



# ART AND MATHS

IN THE COURTAULD COLLECTION  
LEARNING RESOURCE



# GALLERY LEARNING

TALKS AND WORKSHOPS FOR SCHOOLS AND COLLEGES AT THE COURTAULD GALLERY



## GALLERY TOURS

Interactive and exploratory Gallery tours introduce students to key works from the collection.

Gallery tours explore particular themes, including:

- Approaches to Colour • Storytelling in Art
- Impressionism & Post-Impressionism • Materials & Processes • Landscape • Portraiture & Identity
- The Courtauld Collection Gallery Highlights.

Our tours can be individually tailored to fit with your students' current study theme and curriculum.



## DRAW & TOUR WORKSHOPS

Led by experienced artist-educators students will investigate different ways of looking, recording, and questioning works in the Gallery and will be introduced to a variety of drawing techniques in response to what they have seen.

Draw and Tour themes include:

- Approaches to Colour • Portraiture • The Body in Art
- Impressionism & Post-Impressionism • Landscape.

Materials are provided, but we encourage students to bring their own sketchbooks.



## ART & SCIENCE WORKSHOPS

This fascinating workshop combines the subjects of Art and Science to give students a greater understanding of the materials and processes used in art across the centuries. Students will learn how artists from the past created pigments, and how recent scientific developments such as infra-red and x-ray can help us to better understand paintings.



## OUTREACH PROJECTS

We offer a range of bespoke outreach projects for schools with a higher than average number of pupils on free school meals. A visit to The Courtauld Gallery will be the starting point for students to explore themes within our permanent collection or one of our temporary exhibitions. This is followed by a series of practical workshops in school where our artist-educators work closely with teachers to help students to extend and develop their skills.

## BOOKING INFORMATION

Email: [education@courtauld.ac.uk](mailto:education@courtauld.ac.uk)  
Telephone: 020 7848 1058

Advance booking is essential. State school bookings are free of charge. Independent schools are required to pay a fee to cover the basic costs.

# INTRODUCTION

The Courtauld Gallery's world-renowned collection includes Old Masters, Impressionist and Post-Impressionist paintings, an outstanding prints and drawings collection and significant holdings of Medieval, Renaissance and Modern art. The Gallery is at the heart of The Courtauld Institute of Art, a specialist art history college of the University of London, and is housed in Somerset House. Our learning resources are based on The Courtauld's art collection and are informed by the expertise of our students and scholars.

**Henrietta Hine**  
HEAD OF PUBLIC PROGRAMMES

The starting principle of *Art and Maths in The Courtauld Collection* was that art and art appreciation do not exist in isolation but are connected to other disciplines, and the belief that they enrich one another. As a Learning Department working within both a Museum and a University specialising in the History of Art, we are committed to showing how visual analysis, inquiry and research can be linked to a wide range of subjects in school. This learning resource has been created in order to identify the clear and fascinating connections between The Courtauld's Islamic metalwork and Italian Maiolica ceramic collections and mathematics.

**Stephanie Christodoulou**  
PROGRAMME MANAGER  
GALLERY LEARNING

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To book a visit to the gallery or to discuss any of the education projects at The Courtauld Gallery please email: [education@courtauld.ac.uk](mailto:education@courtauld.ac.uk) or telephone: 0207 848 1058

#### COVER IMAGE:

Bowl-shaped box and cover, Iran or Turkey, about 1400  
Brass with silver inlay, 8.2x 15.5cm

#### BACK COVER:

Workshop of Giorgio Andreoli, Moulded dish with pine-cone design, about 1530  
Lustrated earthenware, 28.2cm

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# CROSS-CURRICULAR LINKS

## MATHS

### Measurements

- Use measuring instruments with accuracy
- Calculate the perimeter of rectilinear shapes
- Convert between different units of measurement and round numbers
- Calculate the area of rectangles and squares
- Calculate the areas of triangles and parallelograms
- Understand the principle of ratio in relation to scale drawings

### Geometry – properties of a shape

- Explore a range of 2D and 3D shapes
- Recognise and label lines of symmetry in shapes and patterns
- Appreciate angles as properties of shapes and make deductions about missing angles
- Draw given angles and measure them in degrees
- Distinguish between regular and irregular polygons
- Illustrate and name parts of circles

### Geometry – position and direction

- Analyse and describe linear sequences used to construct patterns
- Identify and count rotations in patterns
- Produce reflections and other translations in lines that are parallel to the axis
- Describe and build simple 3D shapes, including working with nets

## ART & DESIGN

### Materials and processes

- Use a range of materials creatively to design and make products, with a focus on surface design and pattern
- Use geometry as a basis for composition
- Improve control of art and design techniques through 2D and 3D experimentation

### Artists and craftspeople

- Explore the work of artists and craftspeople of different cultures, making comparisons across different countries and time periods
- Describe similarities and variations between distinct practices and disciplines
- Learn about important artists and designers in history

### Sketchbook development

- Record observations. Review and revisit ideas
- Develop a wide range of art and design techniques in using colour, pattern, texture, line, shape, form and space
- Curate and present artworks. Make links with other students' work.

\*Many of these activities relate to learning objectives for students in Upper Key Stage 2.

### ADDITIONAL LINKS

- Geography
- History
- Religious studies
- Science

IMAGE 1 (top of bag): Metalwork bag, Mosul, Iraq, Early 14th century  
Brass with gold and silver inlay, 13.5x 19.2x 15.2x 22cm





# 1: THE COURTAULD ISLAMIC METALWORK AND ITALIAN MAIOLICA COLLECTIONS

Stephanie Christodoulou in conversation with Dr Alexandra Gerstein  
Curator of Sculpture & Decorative Art, The Courtauld Gallery

1. This pack specifically seeks to identify the connections between The Courtauld Islamic and maiolica collections and maths. As the Learning Manager at the Gallery, it was important for me to make the connection that the subject of art does not exist in isolation but is connected to other disciplines.

I feel exactly the same, and that interconnection between disciplines is what I often try and show when displaying these objects in the Gallery. This can be done for example by explaining the uses of many of these beautiful objects – to wash hands before a meal, to dispense medicines in a pharmacy, or simply to be arrayed with other similar objects on a buffet to show off the wealth and good taste of their owner. It's always interesting to relate the decoration of what were in effect luxury items of the Renaissance – expensive non-essentials such as decorative ceramics, metalwork, glass or even painted bridal chests – to other objects made at the time. It is also notable that examples of maiolica (the name for Italian Renaissance ceramics) and Islamic metalwork often appear in the elegant and rich interiors depicted in paintings of the period.

One of the fascinating aspects of the decorative arts is the apparent universality of these decorative themes. Leaves and petals can be stylised and abstracted mathematically into a kind of decorative language which becomes embedded in that culture. The repeated use of compositions inspired by nature – fruit, flowers, vegetation – is something you find equally on works in various media – a dish, a jug, a frame, and often in the architectural decoration of the period.

## 2. How did we come to acquire our Islamic metalwork and maiolica collections?

The collections came to us in 1966 through the bequest (gift made after death) of the grandson of Thomas Gambier Parry (1816-1888), a British artist and collector who had a passion for what at the time were known as the 'early' periods of the Italian Renaissance. Gambier Parry was also a watercolourist and the inventor of a technique of wall painting which imitated Italian fresco painting. He collected works in various materials; most prominently he acquired significant groups of Italian Early Renaissance gold-ground paintings, delicately carved medieval ivories from Northern Europe, maiolica as well as Spanish lusted pottery (image 3) and Ottoman ceramics from the town of Iznik, and, most unexpectedly perhaps, a stunning group of Islamic metalwork comprised of over 20 pieces of brassware, some of it extraordinarily precious and rare.

The latter group may seem strange considering the rest of his collection was entirely European but, in fact, it

made sense for the period. He admired their decorative logic and technical skill – both qualities he thought could serve as models for the Victorian craftsmen of his day. Also, at the time he acquired his metalwork these pieces were widely thought to have been made by Muslim craftsmen living in Venice. That theory was abandoned in the 1970s and now it is thought the pieces were mostly made in modern-day Syria, Egypt, Iran and Iraq, and around Turkey.



IMAGE 2: Zain al-Din, Bucket, Iran, Turkey or Egypt, 15th-16th century, 1475-50  
Brass with silver inlay, and later handle, 11x 23.1x 22.7cm



IMAGE 3: Dish with raised boss of concentric rings, Spain (Manises or Valencia), 1500-25  
Lusted earthenware, 47.5cm

### 3. What is so unique about The Courtauld metalwork bag?

Often a question like this leads to qualifications such as 'it's the largest of its kind' or 'it's the best of its kind,' but with The Courtauld metal bag we can safely say that it is the only one of its kind known (image 4). There is no other metal inlaid bag known and because of this its function has been a mystery for many years, until we staged an exhibition at The Courtauld called 'Court and Craft', where we argued that this bag was made in imitation of a textile or leather bag made for a high-ranking noblewoman of the **Il-Khanid dynasty** (1256-1335), which ruled Persia and neighbouring territories as part of the vast Mongol Empire. In fact, the kind of ceremony at which she may have used the bag is depicted on its lid (page 1) which shows a banqueting scene with an important (probably regal) couple in the centre, with attendants to either side offering all kinds of delicacies and helping with the festivities. An attendant standing near the woman carries a bag, presumably in reference to the metal bag itself.

### 4. As a Curator you not only display and research parts of the collection but you are also responsible for caring for the collection. Have the objects we explore in this pack been cared for in any particular ways?

One of the most gratifying aspects of my job is to work in collaboration with conservators on cleaning and repairing the objects in my care. Sometimes the intervention is so minimal that you can hardly notice it – such as surface cleaning of ceramics – but sometimes it makes a radical difference. This was the case with The Courtauld metal bag. It was cleaned in 2013 by a very experienced metals conservator who has worked on the nation's most important and precious objects at the Victoria & Albert Museum and at Westminster Abbey (she prepares the silver for royal occasions such as the last Jubilee). The bag had last been treated about forty years earlier when it had been lacquered with a product to keep it clean – quite common at the time. Over time, and because the lacquer was well past its shelf-life, small gaps occurred and those open areas attracted corrosion. The lacquer had also become dark and brittle. In-fact the surface had become so dark and dingy that visitors to the gallery could no longer see that there were inlays of silver and gold! The conservator painstakingly, slowly and methodically cleaned the surface, using swabs of cotton with Acetone on toothpick-sized sticks to get into the interstices where the metals meet. All that old lacquer was eventually removed, and all this was done using a microscope. The surface once again 'sings' as it should and it is quite a glorious transformation.



IMAGE 4:  
Metalwork bag, Mosul, Iraq, Early 14th century,  
Brass with gold and silver inlay, 13.5x 19.2x 15.2x 22cm



IMAGES (cont):  
Rear view of Metalwork bag and side views





**IMAGE 5:**  
Dish, Italy (Venice?), about 1530-50  
Bronze with silver inlay, 45.9cm



**IMAGE 6:**  
Workshop of Giorgio Andreoli, Dish with ornamental letter, about 1525  
Lustrous earthenware, 23cm



**IMAGE 7:**  
Candlestick base of engraved brass, Mamluk (Egypt), 14th Century,  
Engraved brass with traces of former silver inlay, 33.5x 17.5 cm

**5. The Courtauld Gallery is predominately known for its collection of Impressionist and Post-Impressionist paintings. As our Curator of Sculpture and Decorative Art, can you tell us something about the importance of the Islamic objects and maiolica collections to the Gallery?**

In these collections more than any others, we can demonstrate the links that existed between East and West, and between North and South during the Renaissance and earlier periods. One of the reasons why the Victorian collector Thomas Gambier Parry liked Islamic metalwork was that he saw it as part of the visual culture of Europe during the Renaissance. He mistakenly thought the metalwork itself had been created in Italy but he wasn't wrong in his view (which was common at the time) that their decoration influenced Renaissance decoration. In fact, there are pieces made in Italy in imitation of Islamic metalwork (image 5). More broadly speaking, the Italian success in making lustrous ceramics in the early 1500s (image 6) relies indirectly on the invention of lustreware in Iran and Egypt many centuries earlier, which was transmitted by Muslim potters living in Spain, and then exported across Europe.

One of the most fascinating things about maiolica and the metalwork is that these wares were part of an international trade in luxury goods such as large dishes or incense burners, with agents relocating to the places of production and disseminating these things far and wide. The vast networks of production, sale and export are rewarding to study. Some objects that Europeans had no use for – such as candlestick holders far too large for European candles – were even turned upside down and used as containers or buckets (image 7).

**6. Contemporary artists are often seen as romantic figures exploring the world and expressing themselves through their art. How did the craftsmen who created these artworks differ from this idea?**

Today the artist is seen as a fundamentally creative and self-expressive individual; they create what they desire using the methods and processes they choose and wish. It would have been an entirely different situation before for two main reasons: intention and process. Patrons with specific desires, tastes, motivations and, most importantly, the funds would commission a particular project. These patrons would often be heavily involved in the decision-making even down to the type of materials, colours and amounts of precious materials used. And it didn't stop there – there was a clear reason they wanted works to be produced which would reveal and hopefully heighten their status in society; this is reflected in the inclusion of family crests, symbols and initials. Whereas today you might see artworks in a museum, gallery or studio, for these patrons, objects of art would adorn their home, ready to be seen by important guests. The concept of the singular individual artist is in fact a rather modern notion. To be an artist was a job, a craft like any other, and these individuals with different skills would all work together in a workshop to make the masterpieces they were tasked with creating.



7. The maiolica features pattern and design found in nature, including leaves, berries and fruit. Why do you think this is such an enduring theme throughout the history of decorative arts?

Nature has always been a rich source of inspiration to artists and in particular to craftsmen, giving an impulse to the enhancement of architectural ornament, and to the decoration of smaller objects as well. Things like shells, leaves, flowers, and trees often tie together commissions that involved interior and exterior walls as well as furnishings and, for the really grand commissions, objects. In the middle of the 18th century Rococo designers and craftsmen took nature as their starting point, and went very far in adopting the wildness and asymmetry of nature in their designs (image 8). But more relevant to the decoration on the maiolica and metalwork are the qualities of symmetry and harmony that are found in nature. One of the aspects of the decorative arts that I find endlessly rewarding is how nature offers a theme that is apparently universal but always treated differently, depending on the cultural context. Pomegranates – often associated with the idea of fertility, appear in expensive textiles of the **Renaissance**, and these are sometimes depicted in paintings in order to connote wealth, taste and abundance. An example of this is the depiction of heavy curtains with pomegranates on the pair of Florentine bridal chests of the late 15th century known as the Morelli Nerli chests (image 9). Ottoman ceramics of the 15th and 16th centuries also include stylised pomegranates.



**IMAGE 8:**  
Louisa Perina Courtauld (1729 –1807), George II Teapot  
Silver, 13.6x 26.1x 19.5cm

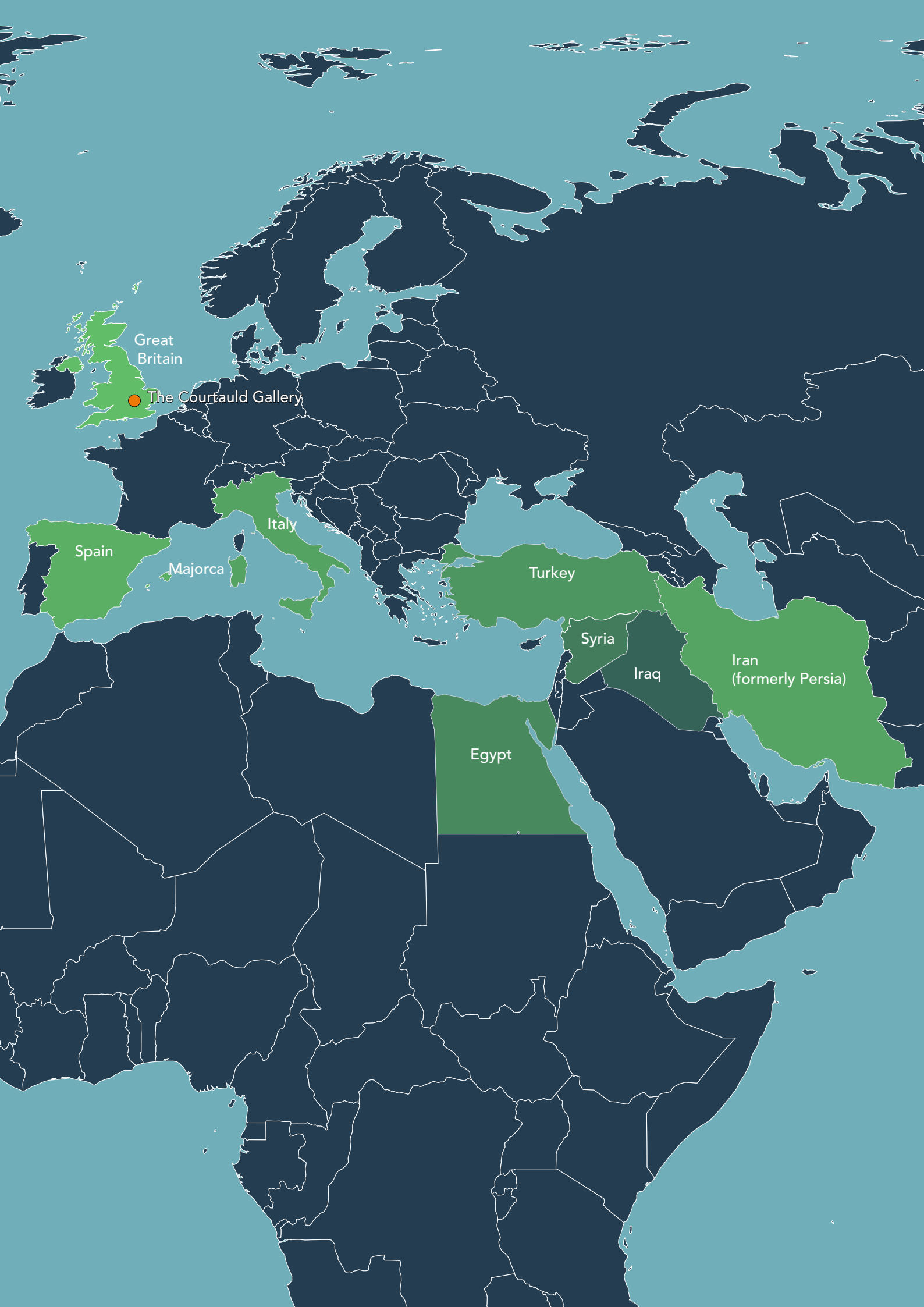


**IMAGE 9 (side view with lid closed and front view with lid open):**  
Biagio d'Antonio and Zanobi di Domenico, The Morelli Chest, 1472  
wood, gesso, tempera, oil and gilding, 205.5x193cm





IMAGE 10 (front and rear view):  
Workshop of the Fontana family, Scalloped footed dish depicting Hasdrubel, 1540-45,  
Tin-glazed earthenware, 34x 9cm



Great Britain

The Courtauld Gallery

Spain

Majorca

Italy

Turkey

Syria

Iraq

Iran  
(formerly Persia)

Egypt



# 2: CREATIVE CONNECTIONS: ART AND MATHS IN THE COURTAULD GALLERY

Francesca Herrick, Courtauld Alumni and Gallery Educator

## ISLAMIC METALWORK IN THE COURTAULD COLLECTION

### ISLAMIC ART & DESIGN

The examples of Islamic metalwork currently on display in The Courtauld Gallery range in date from between 1300 and 1550. The varied countries of origin – modern day Iraq, Iran, Egypt, Syria and Turkey – reflect the rapid growth and global influence of the Islamic religion following its foundation in the early 7th Century CE. In the same period that saw European art transition from the **Medieval** to the **Renaissance** era, craftspeople in nations under Muslim rule were no less busy enriching their own language of design.

Muslim craftspeople over the centuries have worked with the artistic skills and traditions specific to their geographical regions, yet their designs show remarkable unity and are linked by the following characteristics:

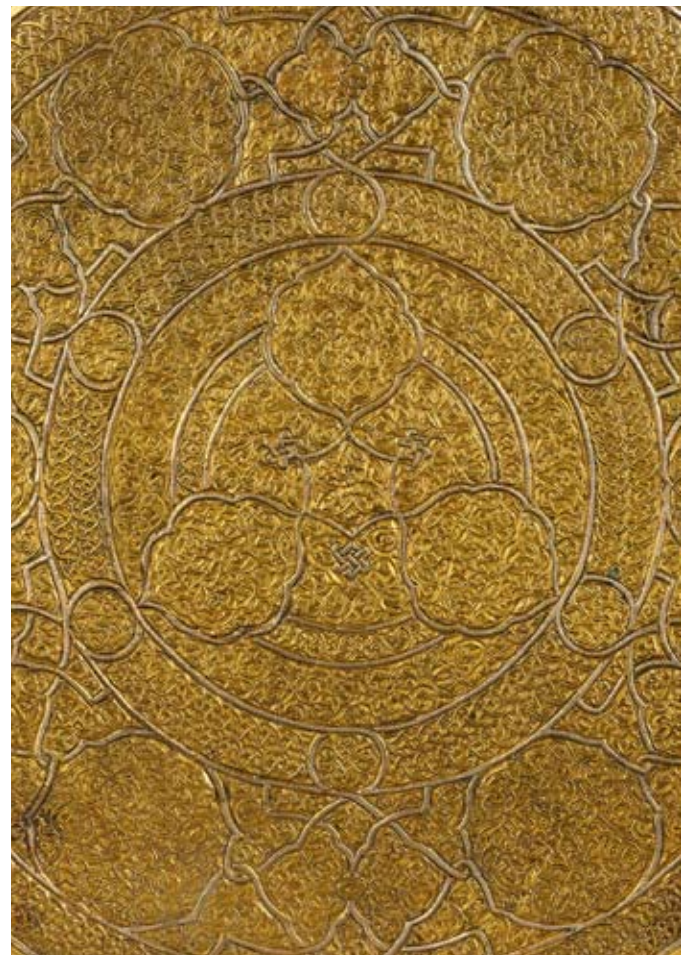
- A focus on 2D surface decoration (largely unconcerned with depth and shading)
- Delight in patterns with infinite possibilities (unlimited by frames)
- Avoidance of figurative imagery on devotional objects (favouring geometric patterns, calligraphic and organic motifs)

In order to understand how these distinctive visual qualities developed, it is necessary to consider the origins of Islam itself. The Prophet Muhammad was born in **Arabia** in 570 CE. According to Muslim belief, the Word of God was revealed to him in the year 610 through the **Archangel Gabriel**. The Prophet Muhammad memorised these words and taught them to his followers, but they were only written down after his death in 632. It was his son-in-law Uthman ibn Affan (died 655) who wrote the definitive text for the Qur'an (also spelt Koran) and had copies sent out to all the major Islamic centres. The text remains unchanged to this day and provides a cohesive set of principles for living and worshipping for all Muslims.

The Qur'an does not ban figurative art, but those making and commissioning art in Islamic nations have traditionally avoided the depiction of humans and animals, since the creation of living beings is considered to be God's unique role. However, more abstract forms of art can play an important part in emphasising the beauty of God's Word and as an aid to contemplating and memorising the holy text. Islamic designs do not contain symbolic meanings, but properties of symmetry, repetition and the infinite point towards the fundamental order and awe-inspiring qualities of the natural world.



**IMAGE 11 (detail):** Metalwork bag, Mosul, Iraq, Early 14th century  
Brass with gold and silver inlay, 13.5x 19.2x 15.2x 22cm



**IMAGE 12:** Mahmud al-Kurdi, Bowl-shaped box, Egypt or Syria, Late 15th - early 16th century  
Brass with silver inlay, 7.6x 15.8cm





**IMAGE 13:** Bowl, Mamluk (Egypt or Syria), 14th century, Brass with silver inlay, 30.7x 16.5cm

### MAKING THE METALWORK OBJECTS

The majority of the items were cast in brass and the reasons for this are largely practical. An alloy of copper and zinc, brass has a relatively low melting point and is more malleable than bronze, which was another available option. These qualities mean that the metal can be easily worked into a variety of forms and lends itself well to rich decorative effects. The technique of engraving metal has existed since at least Roman times and is the most direct way to achieve a surface impression. The craftsperson draws into the metal with a special tool to leave fine incised lines.

In many of The Courtauld examples, the craftsperson has gone one step further and inlaid silver and/ or gold decoration into the brass. This technique was developed in **Persia** in the early 12th century as a way of achieving even greater splendour and contrast. With considerable precision and skill, thin metal sheets are inserted into recessed grooves and shapes. The brass edges that surround the areas of precious metal are then hammered gently to hold the entire design together. Manufacture using this method was at its height between 1300 and 1500, with objects produced for both Islamic patrons and for the European market.

### TALKING POINTS

- What do you think the objects are made from?
- What do you think they would feel like to hold?
- Describe how you think some of these items would have been used?
- Who do you think they belonged to and why?

### GEOGRAPHY

Islamic artefacts are often labelled according to the **dynasties** that ruled the particular region where they were made. The Courtauld Bag (image 4) is thought to have been made in Mosul in Northern Iraq around 700 years ago for a noblewoman of the **Il-Khanid** dynasty (1256-1335). They controlled Persia and neighbouring territories as part of the vast Mongol Empire founded by **Genghis Khan** in the early 13th century. Mosul was sacked in the initial invasion, but was quickly revived as a centre for luxury goods. Other important metalwork centres were Cairo and Damascus, which were ruled by a military caste known as the **Mamluks** (1250-1517).

### HOW THE OBJECTS WERE USED

Just as the writings of the Qur'an are intended to influence all aspects of Muslim life, there is no division between the secular and sacred in Islamic design. The same decorative elements might be applied to a mosque and to a royal palace. Moreover, because the various patterns have no religious symbolism, it has always been easy for people from other cultures to appreciate and enjoy them. During the early 15th century, European merchants, mainly Italians, settled in Damascus and elsewhere and opened up a lucrative second market for metalworkers from Islamic lands.

The objects translated well from one culture to another because lavish dining ceremonies and modes of display were common to both. The Courtauld Bag was probably a gift to the host of a particularly splendid event, since it is adorned with scenes of feasting, hunting and music making. The bag also bears an inscription in Arabic blessing the owner.



### DECORATION AND PATTERN CALLIGRAPHY

Calligraphy is the earliest and most highly revered form of Islamic art. The first style of this decorative writing is called kufic and was invented in Kufa, Iraq, in the 7th century. In the following century, the angular script was used in combination with areas of pattern designed to mark divisions between verses in the Qur'an. By the 11th century, kufic was replaced by six rounded cursive styles that became known as al-aqlam al-sitta (The Six Pens). The calligraphy on the Mamluk bowl depicted above is secular in tone (image 13). Bowls like this would have originally been used to hold scented water for the ritual washing of hands.

### INTERTWINED AND SCROLLING FORMS

The type of pattern composed of delicate scrolling forms is traditionally known as the arabesque, which is a later French term for "in the Arab fashion." Forms resembling leaves and tendrils are arranged to create intertwined surface decoration with a subtle overall rhythm and balance. Similar designs appear in Roman

and Medieval designs, but Muslim craftspeople probably took inspiration from the art of the closer **Byzantine Empire** (eastern Mediterranean, 330-1453) and **Sasanian Empire** (Persia/Iran, 224-651) that predated the birth of Islam (image 14).

### GEOMETRIC

Every geometric design begins as a grid of construction lines, typically based on squares and equilateral triangles because these shapes fit together without gaps (regular tessellation). Patterns are generated by combining and overlapping shapes, usually squares and circles, in repeated formations. The artist can use the same grid to create different designs depending on which construction lines he or she chooses to keep. Seemingly complex patterns and divisions of shapes can be produced with just a ruler and compass. On metalwork, geometric patterns tend to be arranged in bands, with reflections and rotations playing a prominent role in the organisation of motifs (cover image and image 12).



**IMAGE 14:** Incense burner, Mamluk (Egypt or Syria), Late 15th to early 16th century, Bass with silver inlay and piercing, 13.6cm



# RENAISSANCE CERAMICS IN THE COURTAULD COLLECTION

## MAIOLICA

The artistic and cultural movement known as the Renaissance flourished in Europe between 1400 and 1550. Renaissance ceramics are not as well-known as paintings and sculptures of the same era, yet they are also of exceptionally high quality and can similarly reveal a great deal about the social values, beliefs and lifestyles of this period. The colourful decorations on maiolica (pronounced mayolica) ceramics often exemplify the Renaissance concerns for the close study of nature and the human form, as well as the growing interest in the art and literature of the **Classical** past. The most elaborate examples show an advanced handling of perspective and light that had not been present in earlier Medieval art. Furthermore, maiolica ceramics encapsulate the close relationship of the arts and sciences during this age, combining visual inventiveness with technical knowledge of firing and glazes.

The majority of maiolica pieces in The Courtauld date from the first half of the 16th century, by which time Italian potters had perfected the creative processes behind this particular type of painted earthenware. Potters would start by throwing or moulding their vessel in a pure white clay and would then subject this to an initial 'biscuit' firing. A layer of opaque white glaze was poured onto the object once it had cooled and coloured pigments could be applied directly on top to create the designs. The glaze was made from a mixture of tin oxide, lead, sand and potash (burnt wine dregs). Pigments made from a range of chemical compounds needed to be stable enough to withstand up to 1000 degrees of heat as they were fused to the glaze in a final firing. As a result, the colours are just as bright today as they were when they emerged from the kiln.

The technique of using tin oxide actually originated in Iraq and came to be known in Europe after the military conquest of Islam. By the early 8th century, Islam had spread westward as far as Spain and this part of the Muslim empire became a centre of learning. Murcia in eastern Spain was known for its ceramics production in the 12th century and when this area fell to Christian armies in 1243, production moved to Malaga, Granada and later Valencia. The island of Mallorca, after which the Italian pottery derives its name, was an important trading point between Spain and Italy. These ceramics were exported to Italy in large quantities. Islamic Spanish pottery is known for its silver, gold and red metallic glazes. The lustrous effect requires an additional firing of the object that involves a gradual reduction in temperature.

Much of what we know about the manufacturing process comes from one book written in 1557 by **Cipriano Piccolpasso** from Bologna: *Li tre libri dell'arte del vasajo* (*The Three Books of the Potters Art*). Maiolica production was expensive and full of risk since a great deal of fuel was required to heat the kiln and hundreds of ceramics would be stacked together in one firing. The potter had to rely on experience to judge the timings or weeks of work might be lost. Secrets were



**IMAGE 15:** Workshop of the Fontana family, Scalloped footed dish depicting Hasdrubel 1540-45, Tin-glazed earthenware, 34x 9cm



**IMAGE 16:** Workshop of Giorgio Andreoli, Dish with ornamental letter, about 1525, Lustrated earthenware, 23cm

on the whole closely guarded by families who tended to work in particular regions of Italy. Faenza, Deruta and Montelupo became centres known for this type of pottery.

The making of the pots and the painting of the pots were processes generally carried out by separate craftspeople. Once the vessel had undergone its first firing, the artist could transfer their design using a process called pouncing. This involving drawing an image on paper, pricking holes in the design and then dabbing or 'pouncing' powder on top. The powder would filter through the holes and the artist would use the faint marks left on the pot as a guide for the final colourful images. They might turn the vessel on a horizontally mounted wheel to help them achieve straight lines all the way around it.





**IMAGE 17:** Large globular jar decorated with fruit and leaves, Italy, about 1550-75, Tin-glazed earthenware, 33.3cm

### TALKING POINTS

- Where does clay come from?
- Has anyone ever seen a pot being thrown?
- How does the potter shape the object?
- What are the main colours that appear in maiolica designs?
- Do you recognise any of the objects?

### HOW THE OBJECTS WERE USED

It was common for wealthy Italian families to commission large sets of maiolica dining plates, but it is difficult to know how often they were actually used. Renaissance people usually ate with their hands so ceramics do not show the wear that plates have from cutlery today. The dishes would have held scented water for handwashing between courses. We do know from Renaissance inventories that maiolica ceramics were displayed throughout the house and were important symbols of wealth and social prestige. They would often be custom made to include initials and/ or coats

of arms. These would not necessarily be the patron's own insignia, but might show their allegiance to a more powerful family. At this time, Italy was divided into individual city states, which were often governed by elite family dynasties.

The dining ceramics may have served the additional function of aiding conversation. The narrative scenes that appear on several of The Courtauld examples are called *Istoriato* (story painting). They became popular around 1500 thanks to the invention of the printing press half a century earlier and the relative ease with which images and stories could be circulated. Biblical, mythological and Roman stories appear most frequently. The Hannibal set, telling the story of the Carthaginian general who fought the Romans in the 3rd century BCE, was one of the most ambitious (image 15). It was produced in Urbino between 1545 and 1560 and included 114 scenes! On a more practical level, potteries were able to supplement their incomes by

producing a range of vessels for pharmacy remedies and for domestic food storage.

## DECORATION AND PATTERN

### FANTASTICAL CREATURES

The mythical and exotic creatures that frequently appear on maiolica pharmacy jars were a way of enticing customers to buy expensive products such as dried fruit and herbs (images 18 & 19). The decoration might be considered a very early form of branding. The text can be difficult to decipher today as it usually refers to the name of the pharmacy or an abbreviation of a particular medicine. Pharmacies or apothecaries were institutions at the heart of Renaissance civic life and they could afford to commission innovative pieces. Spouted vessels were an opportunity to take the design into three dimensional form.



**IMAGE 18:** Drug jar with an eagle and a scroll, Italy (Deruta), about 1510-15  
Tin-glazed earthenware, 24.1cm



**IMAGE 19:** Dragon-spouted drug jar, Italy (Castelli), about 1520  
Tin-glazed earthenware, 25.3cm

### THE GROTESQUE

Renaissance artists and craftspeople were greatly influenced by the sculpture and architecture of the Romans. The plate in image 20 was made in Sienna in the 16th century and features a Christian martyr in its centre (the 'S' and 'L' possibly stand for Saint Lucretia). The surrounding ornament is based on Roman wall painting and is known as grotesque. This style of decoration was revived from around 1500 and typically features palmettes (palm-like motifs), flying beasts, wreaths, masks, putti (winged babies) and scrollwork in symmetrical arrangements.

### NATURAL FORMS

Maiolica artists initially looked to the patterns that appeared on Spanish Islamic ceramics. The dish in image 16 which was made in the Umbrian workshop of **Giorgio Andreoli** in around 1525, imitates the metallic glaze of these wares, but the decoration takes a more European form. The main motifs are red berries and golden leaves outlined in blue. The central letter 'C' is possibly the first letter of the original owner's surname. Further north in Venice, brightly coloured patterns of fruits or flowers became popular at this time.



IMAGE 20:

Dish with a female martyr, Italy (Siena), about 1510  
Tin-glazed earthenware, 23cm

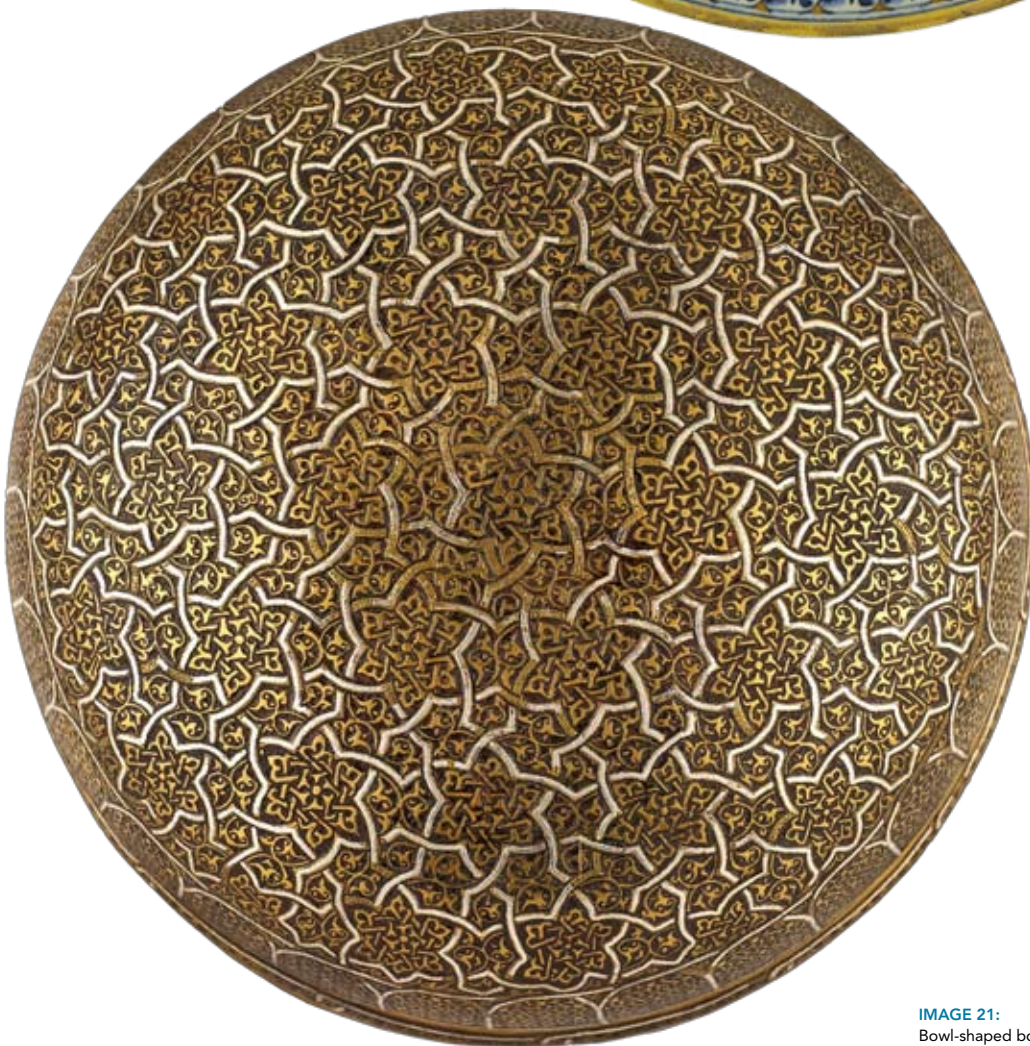
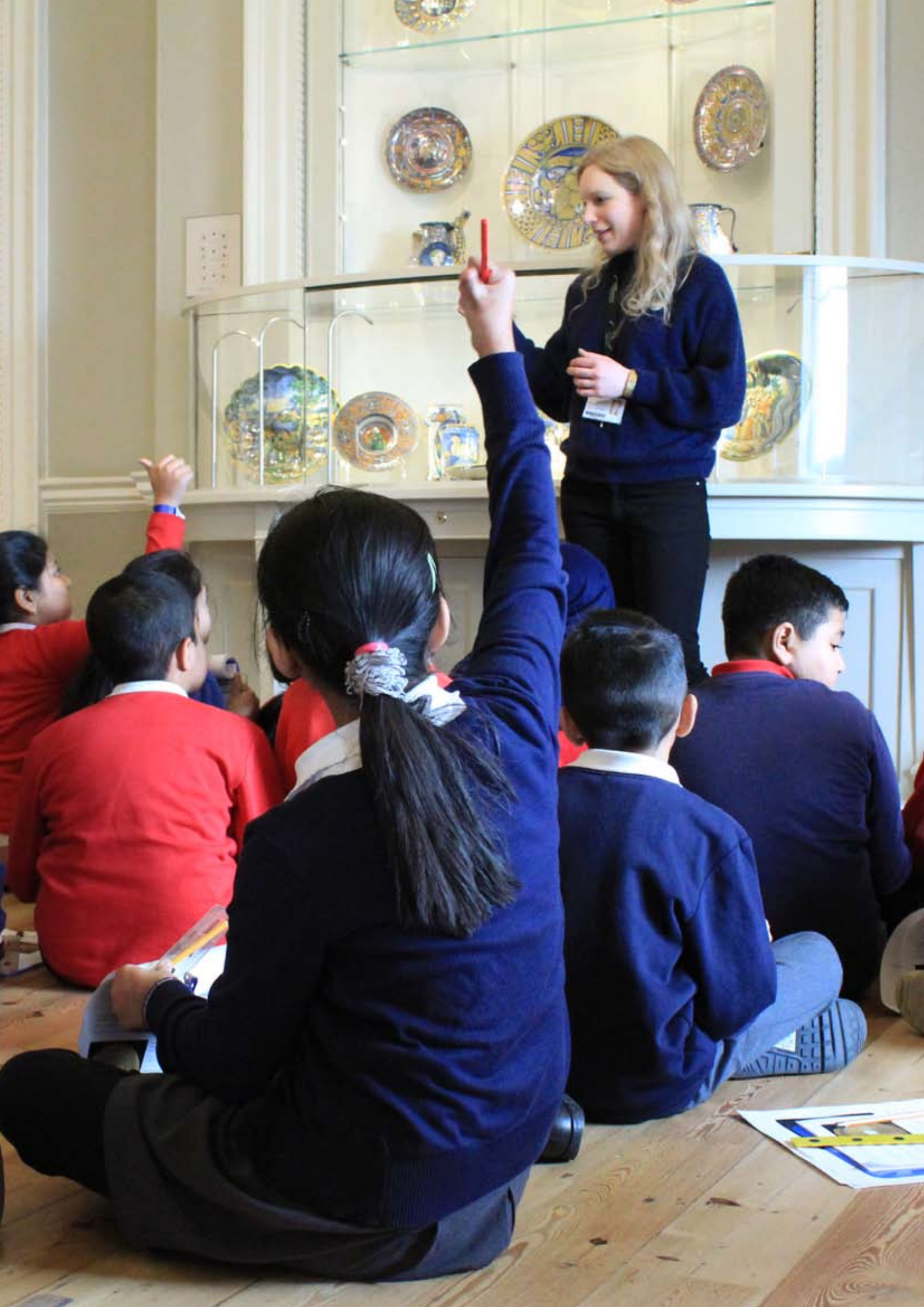


IMAGE 21:

Bowl-shaped box and cover, Iran or Turkey, about 1400  
Brass with silver inlay, 8.2x 15.5cm







# 3: ART AND MATHS IN THE CLASSROOM

Stephanie Christodoulou and Francesca Herrick

Francesca Herrick, Courtauld Alumni and Gallery Educator, who has worked with the collection for almost a decade, was tasked with the exciting and challenging brief of bringing the Art and Maths concept to life for school groups. In January 2017 we tested the concept with a class of year five students from Mayflower Primary school in the London Borough of Tower Hamlets. Francesca set about creating the body of this resource, detailed lesson plans which we trialled, and a supporting workbook. The final section of this resource shares the processes and outcomes with fellow schools and teachers.

For many visitors to The Courtauld Gallery – both school groups and adults alike – our world-renowned collection of Impressionist and Post-Impressionist paintings will often be the star attraction, and understandably so. However, the scope of our collection goes far wider and includes objects revealing early examples of exquisite craftsmanship. We also own a fine group of around 30 pieces of Islamic metalwork, and a collection of over 60 ceramics from various areas and periods, including a very strong group of Italian Renaissance ceramics known as ‘maiolica’ Spanish lustreware and ceramics from Ottoman Turkey. For centuries, artists and designers have employed mathematics to better understand and harness the features in nature that we consider beautiful. An exploration of Islamic metalwork and maiolica ceramics in The Courtauld will encourage your students to appreciate mathematics as an inter-connected discipline with the potential for a wide range of creative applications. Students will see how craftspeople, who worked 450–700 years ago and in different parts of the world, used only a ruler and a compass to generate a dazzling array of patterns. By investigating the processes behind The Courtauld artworks, students will develop their knowledge of geometry, hone their problem solving abilities and expand their mathematical vocabulary in an enjoyable and collaborative way.

## ART AND MATHS OUTCOMES FROM A TEACHERS PERSPECTIVE

“The children loved the Art and Maths project - they were engaged throughout and it was inclusive to all. They were excited for each and every workshop and proud of the work they were producing. The workbooks were also brilliant as the children really took pride in them and were excited to continue using the activities. This project broadened their understanding of visual culture and historical research; my class are now more intrigued about art and ask lots of questions. In an English lesson recently we were looking at some Greek paintings as a stimulus for our writing, and they were pointing out patterns and angles that they had learnt

about during the lessons, as well as questioning how they were created. As teachers we unfortunately don’t get the chance to plan Art in so much detail, so it was great see the Art and Maths format, and to get ideas for the future.”

*Phoebe Ransom,  
Mayflower Primary School*



In pages 17 and 18 is a summary of the 4 lessons we ran with the Mayflower students. To effectively embed the mathematical concepts and provide a space to work through them, a workbook containing 14 distinct activities that link to Maths was created. Some of these mathematical activities lead into creative art activities. For instance, *Activities 6 and 8: Rotation and Tessellation* lead onto printing, *Activities 10 and 13: Making Stars* lead onto stained glass using acetate, and *Activity 14* looks at semi-irregular tessellation as the basis for making an Islamic tile with air-drying clay.

Teachers can access all elements needed to run this project – including lesson plans, the Art and Maths Workbook and a Power Point Presentation – via our website or by emailing the Learning Department.

w: [www.courtauld.ac.uk/learn/schools-colleges-universities/teachers-events-resources](http://www.courtauld.ac.uk/learn/schools-colleges-universities/teachers-events-resources)

e: [education@courtauld.ac.uk](mailto:education@courtauld.ac.uk)

## 1: VISIT THE COURTAULD GALLERY

The first lesson begins with a visit to the Gallery to see the artworks in person. School groups visiting The Courtauld can book a Gallery Educator to help them explore the works on display. If you can't visit the Gallery you will be able to use the images in this resource and explore your local neighbourhood – local architecture, mosques, churches, schools, train stations, tiles and plates, often feature decorative motifs and reliefs. This lesson is about demonstrating the relevance of Maths to design. It encourages your students to think about how artists and designers use Maths today, and explores concepts such as pattern, motifs and geometry. Using activities 1- 6 in your workbook to explore the mathematical concepts of circles, hexagons, symmetry and rotation and show your students how this can be linked to art.



## 2: PATTERN IN MATHS AND NATURE

Lesson 2 fosters curiosity in the mathematical relationships that can be found all around us in nature. Look at fruit, vegetables, shells, plants, pinecones and leaves to reveal natural pattern and symmetry. These patterns form the inspiration of many designs, including Islamic pattern. Explore the features of a circle in Activity 7, tessellation through Activity 8 and polygons through Activity 9. Students can then translate a pattern that they have explored onto small polystyrene sheets. Using printing ink and rollers, the children can create patterns by rotating their design and trying a half-brick and half-drop repeat pattern.





### 3: CONTINUOUS PATTERNS

Lesson 3 introduces the art of stained glass and lattice screens found in Islamic architecture. Some of the earliest geometric motifs used in Islamic design were 6 and 8-point stars. Work through Activity 10 with your group. Activities 11 and 12 explore mathematical pattern further, whilst Activity 13 provides the template for students to make their own piece of stained glass design. Lay a sheet of transparent acetate over their 8-point star design, then with a ruler and marker-pen trace their designs. Students can customise their stars within smaller squares of coloured acetate. Place each of their stars next to one another to explore the potentially infinite pattern. If possible display the work on a window.



### 4: FROM 2D TO 3D DESIGN

The final lesson builds on geometric principles learnt in previous lessons and introduces semi-regular tessellation. Students can construct a geometric design by following Activity 14. Using air-drying clay to a thickness of 1cm, they can use their design as a template to create two tiles. The two-part structure of this lesson effectively combines careful measurement with creative 3D design. Students can decorate their tiles with the motifs and patterns they discovered in previous lessons.



## 5: GLOSSARY OF NAMES AND TERMS

### ARABIA:

The present-day Arabian Peninsula consists of the countries of Yemen, Oman, Qatar, Bahrain, Kuwait, Saudi Arabia and the United Arab Emirates. Historically, divided into four distinct regions: Hejaz, Najd, Southern Arabia and Eastern Arabia. The Prophet Muhammad was born in Mecca in about 570 CE, but relocated to Medina in 622 (both cities in the Hejaz region). From there he and his followers united the tribes of Arabia under the Islamic religion.

### ARCHANGEL GABRIEL:

An angel who is mentioned in the three Abrahamic religions (Judaism, Christianity and Islam) and is believed to act as God's messenger.

### BYZANTINE EMPIRE:

The eastern part of the Roman Empire, with historical origins in the ancient Greek colony of Byzantium. Founded by the emperor Constantine I in 330 CE, it continued to flourish long after the fall of the western half of the Roman Empire in 476 CE. The official religion was Christianity and territory originally stretched as far east as Syria, the Holy Land, Egypt and North Africa. From the second half of the 7th century, the empire was under almost constant attack by Muslim armies and it finally fell to the Ottoman Turks in 1453.

### CARTHAGINIAN:

An ancient eastern-Mediterranean civilization with an empire that extended across the coast of North Africa and the Western Mediterranean. According to myth, its capital city Carthage (now modern day Tunisia) was founded by Queen Dido in around 814 BCE. The Carthaginians were in frequent conflict with the Roman Republic over territory and Carthage was eventually destroyed by the Romans in 146 BCE.

### CIPRIANO DI MICHELE

#### PICCOLPASSO (1524-1579):

An engineer, draftsman, poet and painter of maiolica. He was a member of a powerful Bolognese family from Northern Italy. His publication *The Three Books of the Potter's Art* was commissioned by Cardinal François de Tournon who may have been looking for ways to improve the manufacturing processes of French ceramics. The manuscript (now in the V&A Museum) discusses the choice of clay, shaping, composing, and glazes.

### CLASSICAL:

Referring to the art and literature of, or inspired by, Greek and Roman antiquity. Classical painting and sculpture is associated with balanced compositions and proportions, as well as idealised human features and anatomical details.

### DYNASTY:

A sequence of rulers considered as members of the same family. A dynasty is also often called a 'house'. The term 'dynasty' may also refer to the era during which a family reigned, as well as to events, trends, and artefacts of that period.

### GIORGIO DI PIETRO ANDREOLI (c. 1465-c. 1555):

Italian ceramicist who specialised in lustrated maiolica wares. Born near Lake Maggiore, he moved to Gubbio in Central Italy around 1490 and became the director of a highly productive workshop. He was granted various privileges for his economic contributions to the region.

### GENGHIS KHAN (c. 1162-1227):

The founder and ruler of the Mongol Empire, which continued to expand after his death to become the largest empire in history. Following his earliest campaigns to unite the nomadic tribes of the Mongolian Plateau, he led a series of successful invasions to capture central Asia

and China. He gained a fearful reputation through large-scale massacres of local populations, but also encouraged religious toleration and facilitated trade between Asia and Europe. Before he died, he split his empire into sections (Khanates) among his sons and grandsons who brought further expansion.

### IL-KHANATE:

A breakaway state from the Mongol Empire, established in the 13th century, and based primarily in Persia as well as neighbouring territories. It was ruled by different Mongol Houses (House of Hulagu, House of Ariq Böke, and House of Hasar), also called the Il-Khanids, and was in existence from 1256 until 1335.

### MAMLUKS:

A distinct social group and warrior class, which developed from soldiers enslaved by Muslim armies. Mamluks were often given important military and political roles in regions under Muslim control. From 1250 - 1517, Egypt and Syria were ruled by a Mamluk Sultanate, which successfully fought the Il-khanate and Christian Crusaders from Western Europe.

### MASTER MAHMUD AL-KURDI:

The name of a metalworking master craftsman probably working in Cairo in the late 15th Century. A number of surviving pieces are signed with his name.

### MEDIEVAL:

Relating to the period of roughly 1000 years between the 5th and 15th-centuries, and in terms of cultural production spanning the era between the decline of the classical civilisation of Rome and the advent of the Renaissance. Medieval art was often produced in the service of Christianity and typical forms include devotional sculpture, illuminated manuscripts, stained glass, ivory carvings and metalwork. Approaches to representation were influenced by the legacy of the Roman Empire, early Christian art and local European cultures.



### PERSIA:

A historical reference to the lands that now make up modern-day Iran.

### RENAISSANCE:

From the French for 'rebirth', used to describe the revival of arts and learning under the influence of the rediscovery of classical art and culture from ancient Greece and Rome. It began in Italy around 1400 and culminated in a period known as the High Renaissance (c. 1480 to c. 1530), which is associated with the lifetimes of the prominent Italian artists Leonardo da Vinci, Raphael and Michelangelo.

### SASANIAN EMPIRE:

The last imperial dynasty in Persia (Iran) before the rise of Islam. Founded by Ardashir I in 224 CE, it was a powerful rival to its neighbouring Roman-Byzantine Empire. At its height, the empire encompassed Iran, Iraq, Eastern Arabia and large areas of the Holy Land, Caucuses, Turkey and Central Asia. Iran was the focus of cultural production and its art continued to have significant influence beyond its own borders after the empire's fall in 651 CE.

### SULTAN AL-MALIK AL-NASIR:

The Mamluk sultan of Egypt who reigned three times between 1293 and 1341.

## SOURCES

### *Islamic Design Workbook*

Broug, Eric. London: Thames and Hudson, 2016

### *Court and Craft Teachers Resource*

The Courtauld Gallery, London

<http://courtauld.ac.uk/wp-content/uploads/2015/05/CrossingCulturesTeachersResource.pdf>

### *Geometric Design Tutorials*

Envato Tuts+

<https://design.tutsplus.com/tutorials/geometric-design-working-with-4-and-8--cms-22731>

### *The Helibrunn Timeline of History*

The Metropolitan Museum of Art, New York:

<http://www.metmuseum.org/toah/>

### *Islamic Art and Geometric Design: Activities for Learning*

The Metropolitan Museum of Art, 2004:

[http://britton.disted.camosun.bc.ca/Islamic\\_Art\\_and\\_Geometric\\_Design.pdf](http://britton.disted.camosun.bc.ca/Islamic_Art_and_Geometric_Design.pdf)

### Timeline to accompany the exhibition 'The Art of the Qur'an:

*Treasures from the Museum of Turkish and Islamic Arts*,

Freer | Sackler, Washington, 2016:

<https://www.asia.si.edu/exhibitions/current/art-of-the-quran/downloads/Qurans-timeline.pdf>

### *Maths and Islamic Art & Design Collections Resource*

The Victoria & Albert Museum, London:

<https://www.vam.ac.uk/info/teachers-resources-for-primary-schools>

### *Italian Renaissance Maiolica*

Sani, Elisa P. London: V&A Publishing, 2016

### *Sublime Symmetry Teachers' Maths Resource Pack*

De Morgan Foundation, London, 2016:

<https://www.tes.com/teaching-resource/maths-and-art-at-ks2-using-ceramic-designs-by-william-de-morgan-maths-art-shape-symmetry-11272552>

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First Edition

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