tiles  
High School

## Goals and Objectives

The student will be able to:

- Identify the location of Burkhara, Uzbekistan.
- Identify what is a Madrasa.
- Identify the purpose of a Madrasa.
- Identify the different patterns in the Madrasa in Burkhara, Uzbekistan.
- Discuss the purpose(s) of such work.
- Create his/her own façade of a building.

## Curriculum standards addressed

Geography:

The student uses a working knowledge and understanding of the spatial organization of Earth's surface and relationships between peoples and places and physical and human environments in order to explain the interactions that occur in Kansas, the United States, and in our world.

Places and Regions:

The student analyzes the human and physical features that give places and regions their distinctive character. Indicator 4: uses regions to analyze past and present issues to answer questions.

World History:

The student uses a working knowledge and understanding of significant individuals, groups, ideas, events, eras, and developments in the history of Kansas, the United States, and the world, utilizing essential analytical research skills. Benchmark 5: The student engages in historical thinking skills. Standard 3: uses primary and secondary sources about an event in world history to develop a credible interpretations of the event, forming conclusions about its meaning.

## Time required/class periods needed

Two to three 47 minute classes or One 90 minute class



# Silk Road



# Silk Road

## Primary source bibliography

Tiles of Infinity by Sabastian R. Prange in Saudi Aramco World, 2009, 60(5). Pages 24-31

## Other resources used

Math teachers

Art teachers

## Required materials/supplies

Copy of the article

Internet connection for additional examples and place images

Examples of additional Islamic art

Possibly, other examples of similar tile art

## Vocabulary

Golden ratio

Decagon/decagonal

Euclid

Algebra

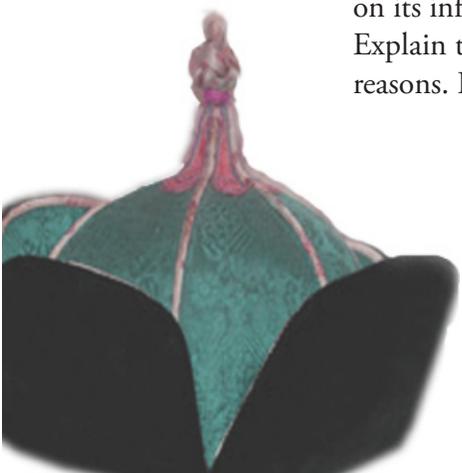
Fibonacci numbers/pattern

Sufism

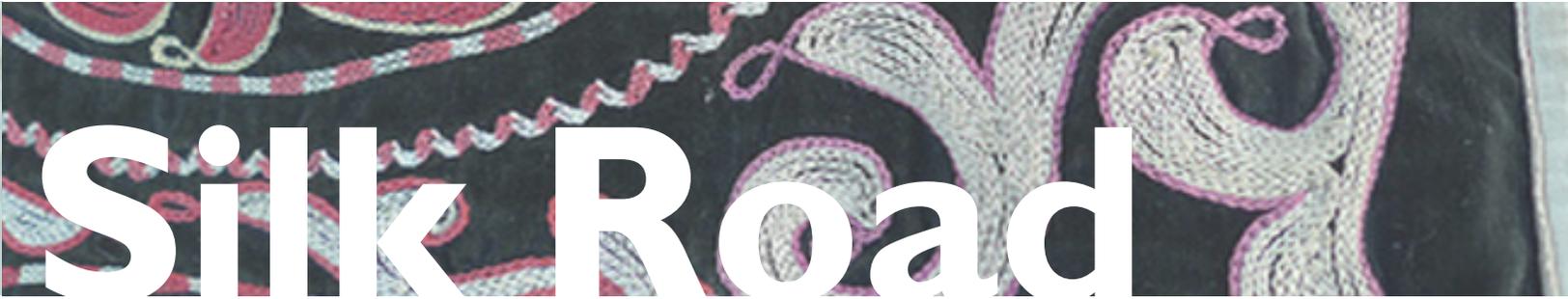
## Procedure

1. Have students locate Asia on a map. Then have the students find Uzbekistan on the map (may want to use Google Earth). Then have the students find Bukhara in Uzbekistan. Have them note which of the Silk Road Routes this city is located on and the terminal destinations in both directions. Discuss the region regarding the climate, people, and culture(s). Have the students indicate on a map the city and the route.

2. Ask the students what they know about Islam. Ask if this religion was in this city during the Silk Route period. Discuss the dates of Islam in the area. Ask how a culture passes on its information and culture/religion to the next generation. Ask if schools are universal. Explain that Islam has schools and they are called Madrasas and are in the news for various reasons. If time permits, discuss additional purposes and rules for a typical Madrasa.



# Silk Road

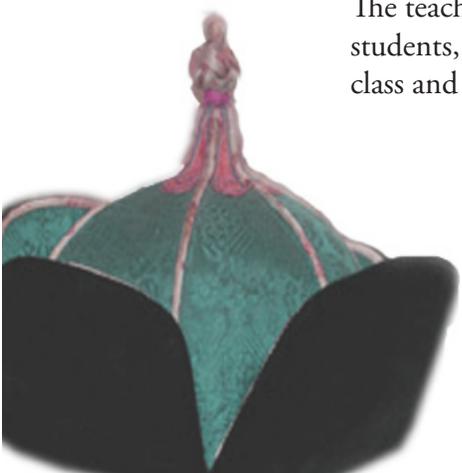


# Silk Road

3. Ask the students what they know about Geometry and Algebra. Let them know that Algebra is from Islam. Remind them that Geometry is all around them. Ask students to identify how Geometry is in the room they are in and the buildings around them. Explain that this lesson will be about Geometry, Islam, and Art.
4. Show the students examples of tile formations from around the world such as on many buildings and floors in Spain (Córdoba). (If your region has quilts, they may be used in lieu of or in addition to this section.) Have them see if they can detect any patterns to the works they are looking at. Help them to see that the patterns may cover more than just a few tiles.
5. Discuss symmetry and the words “golden mean.” Ask them to define that for the others. Ask if they see any evidence for a golden mean in the works so far.
6. Show the madrasa in Bukhara and have the students observe these walls for patterns. Assure them there are patterns...kites and darts for example. Show them the outlines of the five and ten pointed elements in the madrasa. Mention that there are additional patterns such as pentagons, hexagons, rhombus and a “bowtie.” Remind the students that these mathematics were used in the 1500s and were used in buildings all over Europe and the Middle East. Also, remind the students that Euclid’s geometry was taken to the Middle East, translated into Arabic, and around 830 AD the work was used to create Algebra by the Muslims. It would be important now to mention that Arabic numbers came to Europe from North Africa to a person in the 13th century known as Leonardo de Pisa (Fibonacci) who also then made a theory known as Fibonacci numbers.
7. Have the students take a few moments and design their own patterns that must be of several geometric forms to generate a larger pattern. Have the students color the items in such a way that the patterns are not easily recognizable. Ask if the colors and materials are available in the city/region where this discovery was made. Mention that perhaps the Silk Trade helped to provide the materials and share the information of how to make these patterns with the world.

### **Assessment/evaluation**

The teacher may use teacher observations, notes on the materials, maps generated by the students, and/or the final product of a geometric model using the material presented in class and referring to the specifications of the region and time/culture of the period studied.



# Silk Road