

Leonardo da Vinci and the Renaissance

Astronomy

Lesson 4

**Interesting Resources:

Doing Da Vinci a series by The Discovery Channel. A group of engineers builds some of Da Vinci's designs and tests them. Some free video clips are available here: <http://dsc.discovery.com/tv/doing-davinci/doing-davinci.html>

Amazing Leonardo Da Vinci Inventions You Can Build Yourself by Maxine Anderson is a great book that clearly explains the science behind many of da Vinci's inventions and how to make a model of them at home.

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We'll now jump over 1500 years in our study of astronomy to the next significant contributions to the structure of the solar system. It's now the 16th Century, and Europe is just emerging from the Middle Ages or Medieval times. The middle ages were a period of great cultural, political, and economic change in Europe. During the Middle Ages the Islamic civilization had flourished and their astronomers made many significant contributions to the field including careful observations and star discovery and cataloging. Astronomers in Europe made advances in the explanations of the motion of the stars and planets.

The 16th Century was part of a period in European history characterized as the Renaissance (or "rebirth"). The Renaissance began in Italy at the end of the Black Plague, and slowly spread through the rest of Europe. Renaissance thinkers returned to the ancient texts of Greek and Latin philosophers to improve and perfect their worldly knowledge. In particular, the Renaissance saw significant change in the way the universe was viewed and the methods with which philosophy sought to explain natural phenomena.

Leonardo Da Vinci is often considered the quintessential (vocab: quintessential – the most perfect embodiment of something) Renaissance man, whose curiosity was equaled only by his powers of invention. He is widely considered one of the greatest painters of all time and perhaps the most diversely talented person to ever live.

The illegitimate son of a 25-year-old notary, Ser Piero, and a peasant girl, Caterina, Leonardo was born on April 15, 1452, in Vinci, Italy, just outside Florence. His father took custody of the little fellow shortly after his birth, while his mother married someone else and moved to a neighboring town.

Growing up in his father's Vinci home, Leonardo had access to scholarly texts owned by family and friends. He was also exposed to Vinci's longstanding painting tradition, and when he was about 15 his father apprenticed him to the

renowned workshop of Andrea del Verrochio in Florence. Even as an apprentice, Leonardo demonstrated his colossal talent. For example, one of Leonardo's first big breaks was to paint an angel in Verrochio's "Baptism of Christ," and Leonardo was so much better than his master's that the story goes: Verrochio was so moved by the expression on the angel's face, he put down his brush and resolved never to paint again. Leonardo stayed in the Verrocchio workshop until 1477 when he set up a shop for himself.

Leonardo spent much of his time sketching and drawing the things he saw around him—in fact, he always carried his sketchbook attached to a strap around his waist. Leonardo loved to study movement, and was one of the first artists to accurately capture the movement of his subjects. Leonardo was also the first artist to study proportions, and specifically, the physical proportions of people. He used these two techniques to accurately capture movement of proportionally accurate subjects in his paintings.

Artists have always found it difficult to make a living off their art. Even a master like Leonardo was forced to sell out in order to support himself, so he adapted his drawing skills to the more lucrative fields of architecture, military engineering, canal building and weapons design. Although a peacenik at heart, Leonardo landed a job working for the Duke of Milan by calling himself a military engineer and outlining some of his sinister ideas for weapons and fortifications. Like many art school types in search of a salary, he only briefly mentioned to the Duke that he could paint as well.

The Duke kept Leonardo busy painting and sculpting and designing elaborate court festivals, but he also put Leonardo to work designing weapons, buildings and machinery. Lucky for Leonardo, he was actually really talented as an engineer. Good illustrators were a dime a dozen in Renaissance Italy, but Leonardo had the brains and the diligence to break new ground, usually leaving his contemporaries in the dust. Like many crackpot geniuses, Leonardo wanted to create "new machines" for a "new world."

For him, the most interesting part was the use of mechanical gears, and he studied them with relish. Based on the gear, he came up with loads of different thingamajigs, including the bicycle, a helicopter, an "auto-mobile", and some gruesome weapons of course.

Things are not always as they appear though. While Leonardo may have earned a living designing war machines and new architecture for the Duke, he was actually an extremely peaceful man. He was famous for buying birds in the market place just to set them free, and for being a vegetarian who had no desire to hurt other living creatures.

Leonardo was also obsessed with water. Recall that nobody had harnessed electricity yet, so water was at that point the ultimate source for power.

Leonardo studied all forms of water -- liquid, steam, and ice -- and he had all sorts of swell ideas of what to do with it. He cooked up plans for a device to measure humidity, a steam-powered cannon, many different waterwheels, and oodles of useful industrial machines powered by flowing water.

Leonardo was also able to finish some of his most famous paintings while working for the Duke. One of these paintings was *The Last Supper*, although almost as soon as he had finished the painting started disintegrating—ever the scientists Leonardo had been experimenting with a new form of paint that didn't hold up well.

Unfortunately, the Duke was forced out of power in 1482, 17 years after Leonardo had started working for him. So, Leonardo was on his own, free to paint, invent, and design as he liked.

In 1503, Leonardo started working on his most famous painting, *Mona Lisa*. Mona Lisa was the wife of an important citizen in Florence, although the painting was so important to Leonardo that he ended up keeping it for himself.

In March of 1516, King Francis I in France offered him the title of “Premier Painter and Engineer and Architect of the King.” His last and perhaps most generous patron, Francis I provided Leonardo with a cushy job, including a stipend and manor house near the royal chateau at Amboise.

He spent most of his time studying science, either by going out into nature and observing things or by locking himself away in his workshop cutting up bodies or pondering universal truths.

Leonardo died on May 2, 1519 in Cloux, France. Legend has it that King Francis was at his side when he died, cradling Leonardo's head in his arms.

So, now that you have a snapshot of the Renaissance and some of the creative and innovative ideas happening during this time, how do you think the culture of Europe during this time contributed to the Scientific Revolution?

Images used in this lesson:



Self-portrait of Leonardo di Vinci.

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http://upload.wikimedia.org/wikipedia/commons/b/ba/Leonardo_self.jpg

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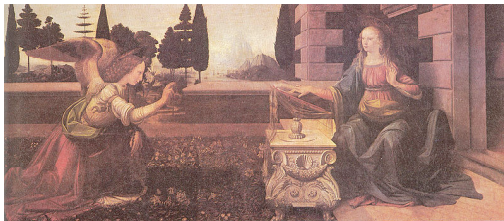


The Baptism of Christ

Source:

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Annunciation

Source:

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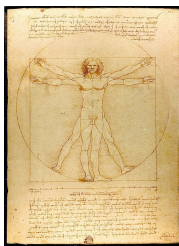
Leonardo's study of water falling.



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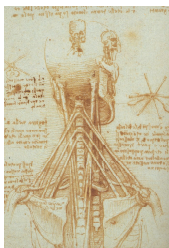


Leonardo's Vitruvian Man

Source:

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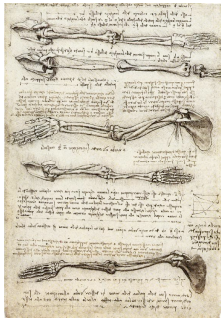


Study of the Anatomy of the Neck

Source:

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Study of the Arm

Source:

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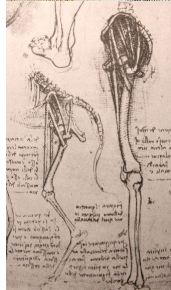


Study of the Fetus

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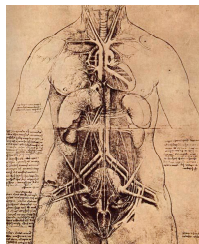


Study of Legs

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Anatomy of a Woman

Source:

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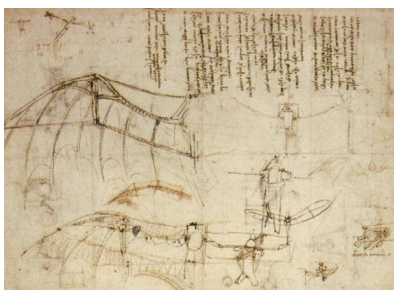


Flying Machine

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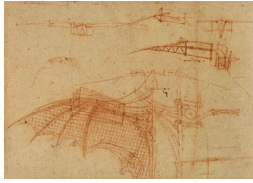


Flying Machine (v. 2)

Source:

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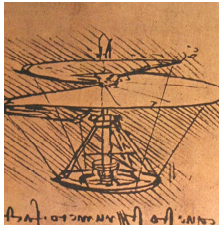


Flying Machine (v. 3)

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Helicopter

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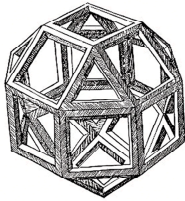


Design for a Boat

Source:

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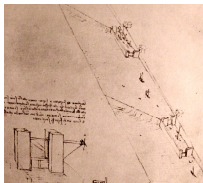


Polyhedra

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River Locks

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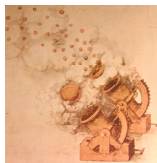


Water Machines

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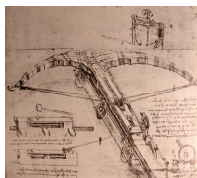


Cannons

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Giant Crossbow

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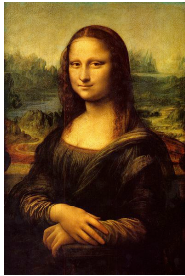


Artillery Park

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Mona Lisa

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The Last Supper

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The Lady with an Ermine (A great example of Leonardo's work with light)

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The Death of Leonardo Da Vinci

By Jean Auguste Dominique Ingres

Source:

<http://commons.wikimedia.org/wiki/File:IngresDeathOfDaVinci.jpg>



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Design of a Tank

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