

## AUDIO GUIDE TAPESCRIPTION

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Hello and welcome to the white room dedicated to a special vision of Leonardo da Vinci ... the X-ray. Here you will find information about the analysis of four paintings by Leonardo da Vinci, studied by chemical methods, in particular by non-destructive techniques and by the use of X-rays.

The audio guide wants to accompany you in an innovative and interactive way when you visit the room: the images of the gallery are explained and the texts of the documents are summarized, hoping that the path will allow you to discover such an unknown and extraordinary subject through some hidden curiosities.

Once we enter the room, we immediately find a gallery with a dozen images representative of the chosen path: To give a brief overview, the first two photos introduce the artist and the analysis technique studied, then we find two images for each painting treated and a final QR code to scan.

The first image is dedicated to Leonardo, a versatile artist dedicated to art and science, who experimented with numerous techniques for his works. Leonardo puzzles us and makes us discover new faces of art and science, he makes us dream and excites us, we love the charm of his paintings but we do not understand their origin and we are overwhelmed, his works confuse and fascinate us, they impress and amaze us.

The second image shows a study carried out on the famous painting of the Mona Lisa in connection with the shading technique. The nuance analyzed by X-ray fluorescence spectrography is obtained by using pigments with a size of about 1-2 micrometers. It was probably obtained by Leonardo by using the glaxis technique, a light and soft thickness of oil paint.

The image, taken from the study by C2RMF researchers, shows in the graph the thickness and concentration of pigments in the different layers in the face of the Mona Lisa, highlighted by the red line that can be seen in the image on the painting. The other photo shows how an analysis is performed with X-ray spectrography: A device similar to a camera is used to select a point on the painting to be scanned.

X-ray analysis is an atomic technique that makes it possible to identify the exact element in the painting, but not the exact pigment. Some advantages are that it is a non-destructive analysis technique, it can be performed directly in the location where the painting is located, and it is possible to identify the element present using a non-specific primary X-ray beam, allowing for true mapping of the painting. X-ray analysis, of course, as we will see throughout the course, is only one of the many analyzes that can be performed, and all of them can be important, depending on the need. However, the best result is obtained by analyzing the same painting using several different techniques.

In the gallery, the four analyzed works by Leonardo are presented one after the other. Right at the beginning, a picture of "The Beautiful Princess" is shown, a painting that has caused a lot of discussion in the scientific community: Who is the woman depicted by Leonardo? Is the painting really by the artist of Vinci? These are just some of the doubts we can try to clarify by combining the charm of ancient texts with the magic of modern technologies. Thus, through a precise historiographic analysis, we can hypothesize that the woman is Bianca, the illegitimate daughter of Ludovico il Moro, or Anna, Ludovico's niece. The result obtained is already surprising, considering that initially there were doubts about five women. The comparative analysis, which provides us with a partial solution to the first question, leaves the second unsolved: can we attribute the work to Leonardo with certainty?

This is where modern technologies come into play. The analysis of carbon 14 on the parchment on which the painting is painted allows us to date it with 95% probability between 1440 and 1650. But the discoveries do not stop there: X-ray analysis has revealed a fingerprint that is probably Leonardo's.

If we flip through the gallery again, we find a study by Leonardo for a woman's head, perhaps the study made before the painting "The Beautiful Princess", because in this sketch, too, the woman is not shown frontally.

Then, browsing through the paintings, we find the analysis of a well-known mystery associated with Leonardo, that of the Battle of Anghiari. If you are sure of the existence of "La Bella Principessa", you do not even know that about the Battle of Anghiari. In fact, we know the history, the commission, the orders for the materials of the painting, we know about the production of the caricatures, but not if they were ever shown on the wall of the Sala dei Cinquecento. We know about a remodeling of the room by Vasari, but we do not know if the artist covered Leonardo's painting or just hid it. To this day, we have only a few studies by Leonardo that never show what the painting must have looked like as a whole. The image you see here is in fact a reproduction of Leonardo's painting by an anonymous 16th century artist and by Pieter Paul Rubens. From texts of the time, some of which are by Da Vinci himself, we know that the technique used for the "Battle of Anghiari" had to be encaustic, a technique suitable for small areas but not for large spaces. The painting had become so famous by this time that Benvenuto Cellini called it the "school of the world".

Flipping through the gallery again, we find a collage that in the first part shows a picture of Seracini's chemical research for the search of the lost Leonardo, next to it is instead a photo of a detail of Vasari's fresco that presents the words "search finds" on a green flag, which some scholars believe is an indication that Vasari wanted to leave the painting of Leonardo to find it. It is precisely this detail that led Seracini to conduct research to unravel the mystery of the Battle of Anghiari. After years of investigation, Seracini finally obtained permission to conduct an endoscopic analysis. Under the supervision of the Opificio delle Pietre Dure, he was allowed to make 6 access holes that allowed him to obtain four proofs of the hypothesis of the existence of the painting.

However, to this day it is not known if the painting is hidden behind Vasari's masterpiece or if it never existed: Indeed, there are refutations of Seracini's theses and in the historiographical analysis there would be elements that do not coincide.

Whether the Battle of Anghiari is hidden behind Vasari's fresco or not remains a mystery that perhaps, who knows... one day it will finally be revealed, whoever searches will find... or maybe not.

But without getting too involved in this mystery, we can proceed with some interesting discoveries about another painting by Leonardo: the Virgin of the Rocks. In fact, the painting has been subjected to various analyzes, such as X-ray fluorescence or infrared analysis. The first made it possible to map the painting without damaging it, while the second revealed hidden figures beneath the painting that we can all see today. More recently, a special algorithm was combined with these techniques that made it possible to depict exactly these mysterious figures, as can be seen in the eighth image.

The last painting in the gallery is the Adoration of the Magi, a work that has come down to us as a large preliminary drawing in black and white. This design has been analyzed using various techniques such as optical coherence tomography, UV false color imaging, 3D optical scanning, and IR reflectography (the result of which we see in the 10th image). These investigations have made it possible to reveal many curiosities, including about Leonardo. For example, it turned out that the

artist's technique remained practically unchanged over the years. On the other hand, we know that the painting was done freehand and without the support of caricatures. We also know that the painting changed completely between the first and the second graphic phase. It turned out that the painting was "sealed" by a thin transparent layer of a binder and lead white, precisely because Leonardo wanted to preserve the painting as much as possible.

Then, at the end of the gallery, we find a QR code that, when scanned, reveals a sketch of words containing all the key words of the room.

Following the gallery, a video has been included that tells the secret life of the paintings, a life that can be revealed through scientific investigation. The video explores some of the researcher's case studies and shows how magic happens when science and art meet.

The video is available in English with the option of Italian subtitles.

In addition to the video, we also find the description of the room, the keywords and some documents: an in- depth analysis of the audio contents in Italian and English, a summary power point presentation and the transcription of the audio guide in Italian and an English translation. .

The QR code refers to a fun quiz of 15 questions related to the contents of the room.

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In sitography there are also some in-depth sites from which the information was selected.

The key words of the room are therefore science, art, history and discovery.

Thank you for visiting our room and for following our audio guide, have a nice day!

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