

A composite image featuring a detailed black and white engraving of Leonardo da Vinci's face on the right side. The background is a collage of various sketches on colored paper scraps. There are yellow scraps with anatomical drawings of hands and a circular diagram. Red scraps show sketches of a figure holding a staff and a figure in a dynamic pose. Green scraps feature sketches of a winged figure and a figure in a dynamic pose. A semi-transparent grey box is overlaid on the left side of the image, containing text.

Google Arts & Culture

# Leonardo da Vinci: Inside a Genius Mind

in association with  sixredmarbles

[goo.gle/leonardo](https://goo.gle/leonardo)

## How to Make the Most of This Lesson

This lesson serves as a **road map** for your journey through a rich and exciting collection of online content made available by **Google Arts & Culture's partners**. You will explore photographs, slideshows, videos, voice recordings, and more. The images in this lesson are just a sample of what's available to you via the **Google Arts & Culture** website.

You can complete this lesson independently or with fellow students, a teacher, or another adult. The content is accessible to a wide range of ages, but it's especially geared toward students ages 12 to 16.

## Your journey in this lesson will take you through three major topics:

Chapter 1: Who Was Leonardo da Vinci?

Chapter 2: The Codices

Chapter 3: The Art

## You'll see some helpful signs along the way:



Estimated time for completing the chapter



Audio recording or video



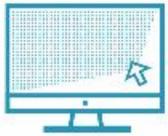
Link to more online content



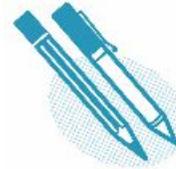
Learning activity

## Tools for Learning

Below are tools for learning that you may need for Digital Discovery lessons:



A device that connects to the internet (a computer or tablet)



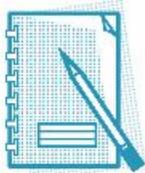
A tool for writing your responses and big ideas (pen, pencil, computer, etc.)



Art supplies (markers, crayons, paint)



Scissors



A notebook



Scrap paper

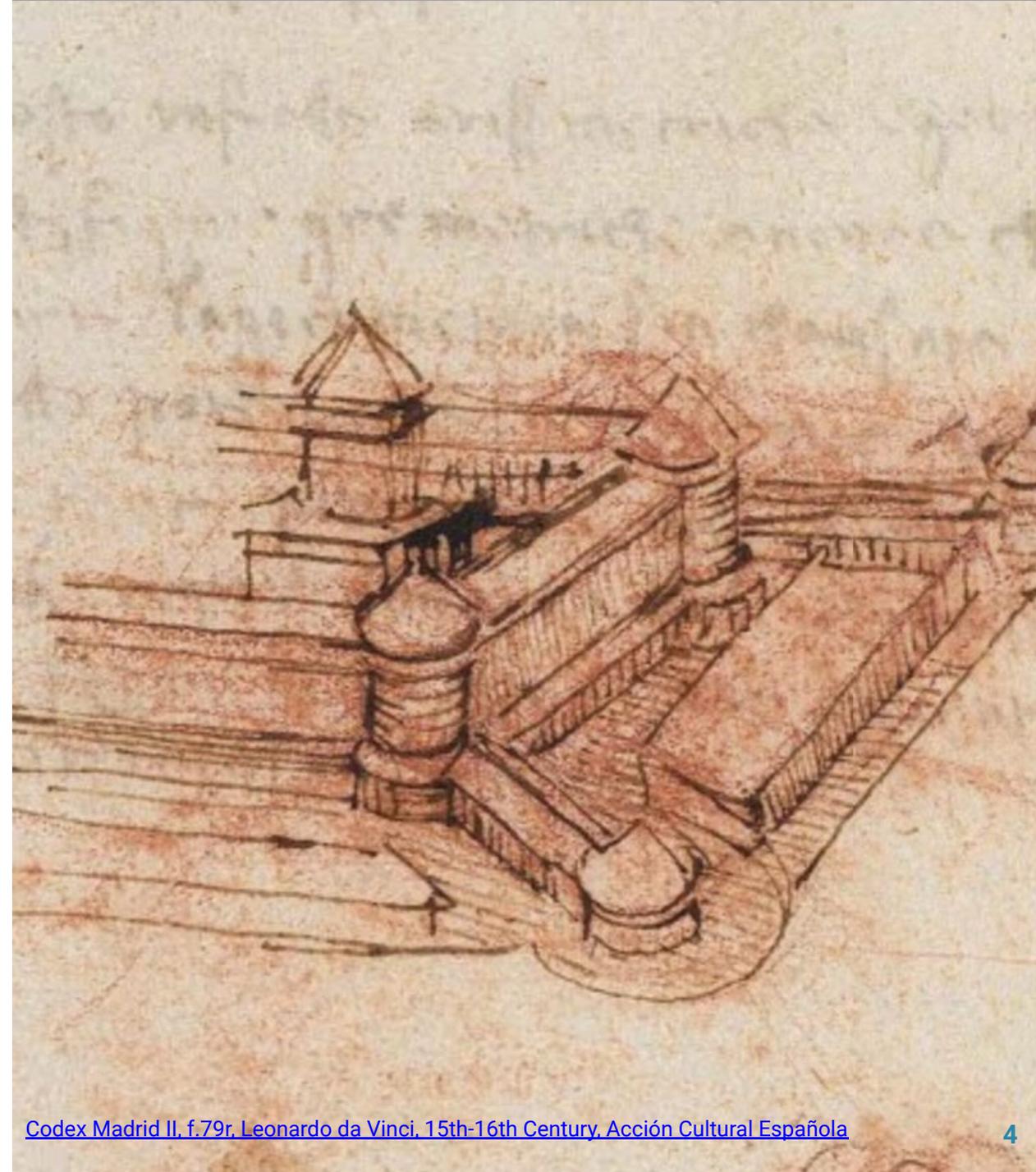
**Explore! Google Arts & Culture** pictures are **big**. If you want to explore a picture in greater detail, click on the magnifying glass symbol and zoom in with the zoom slider. By dragging the white box around, you can see even **tiny** details.

## Welcome to *Leonardo da Vinci: Inside a Genius Mind*

This lesson is about one of the world's most famous painters—Leonardo da Vinci. But did you know that Leonardo was also highly skilled at drawing, architecture, geology, mechanics, and more? You will learn about the life's work of Leonardo and see some of his creations up close. You will then examine a cover letter written by the master himself and write one of your own.

### What Will You Do?

1. Learn about the early life and career of Leonardo.
2. Find out about Leonardo's areas of expertise.
3. See how Leonardo worked.
4. View some of Leonardo's most famous works and read about their details.



A drawing of a fortress

## What's in this lesson?

1. Learn about Leonardo's early life and where he trained to be an artist.
2. Find out about Leonardo's famous notebooks and see some of them close-up.
3. Explore some of the machines drawn by Leonardo.
4. View famous paintings by Leonardo and examine their details.

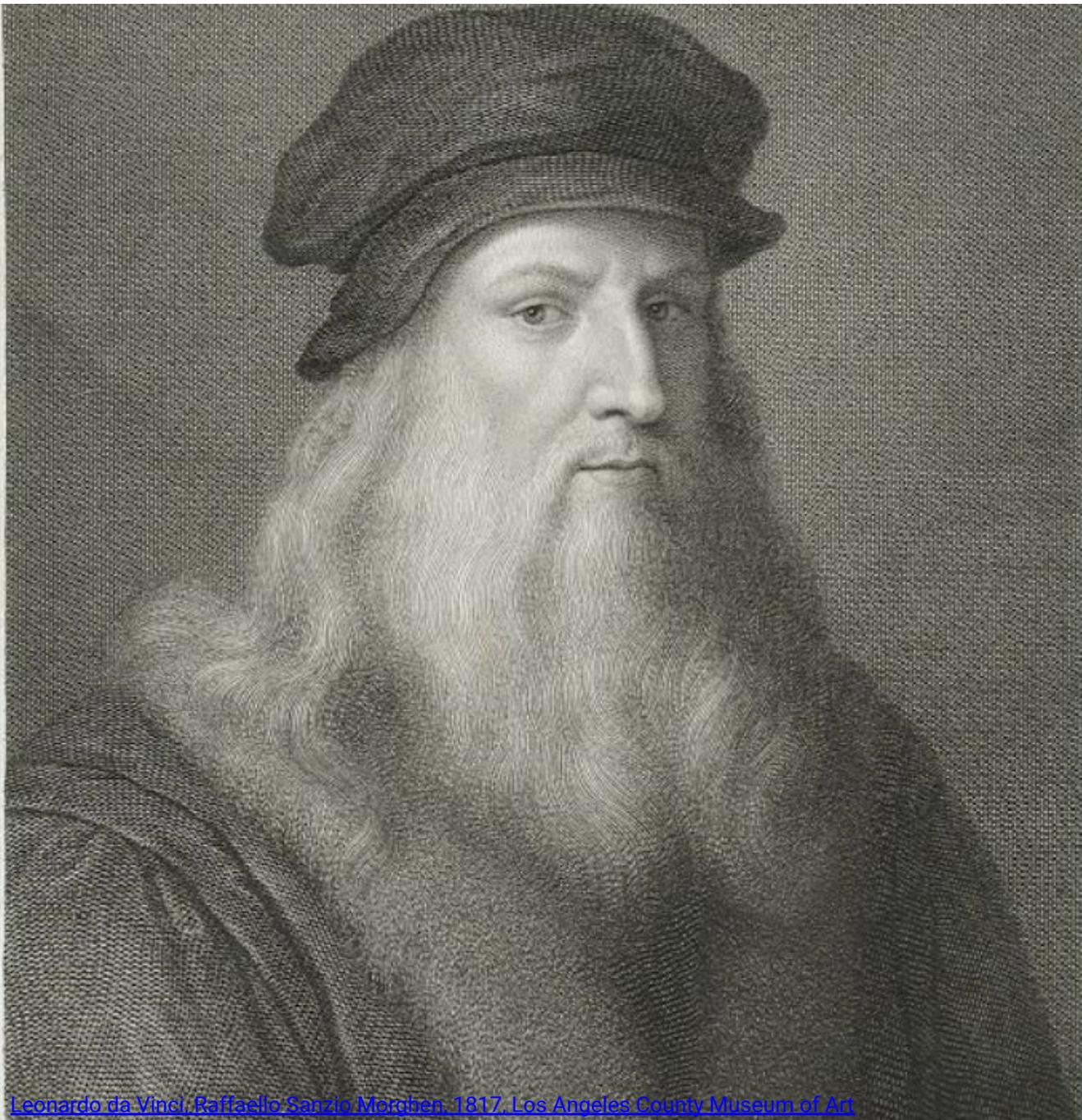
## By participating in this lesson, you will be able to:

1. Explain why many people living during the Renaissance were learned in many subjects.
2. Understand the definition of a codex and see why codices are important to understanding Leonardo's work.
3. Identify some characteristics of Leonardo's paintings and drawings.

## Vocabulary

polymath, iconic, Renaissance, observation, render, codex, apprentice, patron, fable, cosmology, chiaroscuro

*Need help with some of these terms? See the glossary at the end of this lesson.*



[Leonardo da Vinci, Raffaello Sanzio Morabini, 1817, Los Angeles County Museum of Art](#)

## Who Was Leonardo da Vinci?



*What is this chapter about?*  
The life of one of the world's most well-known artists



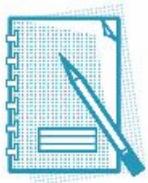
*How long with this chapter take?*  
1 hour

# Chapter 1: Warming Up

Before you explore, answer the questions below in your notebook.

## Consider

1. What does it mean to be a master of something? If you're unsure, look up the definition of *master*.
  - What do you think it takes to master a certain subject, sport, or skill?
  - Is there anything you are trying to master? How will you get to the point of becoming a master?



## Discover

2. Consider the definition of the word **polymath**—a person of wide-ranging learning and knowledge. Do you know any modern-day polymaths? If not, what might it take to be considered a polymath today?



## The Real Leonardo

More than 500 years have passed since the death of Leonardo da Vinci (1452–1519), one of Italy's most famous citizens. However, Leonardo remains as well known today as ever.

Why? Leonardo was a masterful painter. You may know him as the creator of one of the world's most **iconic** paintings—the 'Mona Lisa.' Indeed, the 'Mona Lisa' has been the subject of countless studies, books, films, and more.

But painting is only a small fragment of Leonardo's creative legacy. He was also a student of architecture, geology, physiology, anatomy, optics, physics, and more.

Was Leonardo a genius? Most likely. But he was also like many others who lived during the Italian **Renaissance**, a period of renewed interest in learning and creativity that began in Italy in the 1300s and spread north to other parts of Europe.



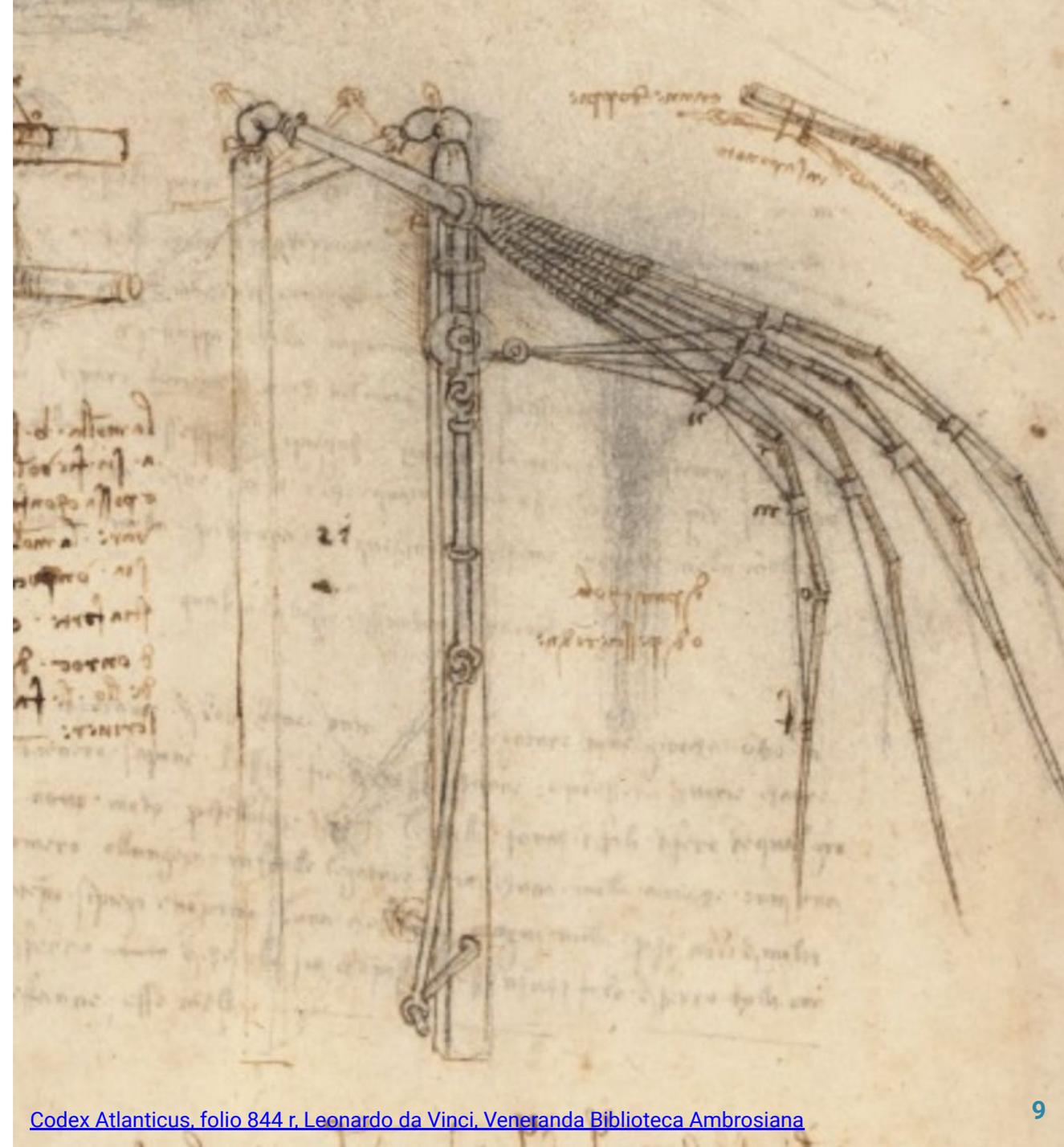
To learn more about the famous self-portrait shown here, read [this story](#).

# A “Renaissance Man”

Leonardo was one of many polymaths—people of wide-ranging learning and knowledge—of the Renaissance era. During this period, it was not uncommon to be educated in many different fields. Scientific study and artistic creation often went hand in hand.

Other polymaths included Italians Filippo Brunelleschi and Leon Battista Alberti. But Leonardo is frequently viewed as the most accomplished, in part due to his unique drawing abilities. His powers of **observation** enabled him to **render** highly skilled and detailed drawings of both real objects and those of his imagination. He used these skills to study things like birds’ anatomy and their flight, which in turn led to his drawing a model for a flying machine.

Leonardo recorded his observations, notes, and drawings on thousands of pages of paper, sometimes only small scraps. Collectively, these notes have become known as Leonardo’s codices. A **codex** is an ancient manuscript text.



For an introduction to Leonardo’s creative legacy, read [this story](#).

# Da Vinci's Early Life

Leonardo was born in Vinci, in what is now Italy, on April 15, 1452.\* (*Da Vinci* means “of Vinci.”) He was raised on his father’s family estate. It is thought that early on, Leonardo’s father recognized his son’s artistic talent. When Leonardo was around age 15, his father sent him to the Italian city of Florence to study as an **apprentice**. Da Vinci apprenticed under sculptor and painter Andrea del Verrocchio (1435–1488), studying painting, sculpture, and technical and mechanical arts.



[Vinci Vinci, Museo Leonardiano di Vinci](#)

\*Note: The kingdoms that made up Italy weren't united as a country until 1861.



Learn more about Leonardo and his hometown in [this exhibit](#).



Explore Leonardo's birthplace [here](#).



Learn more about the painting 'Madonna of the Carnation' that Leonardo created in Verrocchio's workshop [here](#).



Leonardo remained in Florence until 1482. He then moved to Milan to work in the court of Milan's Duke Ludovico Sforza (1452–1508). Leonardo spent 18 years there as the court's painter and engineer. He engaged in many painting projects, including the living quarters known as the Sala delle Asse (left). He also engineered elaborate stage machines for festival performances.



Learn more about Leonardo's life in Milan in [this story](#).

Read about the Sala delle Asse [here](#) and visit it in StreetView [here](#).

## Later Life

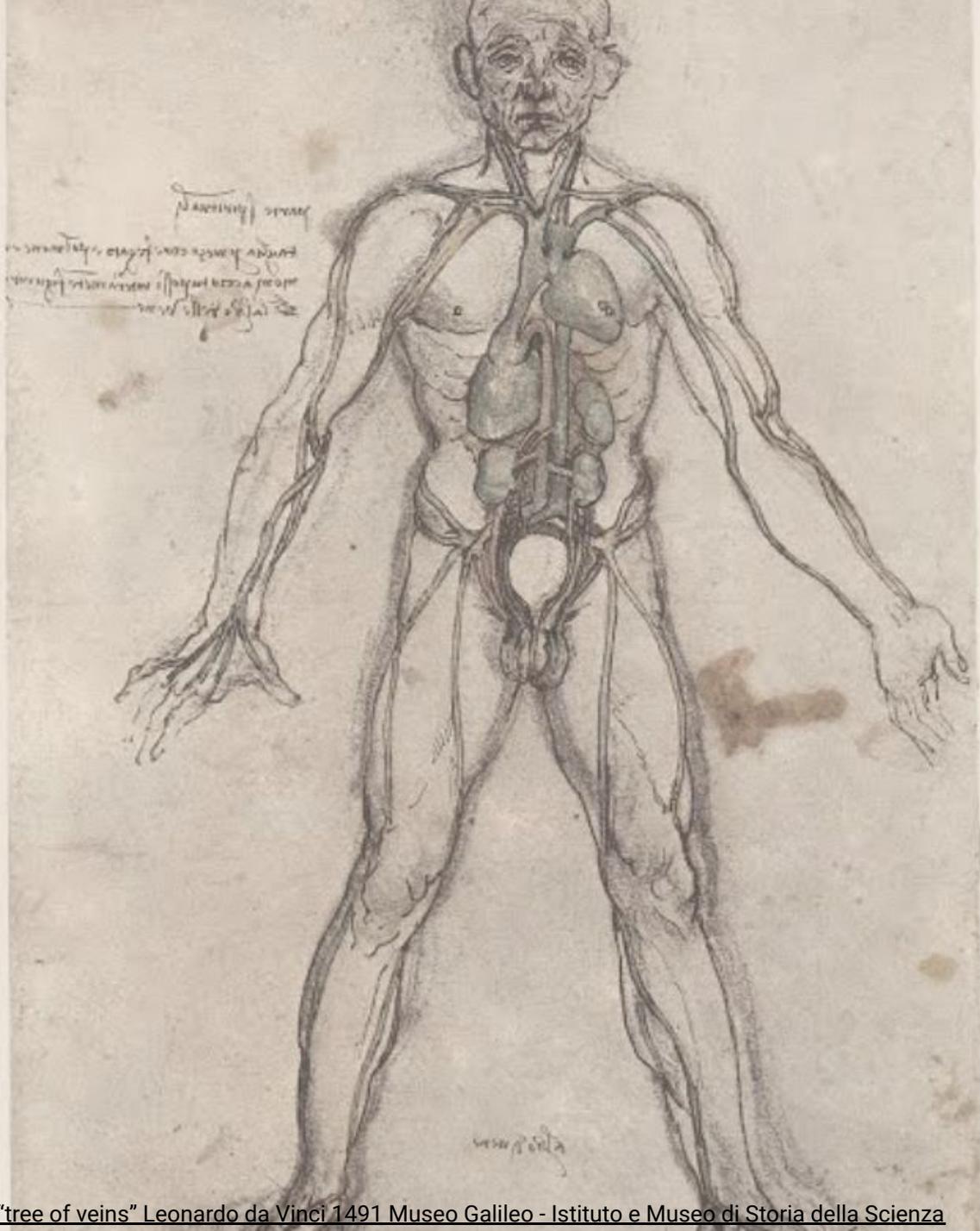
During his later years, Leonardo moved several times for new assignments. He left Milan in 1499 after Duke Sforza fell from power. Leonardo returned to Florence in 1500, where he spent more time on engineering and surveying projects than on painting. He also studied science intensively during this period.

Leonardo returned once again to Milan in 1508, where he remained until 1513. He worked primarily as an architect. He also taught many students and continued his scientific study in anatomy, botany, geology, and other subjects.

In 1513 Leonardo moved to Rome, where he took up residence at the Vatican under a **patron**, Giuliano de' Medici, the brother of Pope Leo X. However, the pope favored younger and up-and-coming artists, such as Michelangelo. After his patron's death, Leonardo felt his fortunes begin to change.



See the books that inspired Leonardo's studies and writings [here](#).





[The Château du Clos Lucé, Unknown, XIIIth century - XXIst century, Castle of Clos Lucé](#)

In 1516, the king of France asked Leonardo to join his court, and Leonardo left Italy forever. He served as principal architect, engineer, and painter to the king for three years. He even served as master of festivities at the palace. Most of his time was spent on his studies, though he did paint and draw as well. He died in France at his residence, Manoir du Cloux (left), and was buried at the palace church.



Learn more about Leonardo's years in France in [this exhibit](#).

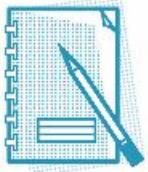


Visit Manoir du Cloux in StreetView [here](#).

Learn more by visiting [The Real Leonardo](#).

# Chapter 1: Wrapping Up

Now that you've read the chapter, reflect on what you've learned by answering the question below.



Review your answers to the Warming Up activity.

- Did you identify a modern-day polymath?
- What skills does that person have?

Write a paragraph explaining that person's skills and why you think that person is a polymath. If you didn't identify such a person, write a paragraph explaining what you think the ideal background and skills would be for a polymath in today's world.

# Chapter 2:

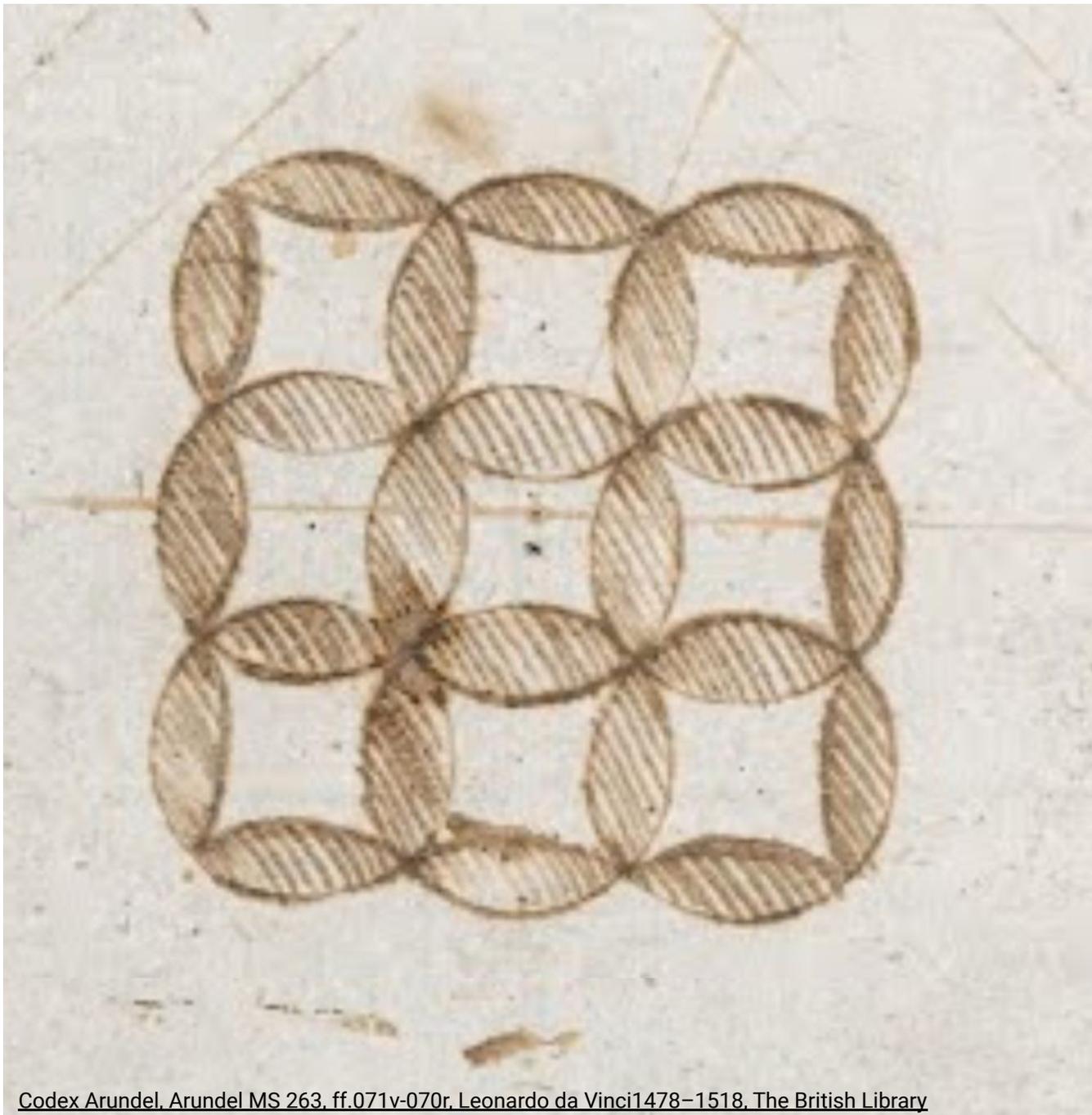
## The Codices



*What is this chapter about?*  
The notes and sketches from Leonardo's lifelong studies



*How long will this chapter take?*  
1 hour

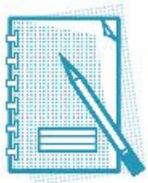


# Chapter 2: Warming Up

Before you explore, answer the questions in your notebook.

## Consider

1. Why do most people take notes in class or elsewhere?
  - How does notetaking help one remember something later?
  - How does writing information down help with processing information?



## Discover

2. You're about to learn that Leonardo was a lifelong student. He read, took notes, and made sketches of the things he learned about. Why do you think he did this? What purpose might his notes have served for him?

## Why Did Leonardo Write Backward?

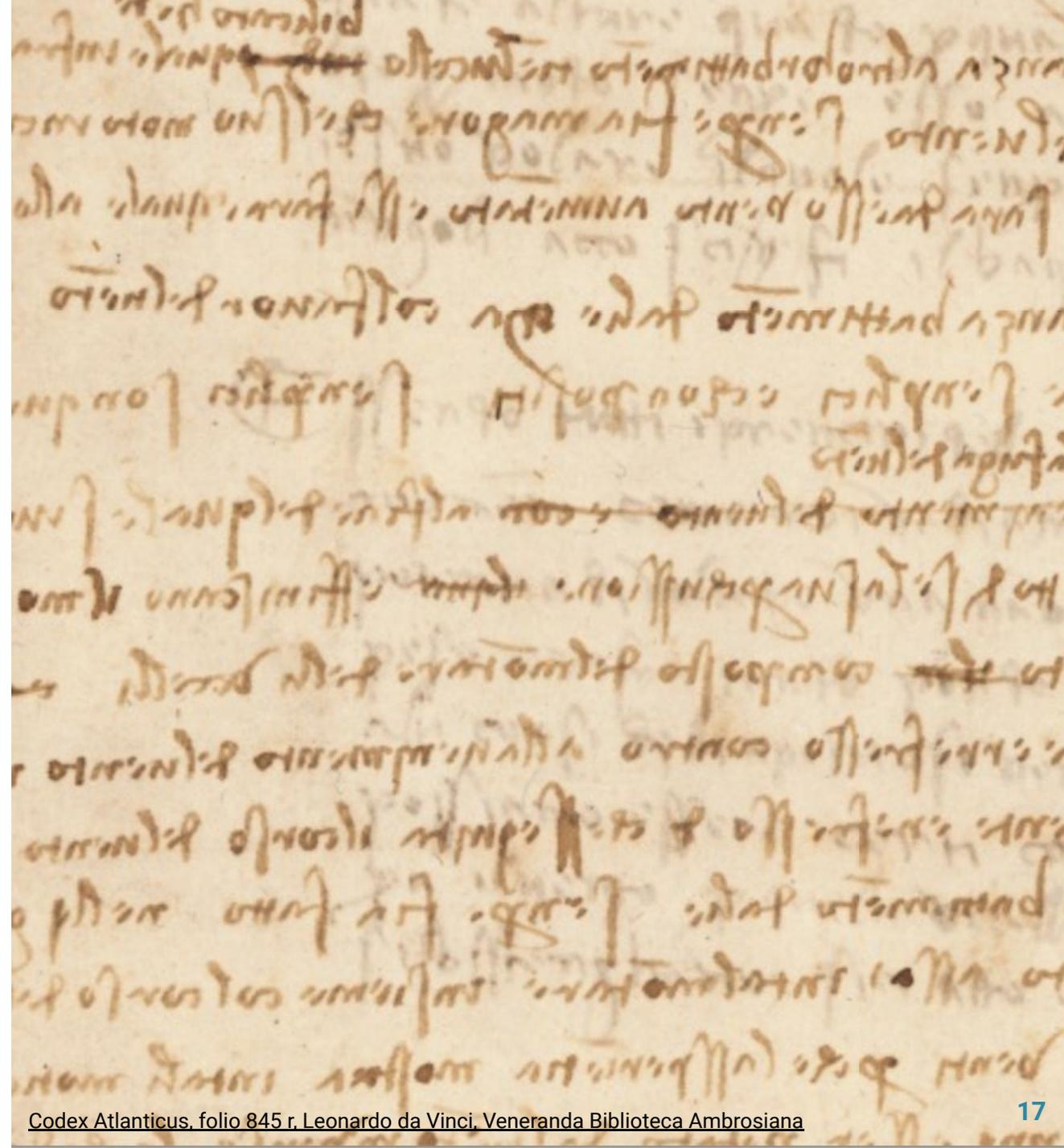
Leonardo was a master of drawing, and he applied his talent to his observations and study of many subjects. He recorded these observations and drawings in his codices. Today, there are thousands of pages of notes and drawings made by Leonardo. These texts give us insight into his study methods.

Interestingly, Leonardo wrote from right to left. In earlier history, some people claimed that his writing was a form of secret coding. In reality, however, Leonardo was left-handed, and it was easier for him. When viewed up close, Leonardo's handwriting appears to be a mirror image of traditional script. You can see this in the detail from the Codex Atlanticus on this slide.



Learn more about why Leonardo wrote backward [here](#).

See how Leonardo folded his pages in [this video](#).



# Codex Atlanticus

Leonardo's notes generally relate to four broad areas of study—painting, architecture, mechanics, and human anatomy. Twenty-one codices survive today, but some other works by Leonardo have been bound to make additional collections. The Codex Atlanticus is the largest collection of notes and sketches—it consists of 1,119 papers. The drawings and notes in this codex mainly concern technical and mechanical subjects. Leonardo also wrote a few **fables** that appear in this collection.

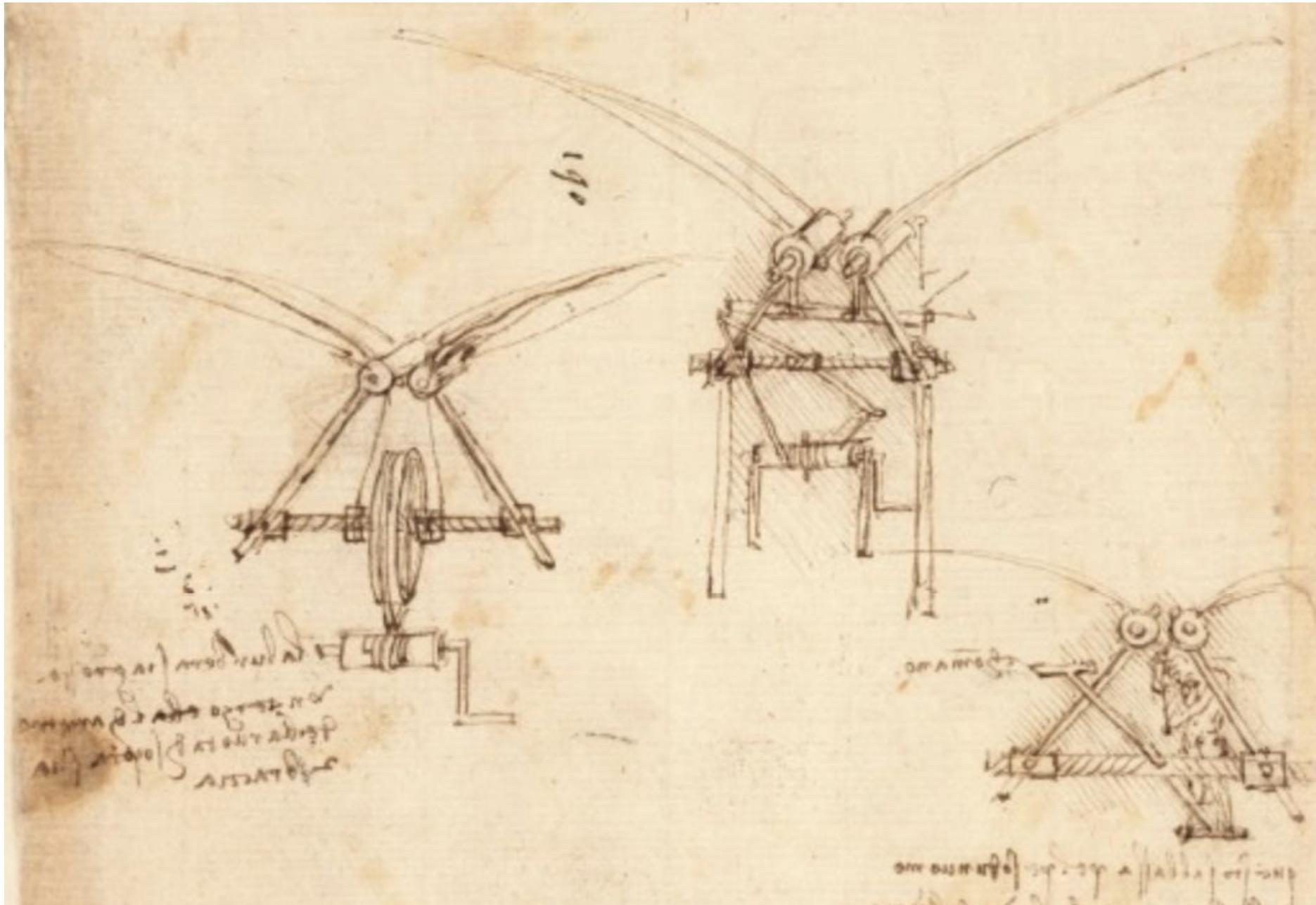


Atlantic Codex (Codex Atlanticus), f. 26 verso, Leonardo da Vinci, 1480/1482, Veneranda Biblioteca Ambrosiana

Leonardo didn't put the Codex Atlanticus together himself. In the 1500s, Milanese sculptor Pompeo Leoni assembled the collection from papers given to him by heirs of Leonardo's pupil Francesco Melzi. Leoni organized the papers according to theme.



Read more about the Codex Atlanticus [here](#).

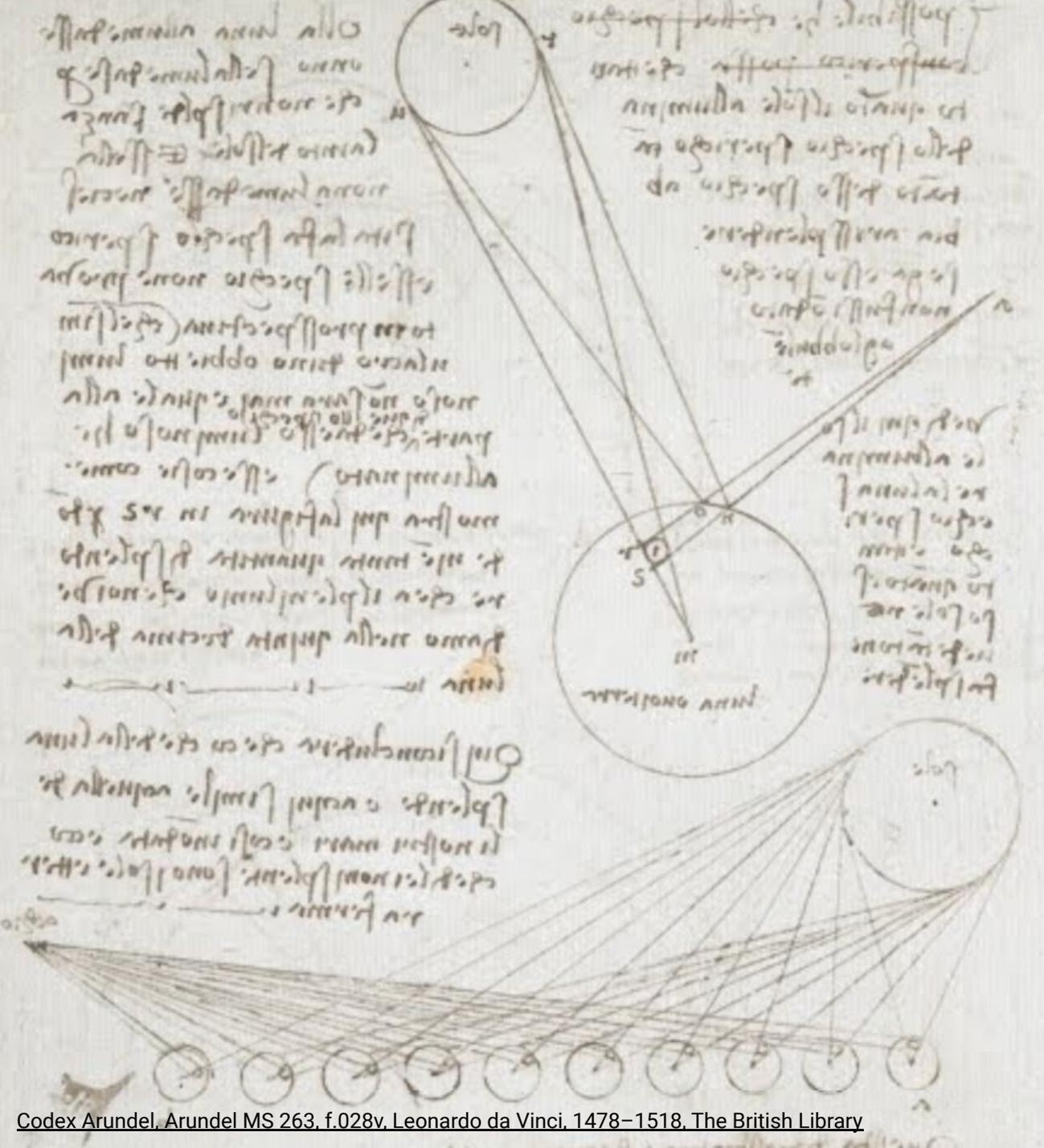


One area that Leonardo explored in the Codex Atlanticus was flight. He studied the anatomy and movement of birds. He also theorized on the possibility of human flight. Some of his drawings feature artificial wings for use by humans. Scholars today believe he meant for these to be used in theater productions. A later codex, Codex on the Flight of Birds (Codice su volo), is devoted entirely to the subject of flight.



Find out about Leonardo's studies on flight in Codex Atlanticus [here](#).

Find out more about the Codex on the Flight of Birds [here](#).



## Codex Arundel

The Codex Arundel includes many different subject areas. Mathematics, geometry, astronomy, cosmology, mechanics, nature, anatomy, and architecture are all represented.

**Cosmology** is the science and study of the development of the universe. In this codex, Leonardo studied the relationship of the sun, the moon, and the planets using his understanding of perspective and optics, or what one can see with the eye. He didn't have the use of a telescope—the telescope wasn't invented until 1608.

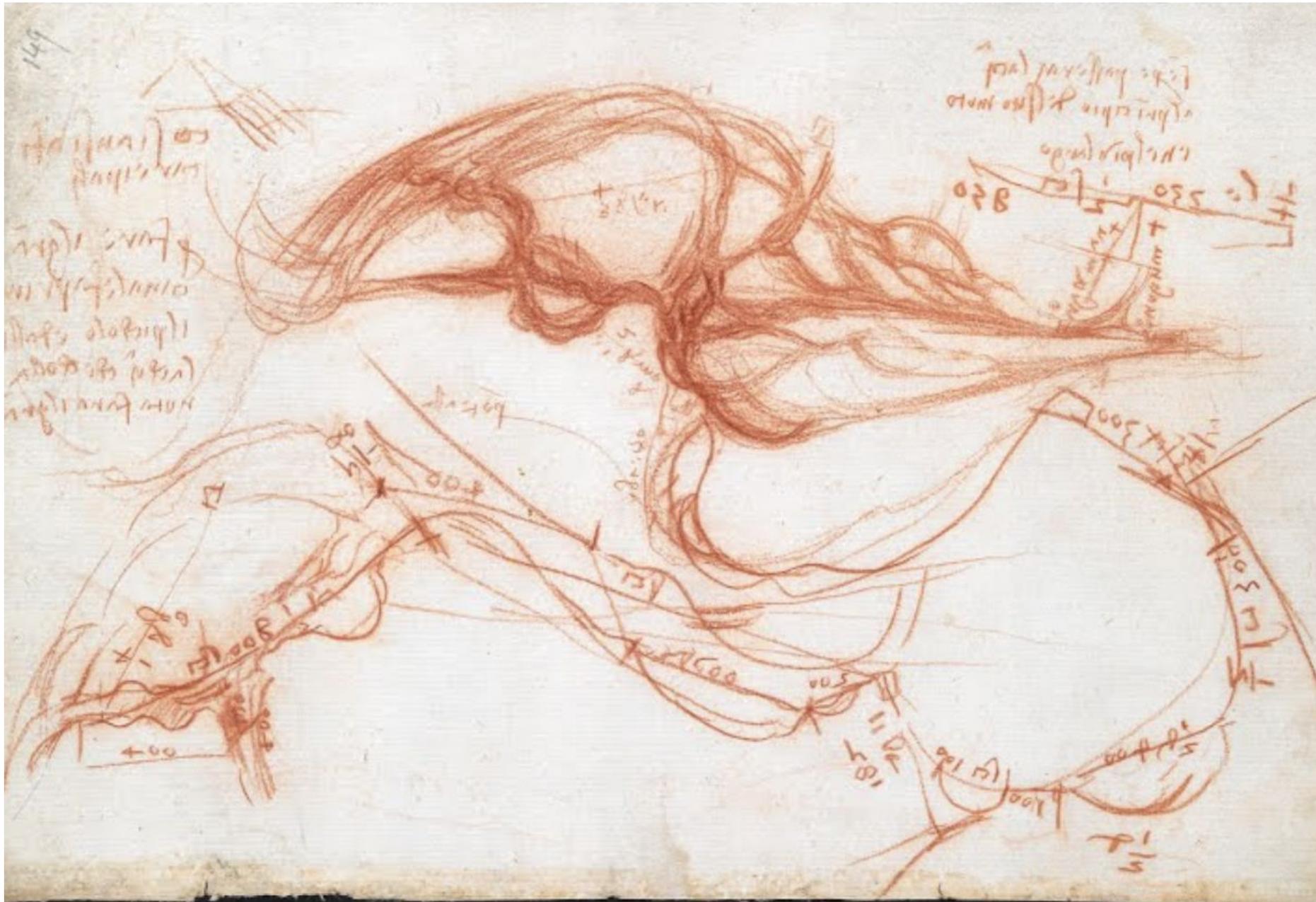
Another topic Leonardo explored in this codex was the science of sound. He wrote notes not only about theories of sound travel but also about different types of instruments and the sounds they made.



Read more about the Codex Arundel [here](#) and [here](#).

Learn about Leonardo's studies in geometry from the Codex Arundel in [this story](#).

Find out more about Leonardo's sound studies [here](#).



The Codex Arundel also contains some of Leonardo's studies about hydraulics and the movement and force of water. He used his studies in his position as a hydraulic engineer in Florence from 1500 to 1506. He later continued his study of water in the Codex Leicester. He even included drawings for machines that could measure water flow.



Learn more about Leonardo's water studies in [this exhibit](#).



## Other Significant Codices

Another noteworthy collection of Leonardo's notes and sketches include the Codex Madrid (I and II), which contains one of the most significant collections on engineering in history. This codex also contains studies in geometry and mechanics.



Find out more about Codex Madrid [here](#).

In addition to notes on flight, Codex Leicester contains notes on the properties of water, air, rocks, and fossils, as well as a study of the moon.



Find out more about Codex Leicester [here](#).

Codex Trivulzianus contains lists of words Leonardo studied, studies on nature and religious architecture, and caricatures.



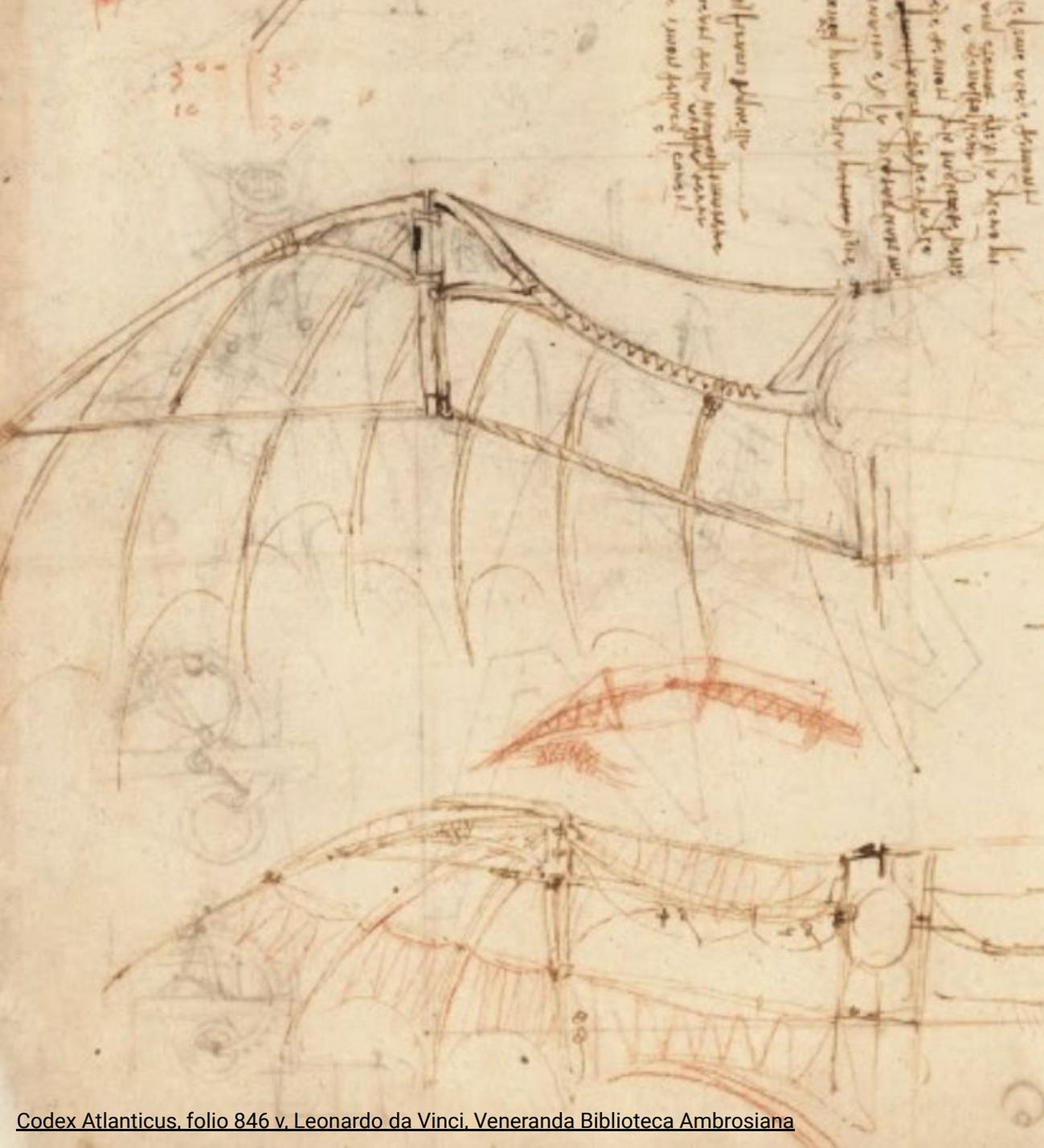
Find out more about Codex Trivulzianus [here](#).



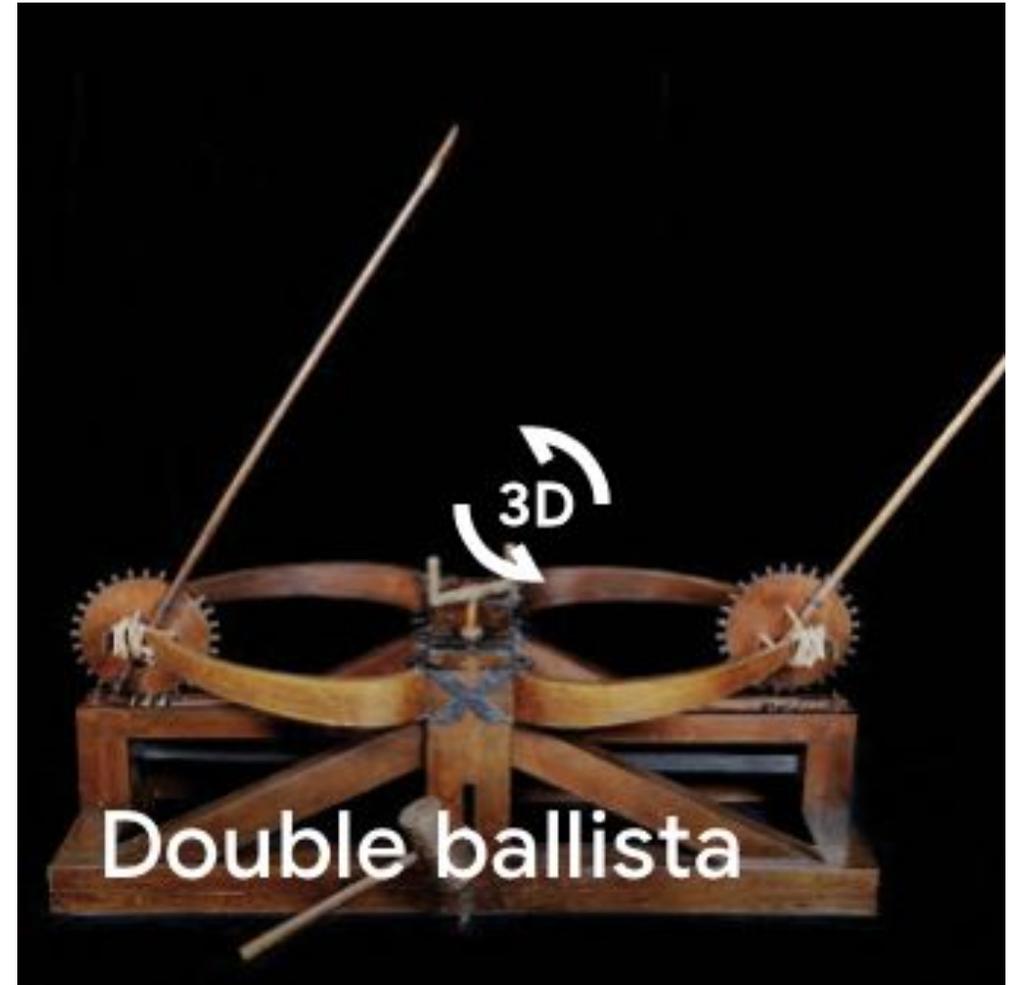
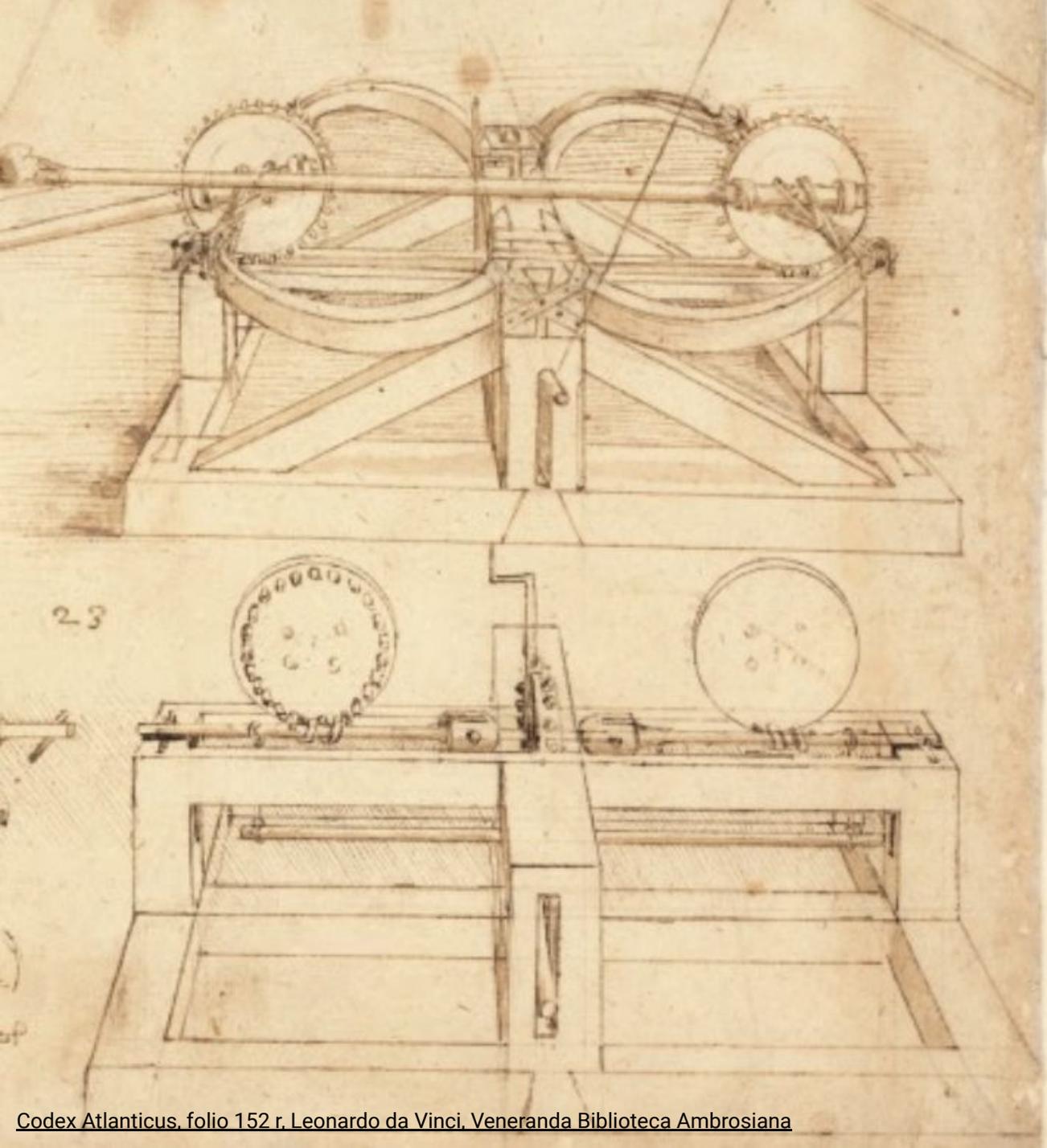
See how one artist interprets the connections among Leonardo's codices in [this video](#).

## Leonardo's Machines

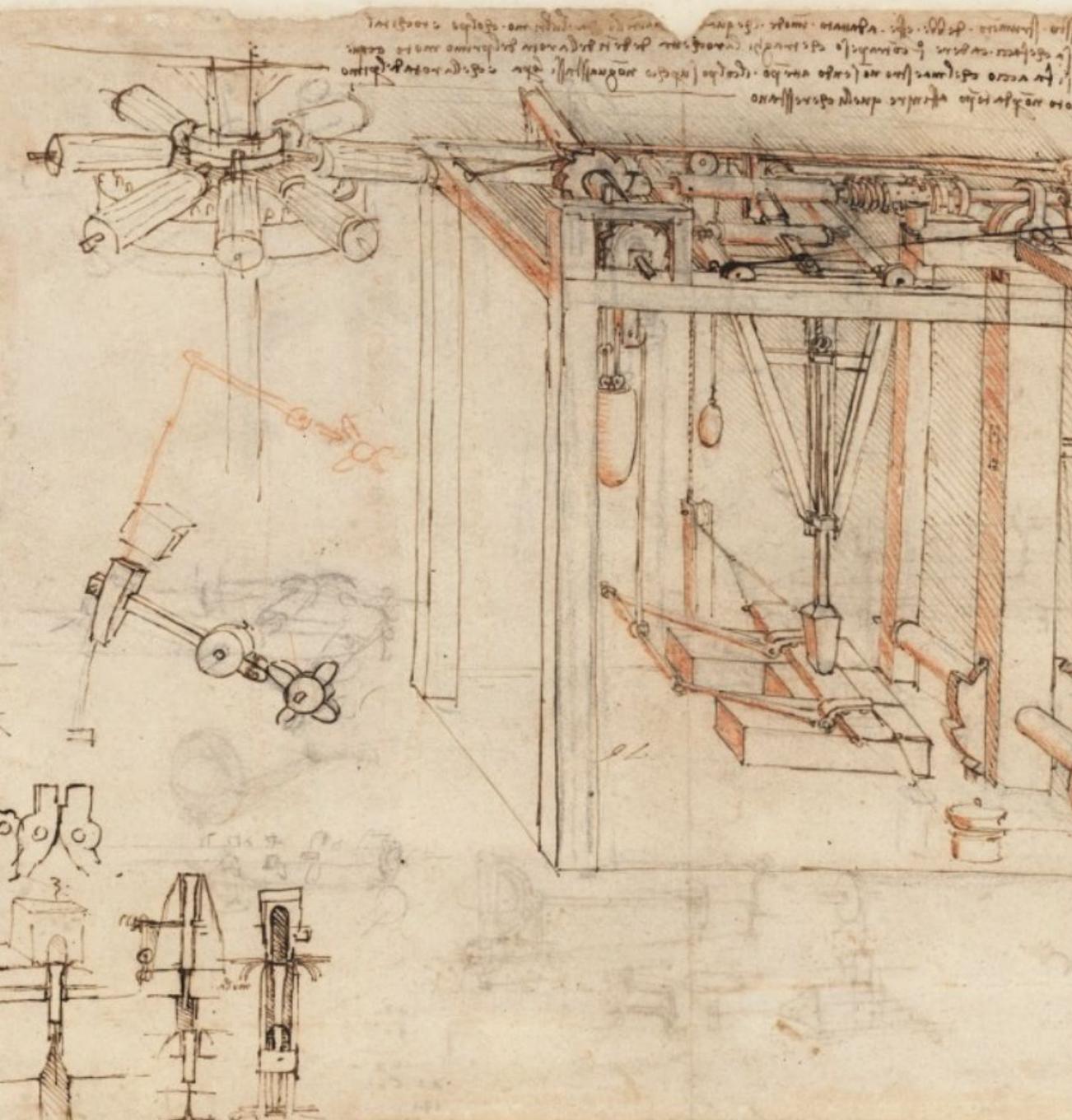
Now that you have seen how Leonardo worked and have viewed many of his drawings, let's look at some of his designs in action. The next few pages show a photograph of a drawing for a machine from a codex, along with a link to a 3-D model of that machine. Click the box with the model to see it move.

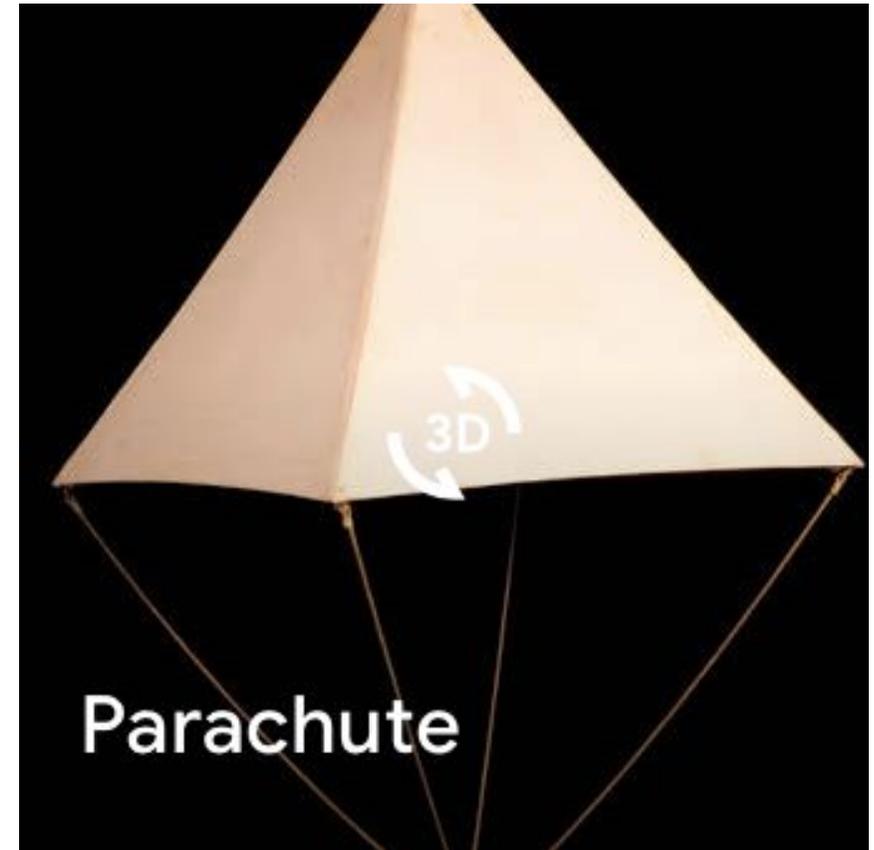


The glider



A ballista is a type of catapult—a weapon used to throw stones or other objects at the enemy.



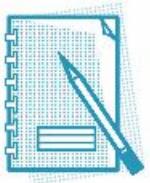


For more on Leonardo's codices, machines, and inventions, visit [Behind the Mind](#).

Explore the codices further in [Inside a Genius Mind](#).

# Chapter 2: Wrapping Up

Now that you've read the chapter, reflect on what you've learned by answering the question below.



Think about Leonardo's codices and what was in them. How did what he studied in real life impact his imagination? Give examples from the chapter.



# Chapter 3:

## Masterpieces Up Close



*What is this chapter about?*  
Leonardo's painting and drawing



*How long will this chapter take?*  
1 hour



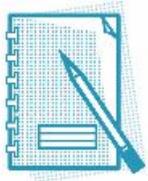
Leonardo was also a cartographer, or mapmaker. Zoom in on the details of this map [here](#) and learn more about his cartography skills [here](#).

# Chapter 3: Warming Up

Before you explore, answer the questions in your notebook.

## Consider

1. You are about to read more about several of the paintings in Leonardo's body of work, including the 'Mona Lisa.' Leonardo never stopped working on the 'Mona Lisa'—it was found in his bedroom when he died. Why do you think he kept working on it?



## Discover

2. Leonardo made relatively few paintings during his lifetime. In fact, many of his paintings were left unfinished. Why do you think this might've been?

# Leonardo the Artist

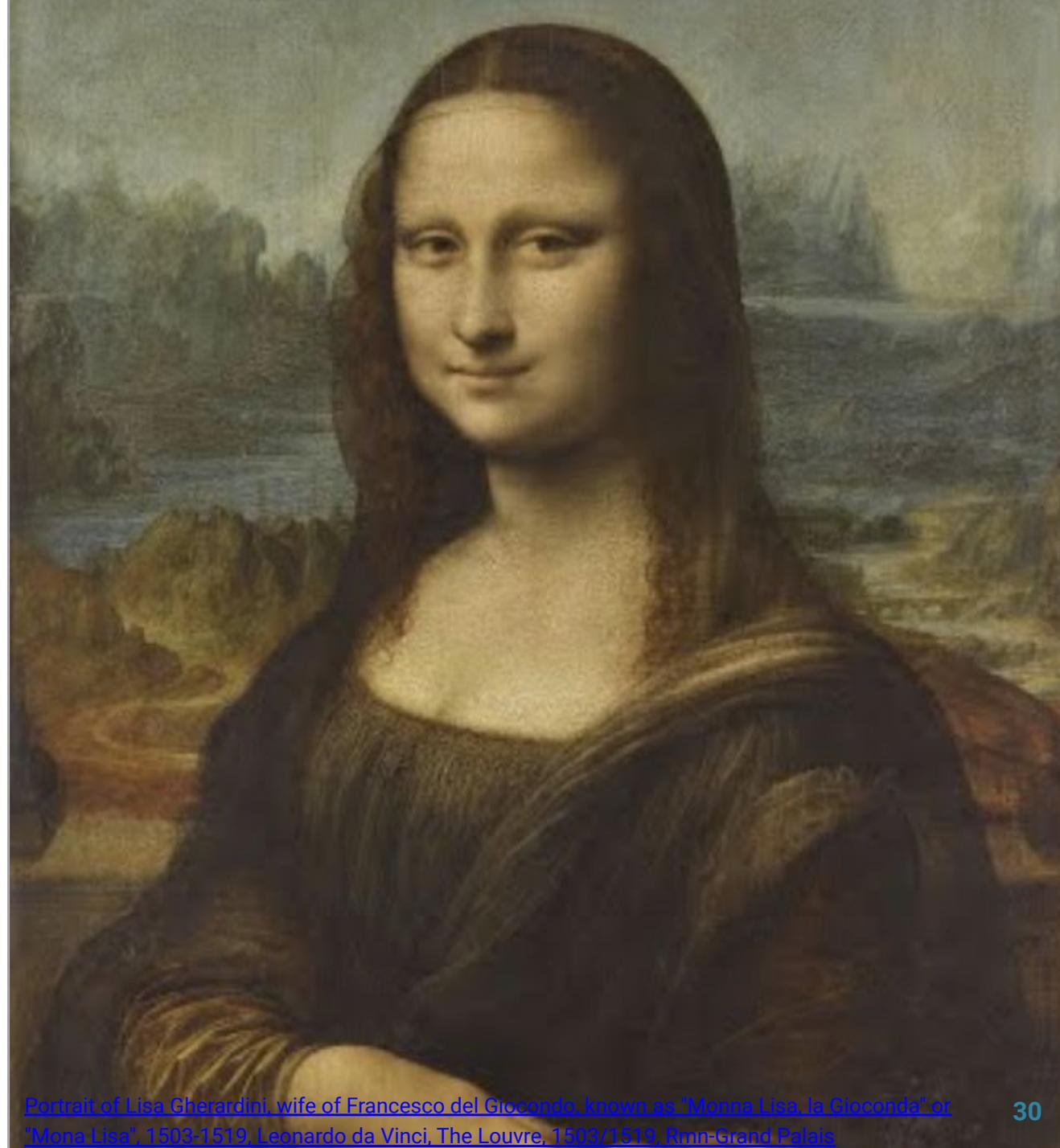
Most people know Leonardo as an artist, rather than as a scientist, engineer, or architect. However, Leonardo only completed around 12 known paintings during his lifetime. He spent much more time on his studies, writings, and drawings. It just so happens that some of his paintings are among the most famous in the world.

Take, for example, the 'Mona Lisa,' shown here. You have probably seen this painting before. As you read earlier, it has been studied and written about extensively. It has even been printed on T-shirts!

This portrait is believed to be of Lisa Gherardini, the wife of Florentine fabric merchant Francesco del Giocondo. The painting is known as 'La Gioconda' in Italian.



Learn more about the 'Mona Lisa' and see the painting up close [here](#).





## 'The Lady with an Ermine'

This painting was done during Leonardo's time in Milan at the court of Duke Ludovico Sforza. The portrait is of 17-year-old Cecilia Gallerani, a lady-in-waiting at the court. The painting is one of only four portraits of women painted by Leonardo. The animal she is holding is an ermine, which is a type of short-tailed weasel.



Why is Gallerani holding an ermine? Find out more about this painting in [this story](#).

Zoom in on the details of 'The Lady with an Ermine' [here](#).

See an analysis of the painting using ultraviolet and other technology in [this story](#).

## 'Portrait of a Musician'

'Portrait of a Musician' wasn't identified as being painted by Leonardo until the 20th century. Experts have said that some elements of the painting resemble those of 'The Virgin of the Rocks,' which you will see on the next page.

Scholars once believed this to be a portrait of Duke Ludovico Sforza, created while Leonardo was the court painter for the duke. However, later removal of some overpainting revealed that the subject is holding a piece of sheet music. This led them to think that the subject is a musician. Still, no one is sure of the exact identity of the young man in the portrait.



Learn more about 'Portrait of a Musician' [here](#).



# 'The Virgin of the Rocks'

The image here is a detail from the beautiful painting 'The Virgin of the Rocks,' which was once part of an altarpiece for a chapel in Milan. Like the paintings on the previous slides, this painting demonstrates the technique of **chiaroscuro**—the use of light and dark for dramatic effect.



Read more about the details of this painting [here](#) and [here](#).





This is a detail from the painting 'The Last Supper,' created by two of Leonardo's pupils. It is believed to be a copy of a mural painting Leonardo made called 'The Last Supper.' The painting was created around the same time. The fresco, which is in the Convent of Santa Maria delle Grazie in Milan, Italy, has been restored many times over the years. This painting has helped conservationists in their work.



Learn more about 'The Last Supper' in [this story](#).

See how Leonardo worked on 'The Last Supper' and other works [here](#).



## 'Hercules with the Nemean Lion'

You have read that Leonardo was a master at drawing and that one of the subject areas he studied was human anatomy. This drawing, 'Hercules with the Nemean Lion,' shows Leonardo's skill at capturing the human form.

The sketch is believed to have possibly been a study, or visual notes, for a statue that was never executed. Leonardo was working in Florence during this period, and the statue was meant for the Palazzo Vecchio.



Learn more about this drawing in [this story](#).

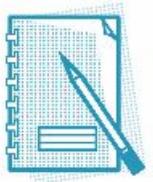
Learn more about Leonardo's anatomical studies in [this exhibit](#).



Want to see and read more about Leonardo's painting, drawing, and cartography? Visit [Masterpieces Up Close](#).

# Chapter 3: Wrapping Up

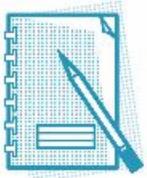
Now that you've read the chapter, reflect on what you've learned by answering the question below.



Review what you learned about Leonardo's paintings. Has your answer changed about why he might've made so few? Explain your answer.

# Digital Learning in Action

So, what did you learn? Read the questions and complete the learning activities below to extend your learning based on what you just experienced.



**Reflect** Answer these questions:

- You've learned about the Renaissance and its renewed interest in learning. How does Leonardo's life reflect that period in history?
- Why do you think Leonardo was so interested in science? What kinds of questions might he have been trying to answer?
- What did you learn about Leonardo's inventions? Do any resemble things you've seen in the modern world?



**Summarize:** Consider the major themes of Leonardo's studies. From what you've learned, what subjects were most important to him? Why do you think these topics fascinated him? Review the codices [here](#) to find examples for your answer.



**Create:** Leonardo wrote a cover letter when he hoped to gain a position at the court of the Duke Ludovico Sforza. Read about the cover letter [here](#). What topics did Leonardo cover? Why do you think he focused on these? Once you've read Leonardo's cover letter, write one of your own. Imagine you're applying for a job that you really hope to get. Focus on your achievements and your skills. Make your letter as convincing as possible. Be sure to proofread your letter for mistakes!

# Glossary

- **apprentice:** someone who is learning a trade from a skilled person
- **chiaroscuro:** the use of light and dark elements in a pictorial artwork
- **codex:** ancient manuscript text
- **cosmology:** the science and study of the development of the universe
- **fable:** a short story that tells a moral tale
- **iconic:** widely recognized and admired
- **observation:** an act of noting a fact or occurrence
- **patron:** a wealthy supporter
- **polymath:** a person of wide-ranging learning and knowledge
- **Renaissance:** a period of renewed interest in learning and creativity that began in Italy in the 1300s and spread north to other parts of Europe
- **render:** to represent by artistic means