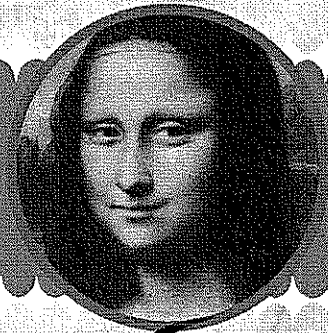
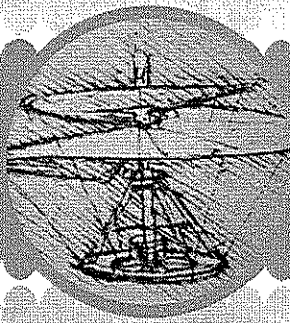


LEARN SOME HANDS ON HISTORY!

Amazing

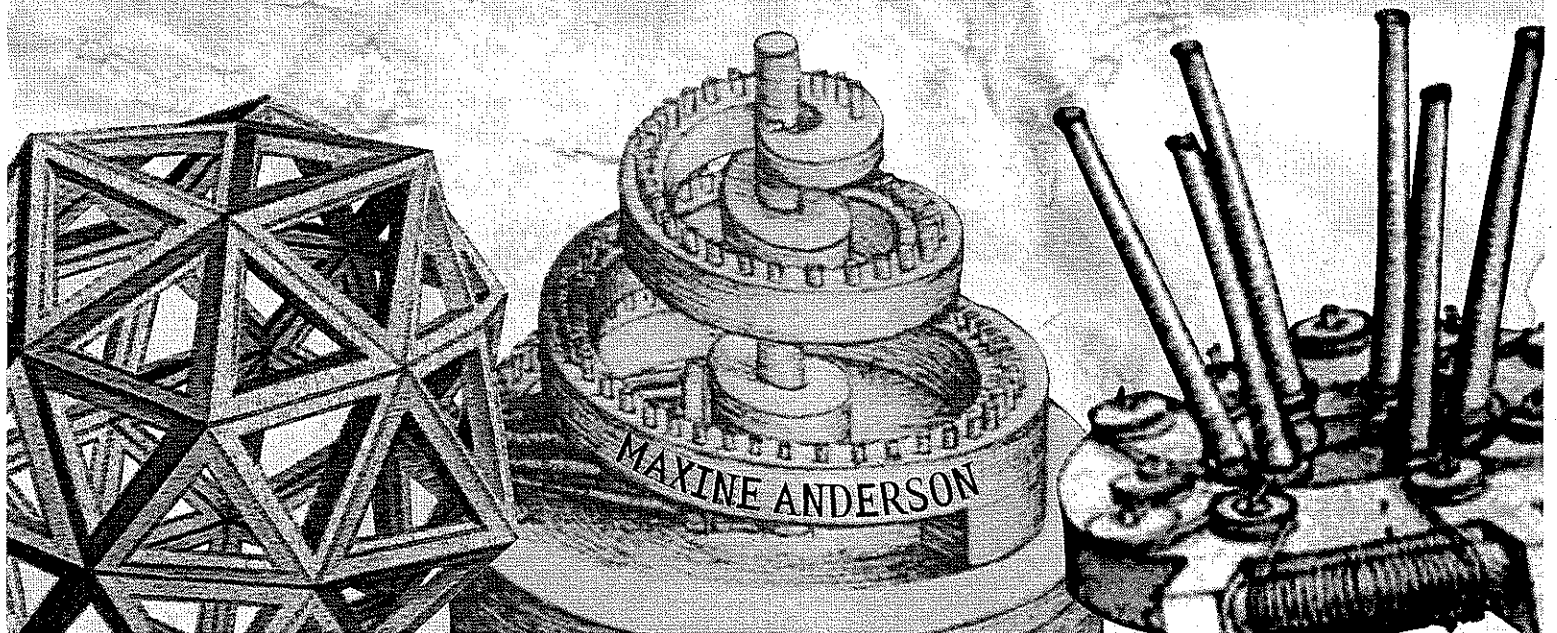


Leonardo da Vinci



Inventions

YOU CAN BUILD
YOURSELF



LEARN SOME HANDS-ON HISTORY!

Amazing Leonardo da Vinci Inventions

YOU CAN BUILD
YOURSELF

MAXINE ANDERSON



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Timeline

April 14, 1452: Leonardo da Vinci is born in Vinci, near Florence

1467–1477: Leonardo goes to Florence to work as an apprentice under the famous artist Andrea del Verrochio, learning everything about the artist's trade. Leonardo probably helped design the machinery to put the 2-ton copper ball that was placed on the top of the dome of the Cathedral of Santa Maria del Fiore.

1482–1499: Leonardo goes to work for Ludovico Sforza, the Duke of Milan, as his military engineer. Leonardo creates paintings, designs costumes, and fills his notebooks with ideas and drawings about nature, science, hydraulics, mechanics of inventions, and machines. This eventually results in nearly 4,000 pages of sketches and notes.

1490s: Leonardo writes his theory on the flight of birds and draws many sketches of machines designed to mimic bird flight. Leonardo may have tried out some of his flying machine ideas.

1495–1498: Leonardo paints *The Last Supper* using a new technique of oil and varnish on dry plaster. Unfortunately, the experiment was a disaster and the painting began to disintegrate almost immediately.

1499: The French invade Milan and Ludovico Sforza falls from power, leaving Leonardo unemployed and without a source of income.

1502: Leonardo works for Cesare Borgia as a mapmaker and military engineer.

1503: Leonardo begins to paint *Mona Lisa*.

1506: Leonardo leaves Florence for Milan, where he studies anatomy, creating anatomical sketches so accurate they are used by medical students for several hundred years.

1509: *The Divine Proportion*, a book on mathematical proportion written by Luca Pacioli and illustrated by Leonardo, is published. It is the first book on geometric proportion with illustrations and becomes the standard text on the subject for many years to come.

1513–1516: Leonardo works for the Pope in Rome. The Pope forbids him to dissect cadavers (humans after they've died), which is important to his study of anatomy.

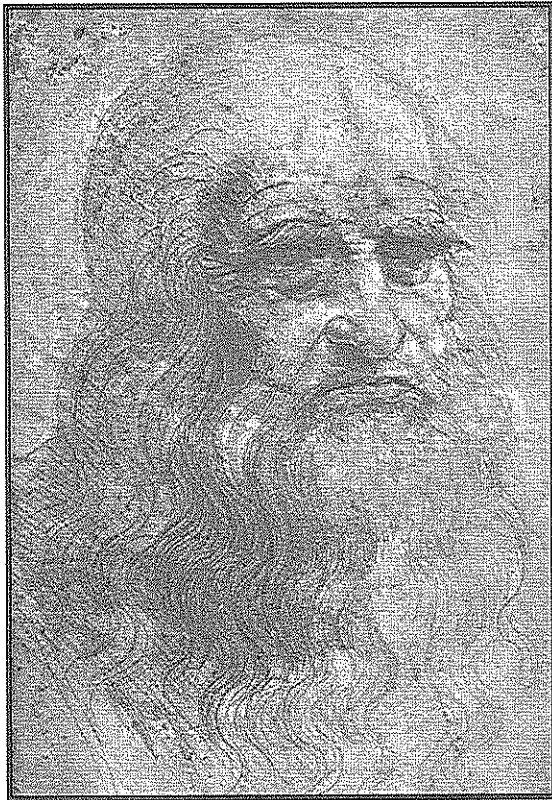
1515: Leonardo paints his last painting, *St. John the Baptist*, which today hangs in the Louvre Museum, in Paris.

1516: Leonardo is hired by King Francis as a member of his court, and moves to France.

1519: Leonardo dies in Cloux, France, and is buried in Amboise.

Introduction

Have you ever had to do a chore that you just didn't want to do—and wished you could invent a machine to do it for you? Or wondered if you could build a flying machine, or a secret weapon, or invent something that no one had even considered before? That's what Leonardo da Vinci did, more than 500 years ago. Leonardo da Vinci is one of the world's best-known artists; he painted *Mona Lisa*, the



Leonardo's self-portrait at about age 60.

world's most famous painting, and other very famous works of art. But Leonardo was also one of the most amazing and creative inventors ever to live. He filled hundreds of notebooks with ideas for inventions ranging from flying machines to armored tanks to shoes that could walk on water, and he did it at a time when people still believed that the earth was the center of the solar system and explorers still hadn't "discovered" the New World.

This book will help you discover Leonardo da Vinci, his life, ideas, and most importantly, his amazing inventions. You'll learn a little history of the time in which Leonardo lived, some

interesting facts about the people and places around him, and also how to build working models of lots of Leonardo's inventions.

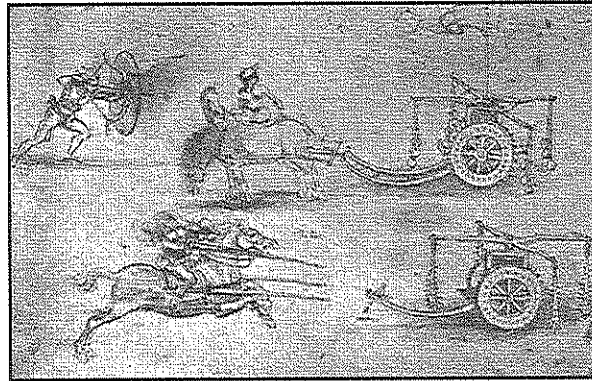
The book is divided into five main sections. **Leonardo the Artist and Dreamer** features Leonardo's inventions that focus on painting, drawing, drama, and other arts.

Leonardo's Useful Machines cov-

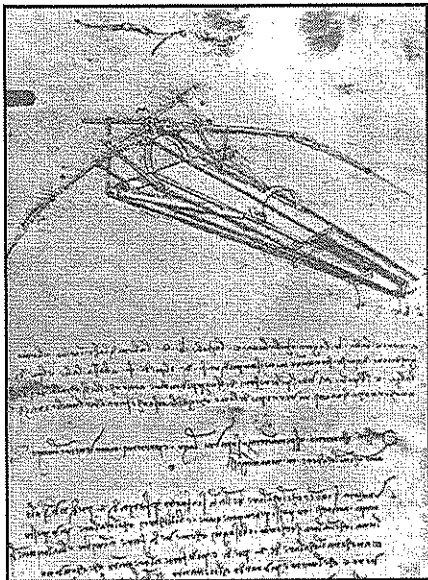
ers inventions that Leonardo developed to make everyday life easier. **Leonardo and Water** explores Leonardo's obsession with the power of water and his quest to tame it, while **Leonardo in Flight** looks at some of the experiments Leonardo conducted

in his quest to fly. **Leonardo's War Inventions** explores his inventions used for warfare.

Most of the projects in this book can be made by kids without too much adult supervision, and most of the supplies for projects are probably already around your house. So, take a step back into Leonardo da Vinci's Renaissance and get ready to Build It Yourself.

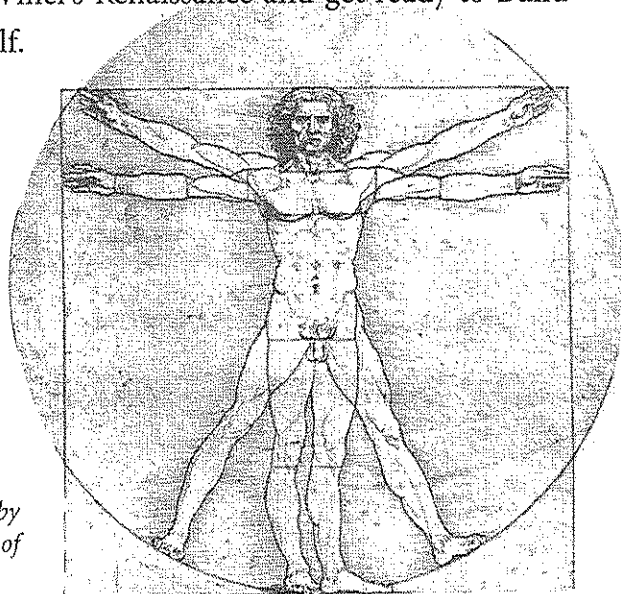


A page from one of Leonardo's notebooks shows ideas for weapons.



Another page shows his design for a flying machine.

Perhaps one of the most famous images created by Leonardo, Vitruvian Man, studies proportions of human anatomy.



What Was the Renaissance?

When people talk about the time in world history called the Renaissance, they are talking about events that happened over a pretty big span of time. More than 250 years passed from the end of the Middle Ages in the 1300s to the beginning of the early Modern Age—and those 250 years are what historians today call the Renaissance.

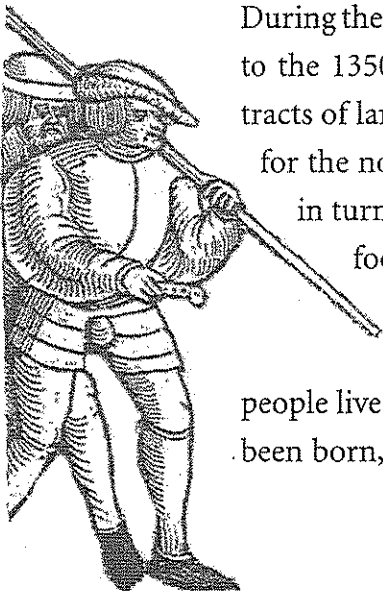
But what was the Renaissance? The word renaissance means “rebirth” in French. In the late fourteenth, and throughout the fifteenth and sixteenth centuries, the countries of Europe went through a period of rebirth in culture, art, music, education, banking, politics, and industry that forever changed the way people lived, thought, and viewed the world.

Renaissance = rebirth



During the thirteenth and most of the fourteenth century (from the 1200s to the 1350s), most of Europe was a feudal society. Kings owned huge tracts of land, and they gave big chunks of their land to nobles in exchange

for the nobles’ loyalty and protection in case of attack by enemies. The nobles, in turn, allowed peasants to live and work on their land. The peasants provided food and goods and services for the nobles and each other, in exchange for protection from invaders. For most people during this time, called the Middle Ages, life was simple, tough, and very isolated. Generations of people lived in the same small villages in which their grandfather’s grandfather had been born, lived, and died, doing the same jobs or working the same trade as their



Late 1300s through 1500s

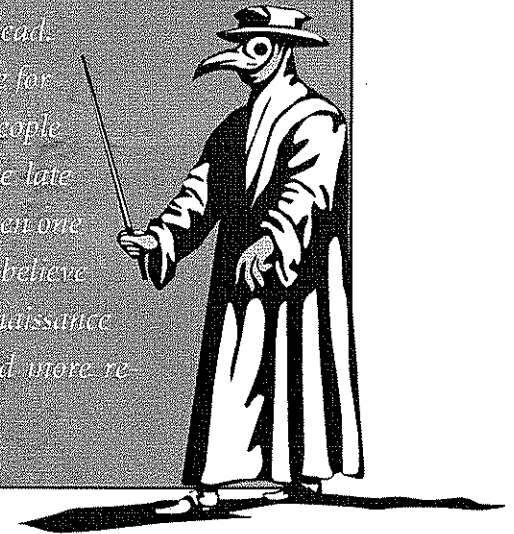
ancestors. People rarely left their villages, because their only protection from warring armies was to stay close to home.

As the years passed, though, armies invaded each others' territories less and less, and village people began to move away from the places they had lived for generations. Over time, more and more people moved from feudal villages to the cities of Europe to make better lives for themselves. Cities offered people more opportunities to learn new or different trades than they could find in their home villages. But city life also meant crowded, unsanitary living conditions—perfect conditions for the spread of Black Death, the bubonic plague that wiped out more than a third of the entire population of Europe in the mid-1300s. The plague was almost always fatal, and it spread throughout the continent, hitting the cities hardest. So many people died from the plague that the entire continent of Europe went in an economic depression that lasted for decades. There were fewer people to buy and use what tradespeople were making and merchants were selling, and many families were poor. Lack of buyers meant that everyone, from suppliers to manufacturers to bankers, was affected.

Finally, the plague ran its course and populations began to increase throughout Europe. More people meant greater demand for goods and services, and the tradespeople and merchants, bankers and importers thrived, creating goods that they ex-

The Plague

Bubonic plague, or Black Death, first hit Italy in 1347. Within two months, almost half of the Italian population was dead. Several more bouts of the plague raced through Europe for the next several decades, and Italy lost three million people in a century. During the time Leonardo lived, in the late 1400s, the population of Italy was lower than it had been one hundred years earlier. Oddly enough, some historians believe that this was actually one reason that the Italian Renaissance was so successful: fewer people meant more food and more resources for those who lived during this time.

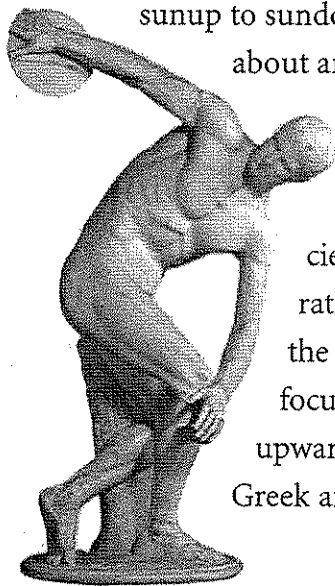


Understanding the Centuries

If you've ever wondered why the fifteenth century stands for the 1400s and not the 1500s—or, for that matter, why it's already the twenty-first century, even though we write the date with digits beginning with 20, look back to the first century, where this confusing trend began. Historians refer to the time since the birth of Jesus Christ as "the Common Era" and separate dates into "before the Common Era," or "BCE" and "Common Era," or "CE." Historians have dated the Common Era like this: since the first century began at Christ's birth, it started at year 0. Therefore the second century began at year 100 and is made up of all the years in the 100s (100–199). The third century includes all of the years in the 200s and so on. Any guesses as to which hundred years the twenty-third century will include?

changed with merchants and suppliers in other countries throughout the world.

In fact, business was so good that a new class of people emerged who not only had enough money for all the daily necessities of life, like food and clothing, but had money to spare—money they wanted to spend on things like fancy houses, beautiful clothes, lovely paintings and artwork, and exotic food. This new middle class also was interested in education: bankers needed to be good at arithmetic, merchants needed to be able to read and communicate in foreign languages, and many wanted to learn for learning's sake alone. This new middle class didn't have to work from sunup to sundown just to survive. They had free time, and they used it to learn about art, music, language, science, and politics.



Part of the reason this time in history is called the "rebirth," or Renaissance, is that many classical ideas about learning and the arts from ancient Greece and Rome were revived. The ancient Greeks and Romans had focused on human achievement rather than the glorification of God, but in the centuries just before the Renaissance (the Middle Ages), most art and writing in Europe focused on God. People didn't look outward at the world, but rather upward to the heavens. During the Renaissance people rediscovered the Greek and Roman languages, ancient literature, and classical ideals, and

Art in the Renaissance

For artists, the Renaissance was a time that changed both the style of art and the purpose of art. In Europe during the Middle Ages, art was used to glorify God: paintings and sculptures were created for religious purposes, to be placed in churches and chapels and offered as a tribute from humankind to God. During the Renaissance, artists shifted their focus from works of art glorifying God to works of art exploring humankind's relationship to God and to each other. For the first time, religious figures were portrayed as real people in real settings.

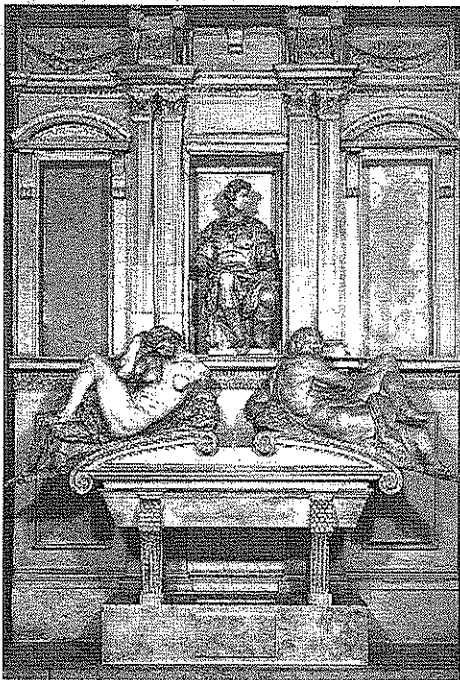
Greek and Roman scholars taught the classical ideals of ancient Greece to the new middle class of Italians eager to learn. Because Italy was ideally situated as a trading center between Byzantium and the ancient empires in the east and Europe in the west, many of its coastal cities became centers for trade, wealth, culture, and education.

One of these cities was Florence, the city where Leonardo da Vinci spent much of his youth. Unlike some other cities in Italy, which were ruled by the Catholic church or by noble families, Florence was ruled by the Medicis, a family of merchants who became wealthy and powerful through their business success, rather than by birth.

The Medicis were patrons of the arts and education: they loved beautiful art and entertainment and supported learning and discovery in many different fields.

Wealthy, powerful families in other Italian cities also supported artists and scientists, teachers, and dreamers in their quest for classical learning. This support led to scientific discoveries, new kinds of art and architecture, and even the exploration of the New World.

patron — a supporter



Tomb of Giuliano de' Medici designed and sculpted by Michelangelo.