# Leonardo da Vinci

by Ira Shull

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BOSTON

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You might know the name Leonardo da Vinci. Many people think of him as a famous artist. Did you know that he was also the leading scientist and inventor of his time?

Leonardo lived in Renaissance Italy. This was a good time for someone like him. People wanted to make big changes in the world. Leonardo's ideas led to many changes.

Leonardo wanted to invent new machines. Leonardo studied each part of a machine to figure out what it did. He thought about how to combine parts from different machines. He planned machines that no one had ever imagined!

Statue of Leonardo da Vinci

LEONARDO DA VINO

## 📢 Leonardo's Big Ideas

Leonardo's ideas were ahead of their time. His inventions included a robot, a submarine, and a car! He even planned flying machines.

This sketch shows the landing gear on Leonardo's helicopter.



Leonardo's artistic work led him to design inventions. When he painted, he studied his subjects carefully. Sometimes new ideas arose out of this study.

Leonardo was interested in how everything worked. He asked a lot of questions. Leonardo's life is the story of his ideas. He had many skills. His ideas still inspire people today.

#### Early Years

Leonardo was born in 1452 in Vinci, a small town in Italy. He had many brothers and sisters. In the 1460s, his family moved to Florence. His father wanted to send him to the best schools.

At about the age of five, Leonardo started sketching. His father showed the sketches to a famous painter, who agreed to teach Leonardo how to paint.

Leonardo read and studied about painting. He worked at the painter's studio. Several famous painters worked there, too, so Leonardo watched how they painted.

Leonardo soon showed great ability, or talent. He painted a very beautiful angel. The painter looked at it. Then this famous painter said he quit. He said he would never paint again! He knew that Leonardo would become an even greater painter than him.

## 📢 The First Inventions

Leonardo moved to Milan in 1482. He was 30 years old and needed a job. He asked the Duke of Milan for work. Leonardo said that he was a military engineer, or builder.

Leonardo planned new weapons and machines for the Duke. He even designed a tank. It had wheels so men could pull it. They could turn its gun with a crank.

Leonardo's machine gun



Leonardo also designed a ship that could go underwater. The Duke did not build most of Leonardo's inventions. However, Leonardo's ideas inspired later inventors.

In 1495, Leonardo designed the world's first robot. The robot looked like a person. It wore a suit of armor. It could wave its arms and move its head! Designing the robot helped Leonardo study how humans moved.

#### Leonardo's Notebooks: Backwards and Forwards

Leonardo wrote down all his ideas in notebooks. The notebooks helped him organize his thoughts. He also sketched inventions in his notebooks.

Leonardo had a special way of writing. He wrote backwards. People usually write from left to right. But Leonardo wrote from right to left. His handwriting had to be held up to a mirror to be read! Some people think he did this to fool thieves. Imagine their frustration! But Leonardo was left-handed. He likely found it easier to write this way.

Leonardo wrote thousands of pages. Most were lost after he died. Scientists today still study his notebooks. Some of his notebooks are in museums because they are very valuable.

#### The Mona Lisa: Keeping It Real

Leonardo stayed in Milan until 1499, when the Duke fell from power. Leonardo wanted to paint some more. Around 1503, he started the *Mona Lisa*. It's one of the world's most famous paintings. It was also one of Leonardo's favorites. He carried it with him when he traveled.

In most paintings of the time, people's faces looked harsh and flat. The *Mona Lisa* was different. It's a painting of a gentle-looking woman. She seems to have a slight smile. Leonardo used light and shadow in the painting to make her face look realistic. Other artists began to copy his realistic style.

#### 📢 In the Name of Science

Leonardo started doing scientific experiments, or tests. He did tests that no one had ever done before. He wrote down the results in his notebooks.

Leonardo studied the ideas of the early Greeks and Romans. But he wanted to know more. He closely observed nature. He asked simple questions. Leonardo could find something to study anywhere. He was always curious. What makes clouds move? How do birds fly? Why can't people fly?

#### Mysteries of the Mona Lisa

For centuries, people have wondered about Mona Lisa's expression. Is she frowning? Or is she smiling? Maybe she is angry. Or maybe she has a secret. No one knows for sure!

There's another mystery about the painting. Who was the model for *Mona Lisa*? Some people think she was the wife of a patron, or supporter. Others think she was Leonardo in disguise. No one knows who she was.

Many of Leonardo's other paintings are also thought to hold secrets. We'll never know for sure if they do. But that's what makes studying his paintings so much fun!

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The Mona Lisa

Leonardo's catapults, machines that throw weapons

Leonardo used his artistic instinct to find answers. He observed clouds. He watched birds flapping their wings. Then he sketched them. He also made notes about them. Scientists today still use this method to figure things out.

#### Right on Time

Time was a key part of Leonardo's experiments. Clocks used weights or springs. The parts wore out quickly. Leonardo wanted to design a better clock.

He wanted to use levers and gears. These devices could move the clock's hands. You may have heard of Galileo, a scientist. Galileo also tried to make better clocks. Leonardo designed his clocks about 50 years before Galileo.

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Leonardo studied gears. He saw that they had many uses, not just in clocks. He used gears in his inventions such as the bicycle.

Leonardo also designed a car with three wheels. Springs made the car wheels move.

#### 📢 Water, Water, Everywhere

Leonardo went back to Milan in 1506. He worked for the governor there. He also kept studying science.

Archimedes, an early Greek scientist, had invented a device for raising water from streams. Leonardo wanted to improve it. He also wanted to use water to run machines.

Leonardo studied water under different conditions. He studied steam and rushing water. He planned giant water wheels to run factories. He planned steam engines and cannons. Water was all around him. Leonardo wanted to control it. With water, he could plan almost any machine.

Leonardo didn't build most of his machines because he couldn't get the parts he needed. Instead, he often went for long walks. His walks helped him think of more ideas.

### Flying Machines: Inventing the Future

Leonardo wanted to find a fast way to travel. He studied birds to get ideas for flying machines.

One flying device was called an aerial screw. It was small and round. It had a propeller on top and looked like a helicopter.

Leonardo also designed gliders and flying boats. Most of his devices had flapping wings. Wings could help a person



This sketch shows how a bird's wing flaps.

fly, Leonardo thought. But they had to be long. They also had to flap at a certain angle. Some of Leonardo's designs are similar to modern airplanes.

#### Leonardo's Later Life

In 1513, Leonardo moved to Rome where he worked on projects for the Pope. Leonardo wanted to learn how people's bodies worked, so he studied dead bodies. The Pope thought this work was wrong. He told Leonardo to stop.

#### Women Inventors

1712

early 1900s

1950s

1990s

Sometimes, people forget that women were great inventors, too. Here are just a few since Leonardo's time:

Sybilla Masters invented a device to grind corn into cornmeal. It was called a corn mill. Cornmeal is used in bread and other foods.

Mary Anderson invented windshield wipers. Imagine trying to drive on a rainy day without them!

 Dr. Grace Murray Hopper came up with the compiler. Her invention was the first true computer language.

Donna Shirley, an engineer, led NASA's Mars Rover project. These spacecrafts landed on, then explored, the planet Mars.

Today, there are more women inventors than ever before. Leonardo would be impressed!

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Dr. Hopper

In 1516, King Francis I of France offered Leonardo a job. Leonardo left Italy to become France's top painter and scientist.

Leonardo continued to study water. He made drawings of horses, cats, and dragons. But he was in poor health. Leonardo was 67 when he died. The world had lost its greatest inventor.

#### **Inventions of Tomorrow**

Which of Leonardo's inventions has had the biggest effect on your life? What ideas do you have for inventions?

We use many of Leonardo's ideas today. We ride in cars and fly in airplanes. Factories use robots to make goods. NASA uses them for space travel. You can even buy a small robot to help with housework!

Leonardo's ideas still inspire many inventors today. Their inventions — like Leonardo's may change life in the future.



Leonardo da Vinci had one of the greatest minds of all time.

Who do you think will be the next Leonardo? What will be the next great invention?





arose	frustration	
barren	harsh	
conditions	instinct	
decrepit	lurched	
elusive	vertical	

Generalizations Use details to explain ideas that aren't stated or are generally true.

**TARGET STRATEGY** Monitor/Clarify As you read, notice what isn't making sense. Find ways to figure out the parts that are confusing.

GENRE Narrative Nonfiction gives factual information by telling a true story.

Level: U

**DRA:** 44

**Genre:** Narrative Nonfiction

**Strategy:** Monitor/Clarify

**Skill:** Conclusions and Generalizations

Word Count: 1,623



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