Although it is hard to overstate Leonardo da Vinci's brilliance, recent scientific research reveals that you probably underestimate your own capabilities. You are gifted with virtually unlimited potential for learning and creativity. Ninety-five percent of what we know about the capabilities of the human brain has been learned in the last twenty years. Our schools, universities, and corporations are only beginning to apply this emerging understanding of human potential. Let's set the stage for learning how to think like Leonardo by considering the contemporary view of intelligence and some results of the investigation into the nature and extent of your brain's potential.

Most of us grew up with a concept of intelligence based on the traditional IQ test. The IQ test was originated by Alfred Binet (1857–1911) to measure, objectively, comprehension, reasoning, and judgment. Binet was motivated by a powerful enthusiasm for the emerging discipline of psychology and a desire to overcome the cultural and class prejudices of late nineteenth-century France in the assessment of children's academic potential. Although the traditional concept of IQ was a breakthrough at the time of its formulation, contemporary research shows that it suffers from two significant flaws.

The first flaw is the idea that intelligence is fixed at birth and immutable. Although individuals are endowed genetically with more or less talent in a given area, researchers such as Buzan, Machado, Wenger, and many others have shown that IQ scores can be raised significantly through appropriate training. In a recent statistical review of more than two hundred studies of IQ published in the journal Nature, Bernard Devlin concluded that genes account for no more than 48 percent of IQ. Fifty-two percent is a function of prenatal care, environment, and education.

The second weakness in the commonly held concept of intelligence is
the idea that the verbal and mathematical reasoning skills measured by IQ tests (and SAT's) are the sine qua non of intelligence. This narrow view of intelligence has been thoroughly debunked by contemporary psychological research. In his modern classic, *Frames of Mind* (1983), psychologist Howard Gardner introduced the theory of multiple intelligences, which posits that each of us possesses at least seven measurable intelligences (in later work Gardner and his colleagues catalogued twenty-five different subintelligences). The seven intelligences, and some genius exemplars (other than Leonardo da Vinci, who was a genius in all of these areas) of each one, are:

- **Logical-Mathematical**—Stephen Hawking, Isaac Newton, Marie Curie
- **Verbal-Linguistic**—William Shakespeare, Emily Dickinson, Jorge Luis Borges
- **Spatial-Mechanical**—Michelangelo, Georgia O'Keeffe, Buckminster Fuller
- **Musical**—Mozart, George Gershwin, Ella Fitzgerald
- **Bodily-Kinesthetic**—Moribe Ueshiba, Muhammad Ali, F. M. Alexander
- **Interpersonal-Social**—Nelson Mandela, Mahatma Gandhi, Queen Elizabeth I
- **Intrapersonal (Self-knowledge)**—Viktor Frankl, Thich Nhat Hanh, Mother Teresa

The theory of multiple intelligences is now accepted widely and when combined with the realization that intelligence can be developed throughout life, offers a powerful inspiration for aspiring Renaissance men and women.

In addition to expanding the understanding of the nature and scope of intelligence, contemporary psychological research has revealed startling truths about the extent of your potential. We can summarize the results with the phrase: Your brain is much better than you think. Appreciating your phenomenal cortical endowment is a marvelous point of departure for a practical study of Da Vinci thinking. Contemplate the following: your brain is more flexible and multidimensional than any supercomputer.

- can learn seven facts per second, every second, for the rest of your life and still have plenty of room left to learn more.
- will improve with age if you use it properly.
- is not just in your head. According to renowned neuroscientist Dr. Candace Pert, "...intelligence is located not only in the brain but in cells that are distributed throughout the body... The traditional separation of mental processes, including emotions, from the body is no longer valid."
- is unique. Of the six billion people currently living and the more than ninety billion people who have ever lived, there has never, unless you are an identical twin, been anyone quite like you. Your creative gifts, your fingerprints, your expressions, your DNA, your dreams, are unprecedented and unique.
- is capable of making a virtually unlimited number of synaptic connections or potential patterns of thought.

This last point was established first by Pyotr Anokhin of Moscow University, a student of the legendary psychological pioneer Ivan Pavlov. Anokhin staggered the entire scientific community when he published his research in 1968 demonstrating that the minimum number of potential thought patterns the average brain can make is the number 1 followed by 10.5 million kilometers of typewritten zeros.

What happens to your brain as you get older? Many people assume that mental and physical abilities necessarily decline with age; that we are, after age twenty-five, losing significant brain capacity on a daily basis. Actually, the average brain can improve with age. Our neurons are capable of making increasingly complex new connections throughout our lives. And, our neuronal endowment is so great that, even if we lost a thousand brain cells every day for the rest of our lives, it would still be less than 1 percent of our total (of course, it's important not to lose the 1 percent that you actually use!).

4 *How to Think Like Leonardo da Vinci*  

*Introduction 5*
Anokhin compared the human brain to "a multidimensional musical instrument that could play an infinite number of musical pieces simultaneously." He emphasized that each of us is gifted with a birthright of virtually unlimited potential. And he proclaimed that no man or woman, past or present, has fully explored the capacities of the brain. Anokhin would probably agree, however, that Leonardo da Vinci could serve as a most inspiring example for those of us wishing to explore our full capacities.

LEARNING FROM LEONARDO

Baby ducks learn to survive by imitating their mothers. Learning through imitation is fundamental to many species, including humans. As we become adults, we have a unique advantage: we can choose whom and what to imitate. We can also consciously choose new models to replace the ones we outgrow. It makes sense, therefore, to choose the best "role models" to guide and inspire us toward the realization of our potential.

So, if you want to become a better golfer, study Ben Hogan, Jack Nicklaus, and Tiger Woods. If you want to become a leader, study Winston Churchill, Abraham Lincoln, and Queen Elizabeth I. And if you want to be a Renaissance man or woman, study Leon Battista Alberti, Thomas Jefferson, Hildegard von Bingen, and best of all, Leonardo da Vinci.

In The Book of Genius Tony Buzan and Raymond Keene make the world's first objective attempt to rank the greatest geniuses of history. Rating their subjects in categories including "Originality," "Versatility," "Dominance-in-Field," "Universality-of-Vision," and "Strength and Energy," they offer the following as their "top ten."

10. Albert Einstein
9. Phidias (architect of Athens)
8. Alexander the Great
7. Thomas Jefferson
6. Sir Isaac Newton
5. Michelangelo
4. Johann Wolfgang von Goethe
3. The Great Pyramid Builders
2. William Shakespeare

And the greatest genius of all time, according to Buzan and Keene's exhaustive research? Leonardo da Vinci.

As Giorgio Vasari wrote of Leonardo in the original version of his The Lives of the Artists, "Heaven sometimes sends us beings who represent not humanity alone but divinity itself, so that taking them as our models and imitating them, our minds and the best of our intelligence may approach the highest celestial spheres. Experience shows that those who are led to study and follow the traces of these marvelous geniuses, even if nature gives them little or no help, may at least approach the supernatural works that participate in his divinity."

Our evolving understanding of the multiplicity of intelligence and the capacities of the brain suggests that nature gives us more help than we might have imagined. In How to Think like Leonardo da Vinci we will "study and follow the traces" of this most marvelous of all geniuses, bringing his wisdom and inspiration to your life, every day.

A PRACTICAL APPROACH TO GENIUS

In the pages that follow you will learn a practical approach, tested in experience, for applying the essential elements of Leonardo's genius to enrich
your life. You will discover an exhilarating, original way of seeing and enjoying your world as you develop powerful strategies for creative thinking and new approaches to self-expression. You'll learn proven techniques for sharpening your senses, liberating your unique intelligence, and harmonizing body and mind. With Leonardo as your inspiration, you will make your life a work of art.

Although you may already be familiar with Da Vinci's life and work, you'll finish this book with a fresh perspective and a deeper appreciation for this most enigmatic figure. Looking at the world from his point of view, you may also get a taste of the loneliness genius brings. But I guarantee that you'll be uplifted by his spirit, inspired by his quest, and exalted by your association with him.

The book begins with a capsule review of the Renaissance and its parallels with our time, followed by a biographical sketch of Leonardo and a summary of his major accomplishments. The heart of the book is the discussion of the Seven Da Vincian Principles. These principles are drawn from an intensive study of the man and his methods. I've named them in Leonardo's native Italian. The good news is that Leonardo's principles will probably be intuitively obvious to you. You do not have to try to invent them in your life. Rather, like much of common sense, they need to be remembered, developed, and applied.

Giorgio Vasari (1511–1574), architect of Florence's Uffizi and a pupil of Michelangelo's, originally published his The Lives of the Artists in 1550. He was credited by scholars with effectively inventing the discipline of art history with that book. Lives remains the most important source on Italian Renaissance art. With uncanny flair Vasari profiles the lives and work of almost two hundred painters, sculptors, and architects, including Giotto, Masaccio, Brunelleschi, Donatello, Botticelli, Verrocchio, Raphael, Michelangelo, Titian, and, of course, Leonardo.

The Seven Da Vincian Principles are:

Curiosità—An insatiably curious approach to life and an unrelenting quest for continuous learning.

Dimostrazione—A commitment to test knowledge through experience, persistence, and a willingness to learn from mistakes.

Sensazione—The continual refinement of the senses, especially sight, as the means to enliven experience.

Sfumato (literally "Going up in Smoke")—A willingness to embrace ambiguity, paradox, and uncertainty.

Arte/Scienza—The development of the balance between science and art, logic and imagination. "Whole-brain" thinking.

Corporalità—The cultivation of grace, ambidexterity, fitness, and poise.

Connessione—A recognition of and appreciation for the interconnectedness of all things and phenomena. Systems thinking.

Having read this far, you are already applying the first Da Vincian principle. Curiosità—the quest for continuous learning—comes first because the desire to know, to learn, and to grow is the powerhouse of knowledge, wisdom, and discovery.

If you are interested in thinking for yourself and freeing your mind from limiting habits and preconceptions, then you are on track for the second principle: Dimostrazione. In his search for truth, Da Vinci insisted on questioning conventional wisdom. He used the word dimostrazione to express the importance of learning for oneself, through practical experience.

Pause for a few moments, and recall the times in the past year when you felt most vividly alive. Chances are, your senses were heightened. Our third principle—Sensazione—focuses on sharpening the senses, consciously. Leonardo believed that refining sensory awareness was the key to enriching experience.

As you sharpen your senses, probe the depths of experience, and awaken your childlike powers of questioning, you will encounter increasing uncertainty and ambiguity. "Confusion endurance" is the most distinc-
tive trait of highly creative people, and Leonardo probably possessed more of that trait than anyone who has ever lived. Principle number four—Sfumato—guides you to be more at home with the unknown, to make friends with paradox.

For balance and creativity to emerge from uncertainty requires principle number five—Arte/Scienza—or what we now call whole-brain thinking. But Da Vinci believed that balance was more than just mental. He exemplified and affirmed the importance of principle number six—Corporalita—the balance of body and mind. And if you appreciate patterns, relationships, connections, and systems—if you seek to understand how your dreams, goals, values, and highest aspirations can be integrated into your daily life—then you are already applying principle number seven: Connessione. Connessione ties everything together.

Each principle is highlighted by excerpts from the maestro's notebooks and illustrated with his sketches or paintings. This illumination is followed by some questions for reflection and self-assessment. These questions are designed to stimulate your thinking and inspire your application of the principles. The questions are followed by a program of practical exercises for cultivating a personal and professional Renaissance. To get the most benefit from How to Think like Leonardo da Vinci, read the whole book first, without doing the exercises. Just contemplate the questions for reflection and self-assessment. After this preview, review the explanation of each principle and then do the exercises. Some of the exercises are easy and fun, while others require challenging inner work. All are designed to bring the spirit of the maestro to your daily life. In addition to the exercises, you will find an annotated reading and resource list to guide you in exploring and applying each principle. The reading list includes recommendations on the Renaissance, the history of ideas, the nature of genius, and, of course, the life and work of Leonardo.

In the final section of the book you will discover "The Beginner's Da Vinci Drawing Course," and you'll also learn how you can participate in a history-making project that embodies the essence of the Da Vincian spirit.