

The background image shows a highly detailed ceiling with intricate Islamic geometric and floral patterns. The design features large, interlocking star and polygonal shapes in shades of blue, green, and gold. A large, ornate chandelier with many crystal prisms hangs from the center of the ceiling. A semi-transparent circular overlay is positioned on the right side of the image, containing the title text.

**DESIGNING THE WORLD
AROUND ME:
MATHEMATICS AND CULTURAL
INSPIRATION IN DESIGN**

Imagine you are a designer of the future ...



Image credits: User:Vmenkov [CC BY-SA 3.0
(<https://creativecommons.org/licenses/by-sa/3.0/>)]
https://commons.wikimedia.org/wiki/File:Wuhan_-_Future_City_-_Area_G_-_P1530366.JPG

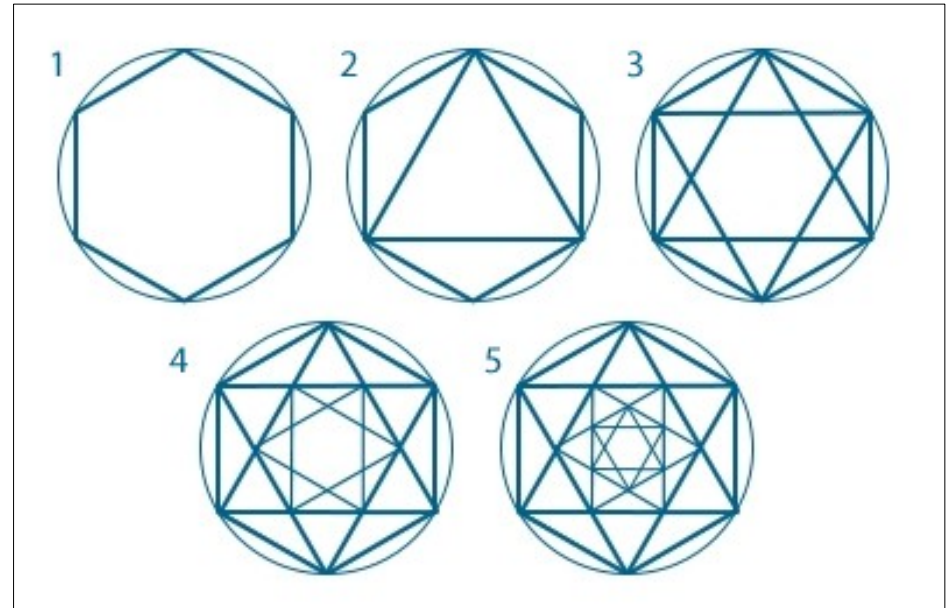
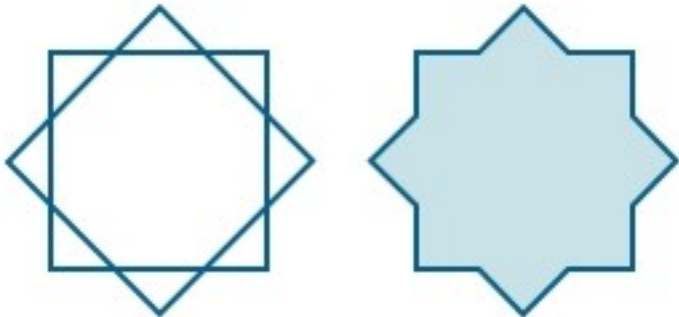
... you need to combine
a feeling for what is
beautiful with an
understanding of
mathematics ...

... watch [Ars Qubica](#)
movie ...

Start with ... a circle and some regular polygons

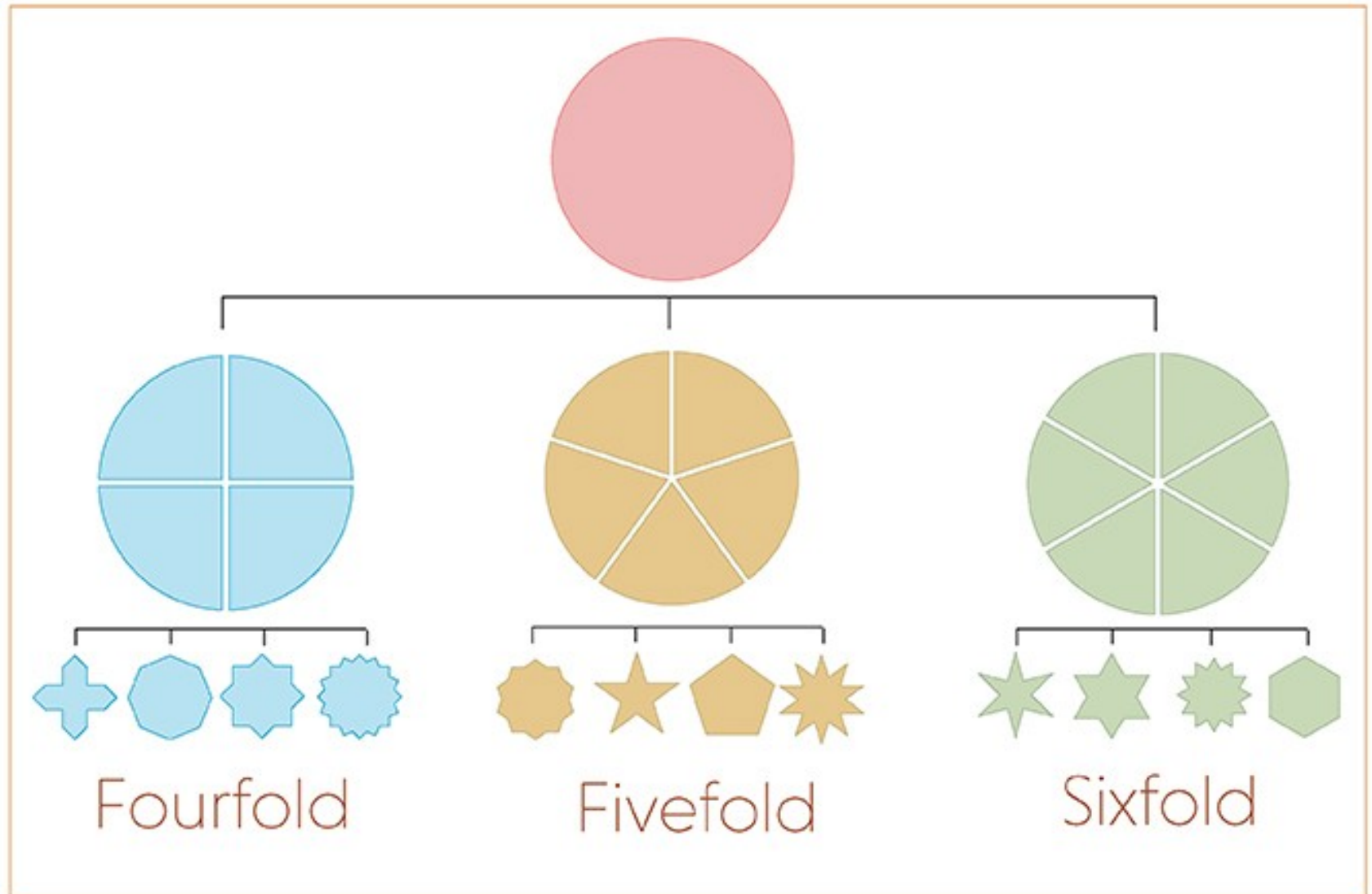


Combine them:



Pupils can choose to erase the lines in the centre if they wish.

Islamic Geometric Family Tree



Tiling with five fold symmetry

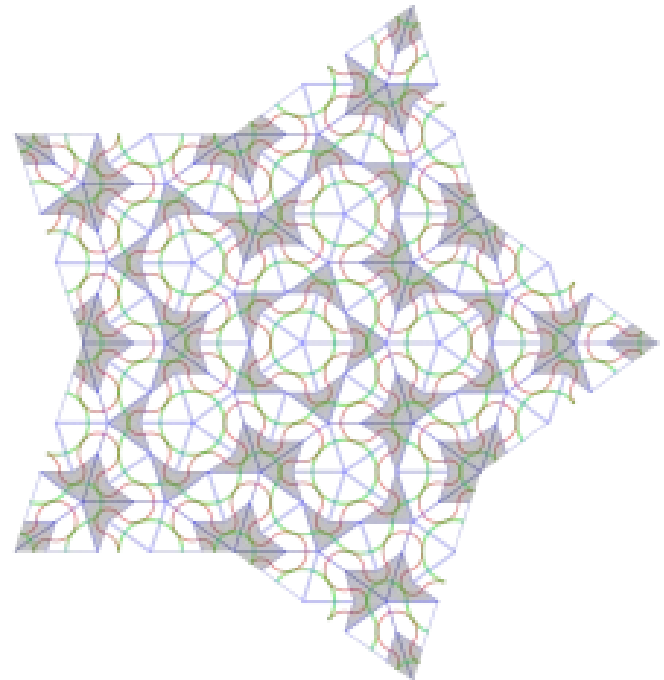
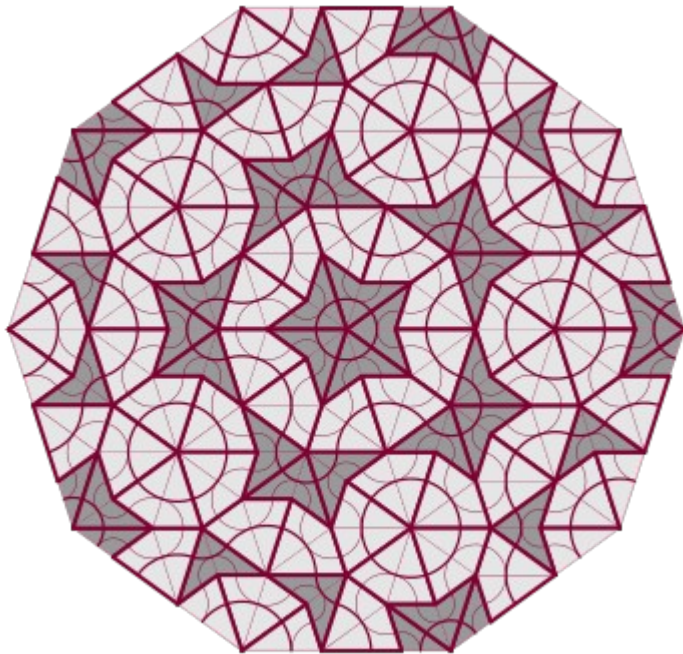
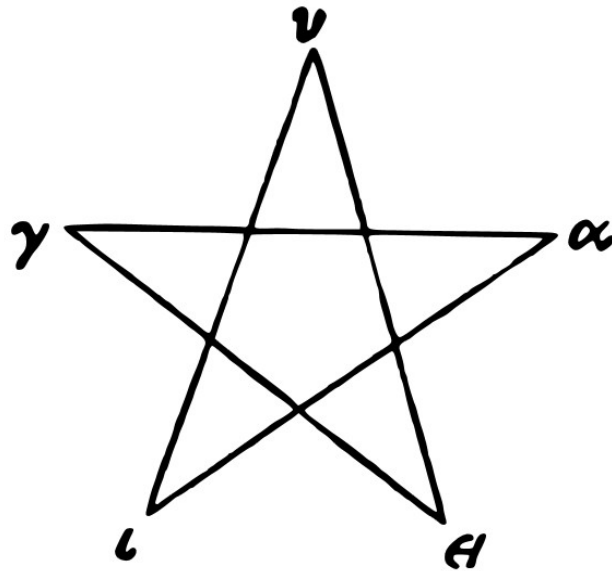


Image 1: https://commons.wikimedia.org/wiki/File:Penrose_sun_3.svg

Image2: https://commons.wikimedia.org/wiki/File:SSS_Penrose_tiling,_4iter,_star.svg

The pentagram

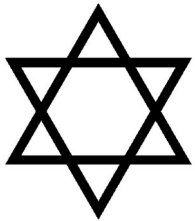
The pentagram has been used by many different peoples as a symbol of significance. It is said to have been used as a sign of recognition by the Pythagoreans.



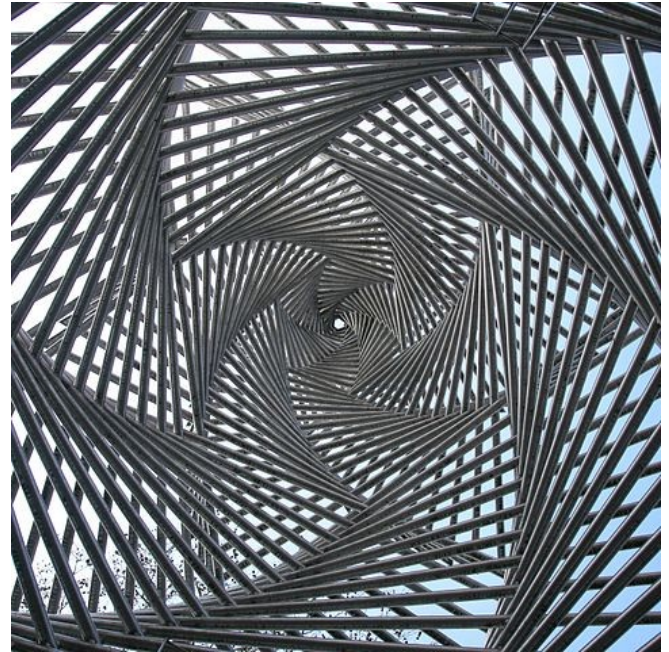
A Pythagorean "[Hugieia](https://commons.wikimedia.org/wiki/File:Hugieia-pentagram.svg) Pentagram"

Symbols (1/5)

Jewish Religious Symbol-
the Star of David



[Anemone coronaria](#) with 6
petals creating [Star of David](#)



Inside the memorial at the
site of the former Synagogue
in [Göttingen](#), Germany

Image:

<https://commons.wikimedia.org/wiki/File:StarofDavid.png>

Image:

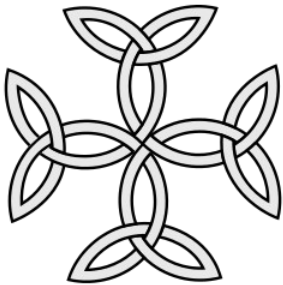
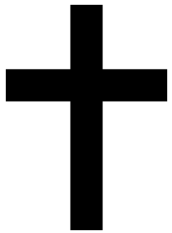
<https://commons.wikimedia.org/wiki/File:Calanit006.jpg>

Image:

https://commons.wikimedia.org/wiki/File:Goe_Platz_der_Synagoge_Detail_2.jpg

Symbols (2/5)

Christianity Cross



Carolingian Cross -
represents unity,
balance and the
eternity of God.



Christian hospital,
tiled cross symbol

Image 1:

https://commons.wikimedia.org/wiki/File:Christian_cross.svg

Image 2:

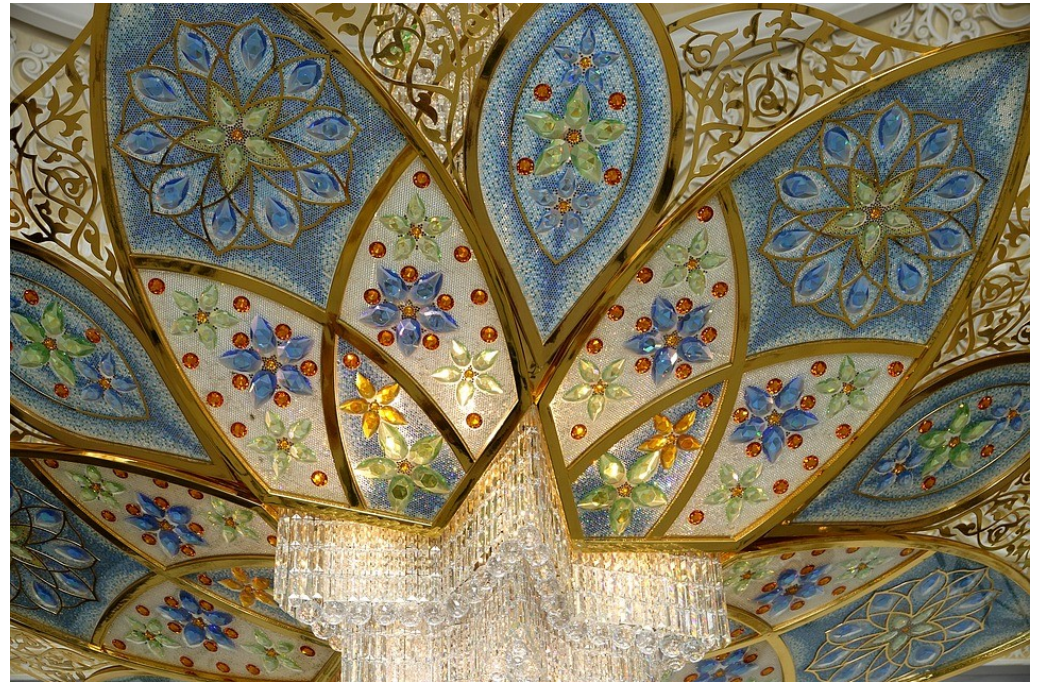
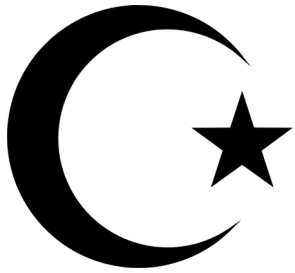
https://commons.wikimedia.org/wiki/File:Carolingian_Cross_Carolingian.svg

Image 3:

https://commons.wikimedia.org/wiki/File:Christian_hospital,_tiled_cross_symbol,from_Mr._Isa_Bahadori_works_in_Isfahan..JPG

Symbols (3/5)

Islamic Crescent moon



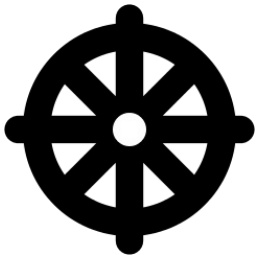
Mosque Abu Dhabi UAE Islam

Symbols (4/5)



Yin-Yang

The **yin**, the dark swirl, is associated with shadows, femininity, and the trough of a wave; the **yang**, the light swirl, represents brightness, passion and growth.



Dharmachakra (Dharma wheel) – used in Buddhism

– a symbol of the ideal kingdom

"Truth Alone Triumphs"



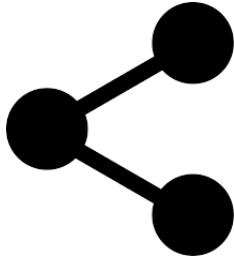
Fleur-de-lis (flower-de-luce/ lily)

The three leaves represent the medieval social classes:

- those who worked,
- those who fought
- those who prayed.

It is especially used by the knights in Europe.

Symbols (5/5)

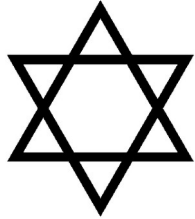


Share symbol - used on the internet to identify shareable content. It aims to convey the act of sharing visually by representing one hand passing an object to another hand, while also representing an eye looking on.

Triskelion - an ancient Celtic symbol found in many places including Malta (4400-3600 BC) and Ireland (around 3200 BC). It represents many things of a triple nature: for example the movement of life which is formed of past, present and future.



Combinations of symbols



Star of David (or Shield of David)

The two interlocking triangles could represent the reciprocal relationship between human being and God.



Fleur-de-lis – three social classes



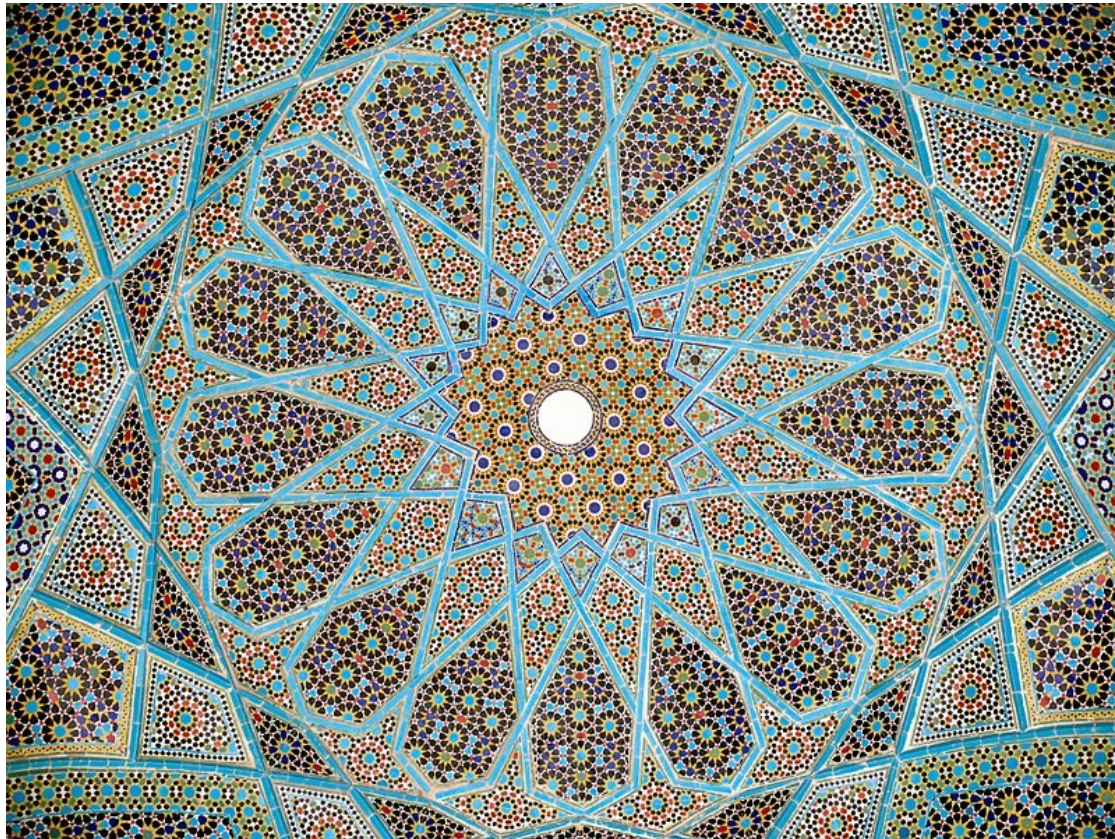
Tiles in St Peter's Church, Wallingford

Image 1: <https://commons.wikimedia.org/wiki/File:Starofdavid.png>

Image 2: https://commons.wikimedia.org/wiki/File:Lilie_stilisiert_2.svg

Image 3: <https://medievalmosaic.com/wp-content/uploads/2017/11/Dsc08386-1.jpg>

Medieval Islamic tiling reveals mathematical savvy



See the article by Jeff Hecht on: NewScientist.com

<https://www.newscientist.com/article/dn11235-medieval-islamic-tiling-reveals-mathematical-savvy/>



Detail of dome of the
Shrine of Shah Nematollah Vali

Girih designs are
assembled from five
regularly shaped tiles,
including:

a bowtie shape,
a rhombus,
a pentagon,
an elongated hexagon,
and a decagon.

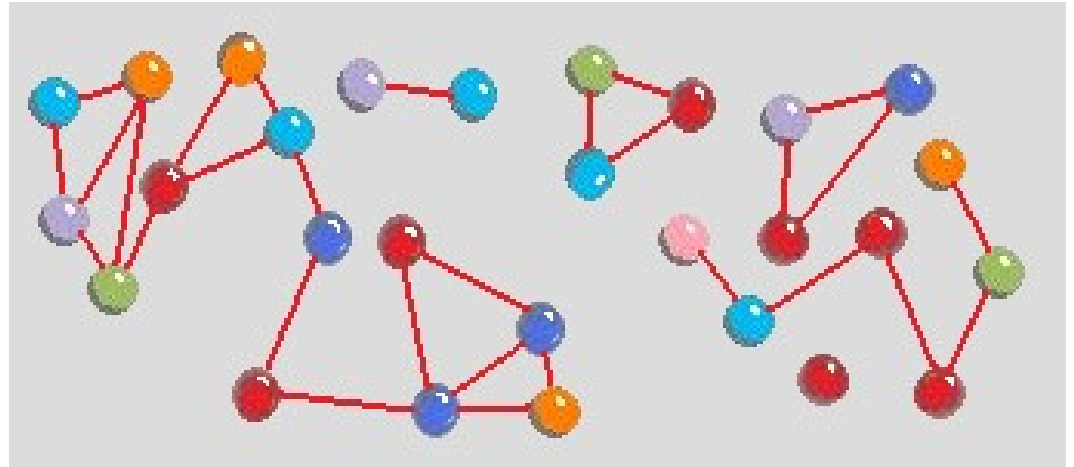
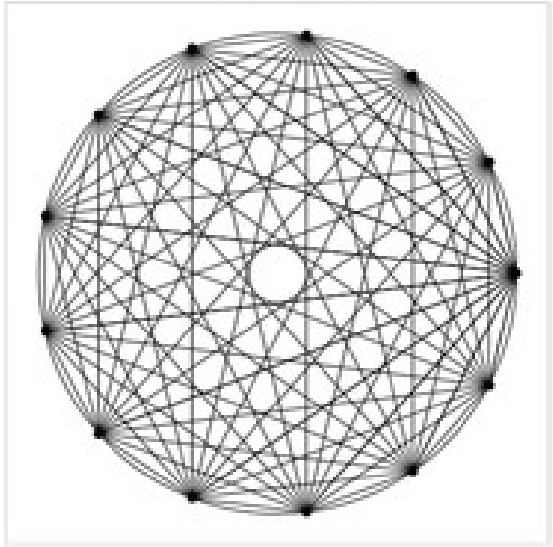
*Can you spot any of these
in this pattern?*



*Look for tiling patterns
in the environment.*

*Take photographs to
share and discuss the
mathematical properties
of the tilings you have
found.*

Tile floor from Museo Arqueológico de Sevilla, Spain.
Semi-regular Tessellation.



These two images could represent a social world.

<https://demonstrations.wolfram.com/TheMysticRose/>

Michael Croucher CC BY-NC-SA

https://en.wikipedia.org/wiki/File:Network_self-organization_stages.png Takemori39