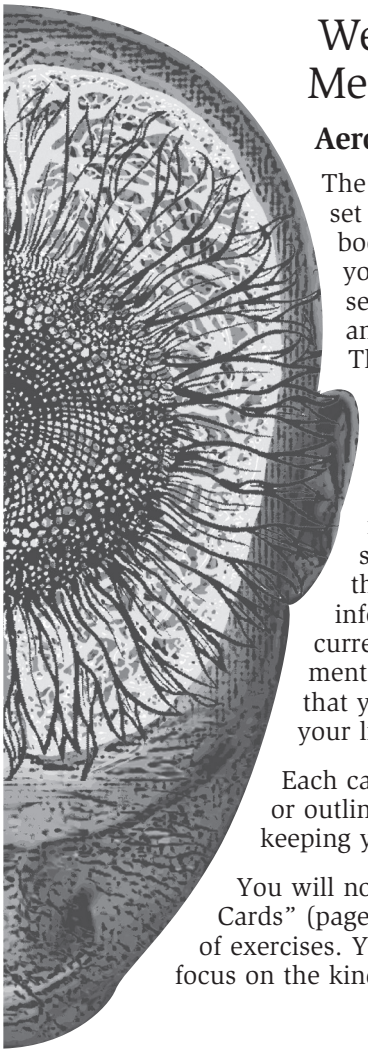


Welcome to Mental Fitness:

Aerobics for your Mind

The Mental Fitness card set (100 cards and this booklet) helps you keep your mind active with a selection of stimulating and enjoyable exercises. This set will encourage you to take charge of your own mental fitness.

First, read this booklet for card categories and suggestions for using the cards, background information, news about current research, plus mentally beneficial activities that you can incorporate into your life.

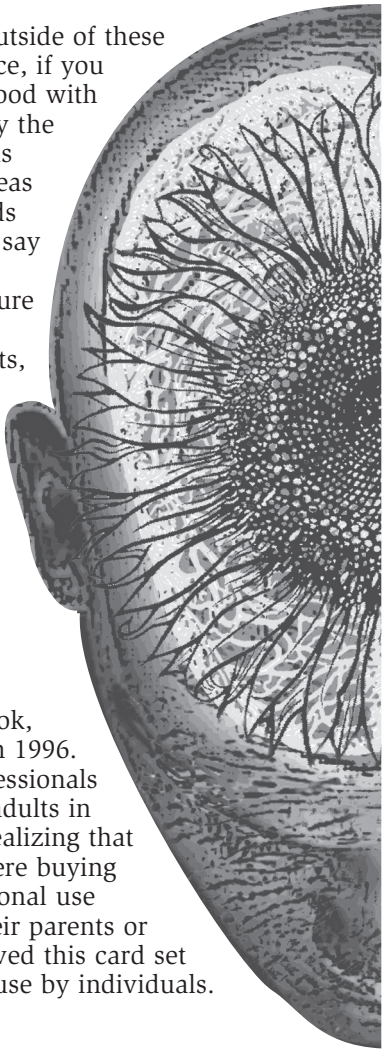
Each card makes suggestions or outlines strategies for keeping your mind stimulated.

You will note that the "Plan of the Cards" (page 3) lists a wide variety of exercises. Your tendency will be to focus on the kinds you like to do best.

Try to push yourself outside of these constraints. For instance, if you feel that you are not good with numbers, be sure to try the number cards since this might be one of the areas of your brain that needs stimulation. Or, if you say that you can't draw a straight line, then be sure to try those exercises related to the visual arts, doodling and drawing.

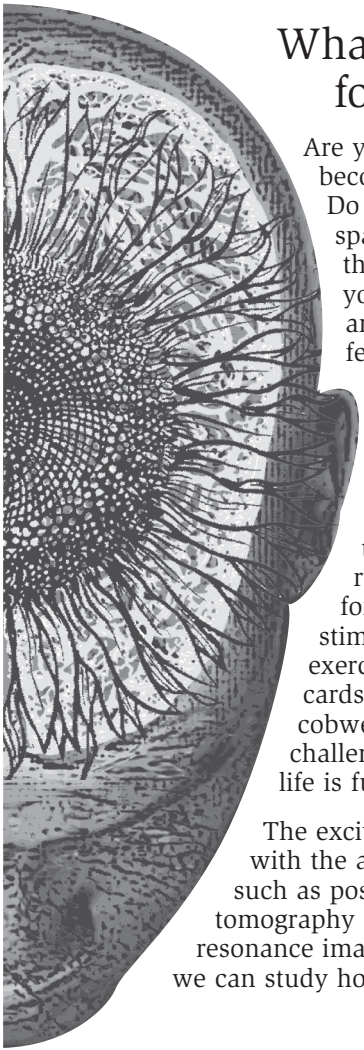
If you like doing the exercises on these cards, you may want to look into some of the books in "Resources Used" (page 20) to find other ideas and exercises for mental jogging.

I wrote the original book, *Aerobics of the Mind* in 1996. It was written for professionals who work with older adults in group settings. After realizing that a number of people were buying the book for their personal use or were giving it to their parents or grandparents, I conceived this card set which is designed for use by individuals.



Plan of the Cards

CATEGORY	CARD NUMBERS
Wake Up Your Brain	**1–8**
Words	**9–27**
Memory	**28–36**
Numbers	**37–44**
Creative Problem Solving and Listing	**45–53**
Art, Visual, Imagination	**54–67**
Puzzles	**68–74**
Brainstorming	**75–81**
Seeing	**82–90**
Hearing	**91–93**
Double Mind	**94–96**
Smell	**97–100**



What is Aerobics for the Mind?

Are you ever concerned about becoming more forgetful? Do you spend increasing spans of time remembering the past? Do you find yourself watching more and more TV? Do you feel that your life is less interesting now than it was when you were younger?

If your answer to any of these questions is "yes," then you have found the right resource! Aerobics for the mind is defined as stimulating and invigorating exercise for the mind. These cards can help you brush the cobwebs from your mind and challenge your brain so that life is full and meaningful.

The exciting news today is that with the aid of new technologies such as positron emission tomography (PET) and magnetic resonance imaging (MRI) scanners we can study how the brain functions.

Pictures of the brain allow us to observe which parts "light up" as we think or do certain things. Even more exciting is the fact that researchers have recently learned that parts of the brain can regenerate themselves.

We know that the brain has as many as l00 billion neurons (nerve cells), many with a thousand or more connections to send signals to neighboring neurons. In normal people, even very late in life, the actual number of nerve cells doesn't change much. We may lose some neurons as we age, but the billions remaining can sprout new dendrites and thereby form new connections with one another.

For years it was believed that adults could not generate new brain cells. Recently, biologists at Princeton University have found that thousands of freshly born neurons arrive each day in the cerebral cortex, the outer rind of the brain. Though based on research in monkeys, the finding is likely to prove true of people too. It is projected that this natural regeneration system for replacing cells may be able to replace cells lost in the diseases of aging. Think of the implications for those who have suffered strokes and senility of one sort or another.

Studies are showing that stimulating and challenging the brain increases its capacity to stay vital and healthy. For example, research going on at the University of Illinois is exploring the possibility that when we are in a stimulating environment, new brain connections develop. They have learned that when old fat rats with deteriorating brains are put in an enriched environment and encouraged to be

more active using challenging mazes with new toys and good food as rewards, magic happens. The rats not only lose weight but the empty gaps in the brain are filled in. So there is beginning to be proof that mental exercise along with physical exercise makes for a healthier brain.

You might ask if these animal studies are relevant to humans. Dr. Marian Diamond at the University of California-Berkeley, one of the foremost brain researchers, says that she is convinced that the same is true for humans. Adults who keep reading, learning, stretching their minds, doing new and different activities, and interacting with others are far less likely to lose their memory or decline into senility than those who sit passively and retreat into themselves as they age. The more connections or synapses one has between brain cells, the more resistant one is to the effects of Alzheimer's and other dementias.

Learning from the nun's study

Recently there have been reports of an order of nuns in Mankato, Minnesota, called "the nuns who won't sit still." They are the School Sisters of Notre Dame, a community in which a long life is the norm. The Sisters live to an average age of 85, and many live far beyond that. Of the l50 retired nuns, 25 are over 90.

But longevity is only part of the nuns' story. They do not seem to suffer from dementia, Alzheimer's disease, and other debilitating brain diseases as early as the general population.

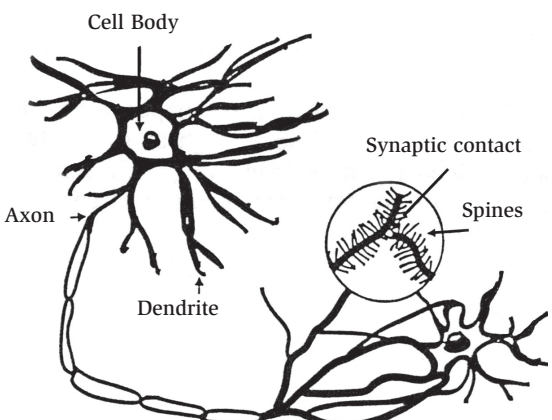
Brain/mind exercise is a way of life at the convent where the sisters live by the principle that an idle mind is the devil's plaything. They write in their journals, compose letters to members of congress, do puzzles of all sorts, and participate in current events seminars every week. The young researcher, David Snowdon, who has been studying these nuns, is convinced that their focus on keeping their minds active is a key element in their health and longevity.

Nearly 700 of these nuns, including almost 300 who have already died, are donating their brains for post-mortem research on Alzheimer's disease. A recent report of the nuns' study helps us to understand that Alzheimer's disease may be due to tiny unnoticed strokes. Many strokes are preventable, leading researchers to conclude that we can forestall Alzheimer's not by curing it but by preventing the strokes in the first place.

And how do we do that? Some are suggesting that keeping the brain active and challenged is one good way to keep the brain healthy. There is much to be learned about the brain and aging and we are in hot pursuit of that knowledge.

What about the neurons and the dendrites?

The brain, which weighs about three pounds, is made up of over l00 billion neurons. A neuron may interact with thousands of other cells, some of them quite far away. Therefore, the cell body contains separate sets of tubular sending and receiving extensions, axons and dendrites. The dendrites have tiny spines. The contact points between these spines are called synapses and are both electrical and chemical. This drawing helps visualize how it works.



Structure of a neuron

It is said that the brain is the most complicated piece of equipment in the universe. To understand its complexity it is helpful to know that:

- Thirty thousand neurons can fit into a space the size of a pinhead.
- The brain has the information processing power of a hundred billion medium-sized interacting computers.
- There are more neurons in the brain than there are stars in the milky way.
- The normal brain has a quadrillion connections between the brain cells, more than all the phone calls made in the US in the past decade.

Isn't this incredible information?

How is this relevant to aerobics for the mind? Dr. Diamond indicates that the more we think, regardless of our age, the bigger our brains become and the better they function. She believes that with a healthy lifestyle and ongoing mental activity, that a healthy older brain can function virtually as well as a healthy young brain. She has written, "Whether we are young or old, we can continue to learn. The brain can change at any age."

Can thinking abilities be improved?

Dr. Warner Schaie, Professor at Pennsylvania State, has done a study with a group of older adults who had hit the "memory barrier" of their fifties and sixties and showed symptoms of mental decline. Dr. Schaie offered them a program of mental training, consisting of five one hour sessions. The program was designed to improve reasoning and spatial orientation by teaching participants "how to think." The results of this minimal training were encouraging. Fifty percent of the subjects improved significantly! He observed that it proves that you can teach an old dog new tricks.

We are told that Senator Robert Byrd stays in shape by jogging his mind and flexing his memory. He can name every Roman emperor, king and queen of England, and every president of the United States. He recites Shakespeare and Milton at will. Mr. Byrd persuades his colleagues in Congress by rattling off words from Emerson, Byron, and Gibbon. Mental calisthenics are part of his lifelong regime of self-improvement.

Left-brain/right-brain research

It was early in the 1960's when Dr. Roger Sperry and his colleagues did research on a 48 year old person with epilepsy. In a dramatic effort to try to stop the frequent seizures, Dr. Sperry severed the corpus callosum, the tough tissue which connects the left side of the brain and the right side of the brain.

The surgery did indeed reduce the seizures greatly, and in the process the doctors learned that the two sides of the brain tend to function differently.

In most humans the left hemisphere of the brain is the logical, rational side of the brain. It deals with facts, diagrams, dates, point by point information. It is believed that it deals with letters and numbers and that some language is learned here. On the other hand, the right hemisphere deals with imagery, color, imagination, creativity, intuition, rhythm.

The right brain recognizes faces. The left brain recognizes names. Educators believe that when both sides of the brain are involved in learning, the learning is easier, faster and more fun.

What about memory?

Our memories are probably better than we think. Have you visited a kindergarten room and looked in the lost and found box recently? Or observed how many toys were left in the sandbox at a city park? Children often forget and we think little of it.

When I audit classes at the University I am amazed at how much the younger students forget. They forget their pens, their notebooks, the assignment, the change in location of the classroom. Forgetting for them is inconvenient and maybe irritating, but it's no big deal. But as soon as we reach our 50's or 60's we begin to worry about our memories. Memory lapses occur at all ages but different ages react differently. We have the ability to keep our memories sharp if we are willing to work at it.

Researchers talk in terms of the "brain's plasticity." This means that new learning and relearning can take place at any age, even into the later years. Mental exercises, such as the ones in these cards, are an important key to keeping your memory sharp.

What about watching TV?

Sitting and watching TV doesn't do it! When watching TV, the brain waves are very similar to when we are asleep. Some will object, saying that they watch Jeopardy or Wheel of Fortune and get actively involved in playing the games. These game shows are probably an exception, but in general TV is one of the greatest thieves of mental acuity.

Television provides us with an abundance of information and entertainment, but most programs allow the brain to be passive and this erodes cognitive skills. Data indicate that passive observation isn't enough; one must interact with the environment. Turn off the TV, do some mentally stimulating activity and you will be healthier and happier.

How to get optimum brain exercise?

Doing the exercises on these cards is a good start. These activities will provide encouragement for you to find other ways to give your brain a workout.

It is clear that we need a brain exercise program to keep our precious minds active. In the future we will undoubtedly know which parts of the brain are energized by which exercises, but in the meantime, use a variety of activities for optimum stimulation.

Some neurological researchers believe that reading is uniquely beneficial for the brain. Reading requires active engagement of the mind, stimulates visual images and stirs up a variety of "word" areas of the brain. It is believed that it engages both sides of the brain. So read, read, read and raise critical questions as you read.

Over a period of years I have, with the help of groups of older adults, developed a list of activities that I believe to be mentally beneficial, including:

- Read newspapers, books, magazines
- Write letters, stories, poetry, family history
- Keep a diary
- Do family genealogy
- Play cards, the more challenging the better
- Play word games such as crossword puzzles, Cryptoquotes, Jumbles, Scrabble

- Play board games such as checkers, chess, cribbage
- Do jigsaw puzzles
- Invent a new recipe
- Balance your check book every month
- Play a musical instrument
- Sing, whistle, dance
- Get involved in drama
- Do art projects *(kits are not very useful since they leave little to the imagination)*
- Learn to use a computer
- Memorize telephone numbers and other numbers that are important in your life
- Memorize poetry, quotes, verses from religious literature
- Learn a new language
- Travel
- Go to an Elderhostel
- Grow a garden
- Become a bird-watcher
- Be active in government and environmental concerns
- Volunteer to teach someone to read

You will notice that bingo, the all-American older adult pastime, is not on this list. It is my bias that bingo provides minimal stimulation, unless perhaps you play with l5–20 cards.

You get the idea. Now add some of your own suggestions. And don't just think up new ideas, commit yourself to do them!

How much mental exercise is enough?

So you ask, "How much is enough?" Whatever feels stimulating to you and makes you feel alive. A doctor that I know has recommended one or two hours a day of doing mental exercises. For some that would be adequate; for others that would be a bare minimum.

If you have major concerns about your mental abilities, you should talk with your doctor or another qualified health professional,

What about doing new and different things?

Recently researchers have stated that it is especially beneficial to the brain to challenge it with novel tasks—anything that is new and different. The idea is to do things that you have never done before.

For instance, if you are a good cook but have never fixed a simple electrical appliance cord, that would be a good challenge. If you are a whiz at wood working, but have never fixed a meal, that might be just the ticket for you. If you have always dreamed

of painting a picture, take courage and sign up for a class and give it a try. Think of it as an adventure.

Buy a kite and fly it. Read children's books. Take a hot air balloon ride. Take some risks. Get out of the ruts of your life! Do routine things differently. Sit at a different place at the table. When you go for a walk, take a different path. When you wash your face, do it with your left hand.

It is important to break out of routines.

What about physical exercise?

Keeping our bodies functioning well is vitally important because it affects blood flow to the brain and the blood carries oxygen which the brain desperately needs to function well. Walking briskly, climbing stairs, mowing the lawn or doing household chores on a regular basis will help keep your brain fit.

This booklet and these cards focus on mental exercise, but you can be sure that good physical activity is very important to a healthy brain. Physical and mental aerobics go together. We cannot separate the mind and the body.

So, what have we learned?

- The brain is probably the most complicated piece of equipment in the universe.
- The brain's functions get rusty with disuse.
- Mental exercise is vitally important for brain maintenance and brain regeneration.

- No matter how depleted your brain power, you can improve it.
- Our memories are probably better than we think they are.
- We use only a small percentage of our brain's potential.
- Doing new and different activities can be especially stimulating.
- We need to keep physically fit.
- An important motto is: "Use it or lose it."

How were these cards developed?

A key factor in the development of these cards was an awareness that cells in different parts of the brain need to be stimulated. When brain cells aren't used, they get the message that you don't need them to survive. Then those unused cells shrink their dendrites and the cells begin to deteriorate. Thus, these exercises are designed to stimulate the cells in different parts of the brain.

There are exercises that have to do with numbers, words, memory, creative problem solving, games, drawing and doodling, art, optical illusions, puzzles, hearing, smelling, touching, and the double brain. Some exercises look back, but most focus on living in the present or looking to the future. The emphasis is on explicit instruction related to thinking skills and mental fitness.

These exercises are not a magic cure, but can help you keep your brain healthy all your life.

How can these cards be used?

Some ways to use these cards:

- Set a goal of using one or more cards a day, repeating the exercises whenever you choose. Take one with you on the bus or even when you visit the bathroom.
- You may want to do these exercises with your adult children or other relatives and friends. Some you could even do with your grandchildren.
- If you live alone, you might want to do the exercises and then compare notes with another person who is doing them via phone or e-mail.
- Some of the activities lend themselves for use at group meetings of older adults such as discussion groups or parties.
- Activity directors or those who work with the elderly can select activities to use in their programs.
- Caregivers, whether in the home or in more formal settings, will find them useful to use with those in their care.

In Summary

Compare these two drawings of brain cells called neurons.

Figure A

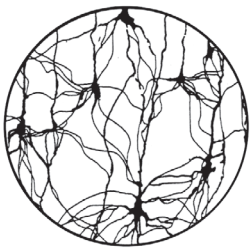


Figure B

The difference between figure A and B is not in the number of cells—they both show about seven—but the number and length of the dendrites that branch off of them. Drawing B pictures healthy active neurons. Remember that the human brain has billions of them and each has thousands of contacts with other neurons. The more dendrites branch out to touch other cells, the better they combine forces to recall information or solve problems.

A brain that is kept busy grows more dendrites than an idle one. Doing aerobics for the mind keeps your dendrites humming and helps you feel healthier and happier.

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Answers and Solutions

14. The Fourteenth Word

(1) acquire, (2) adult, (3) all, (4) amount, (5) an, (6) and, (7) any, (8) are, (9) bald, (10) be, (11) because, (12) become, (13) bird, (14) birds

39. Illusive Numbers

Numbers seen in puzzle: 7, 2, 3, (or 23), 4, 5, (or 45). These numbers add up to 21 (2,3,4,5, and 7) or 75 (7, 23, and 45).

40. Addition and Subtraction

$3 + 2 - 1 + 4 - 1 + 3 = 10$

$8 - 7 + 1 + 4 + 4 - 6 = 4$

$5 - 3 + 2 + 4 + 1 + 5 = 14$

$2 - 1 + 8 + 9 - 3 + 5 = 20$

$5 - 3 + 4 - 4 - 2 + 9 = 9$

$7 - 6 + 2 + 9 - 9 - 3 = 0$

42. Adding Numbers

	(6)	(1)	(2)	
5	•	•	•	
8	7	4	3	
	(4)			(5)
1	•	3	5	•

44. Magic Squares

8	3	4
1	5	9
6	7	2

45. Brainstorming

Brainstorming is a creative thinking procedure. It was invented by creative person Alex Osborn, founder of the Creative Education Foundation in Buffalo, New York.

The purpose of brainstorming is deferred judgement. Deferred judgement means postponing evaluating of ideas until later. Any sort of criticism or evaluation simply interferes with the generation of imaginative ideas.

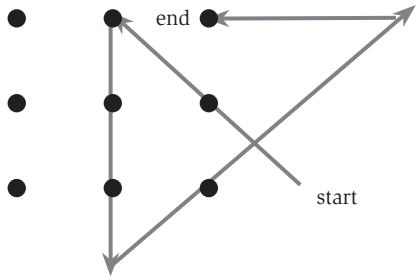
The key ground rules for brainstorming are:

1. Criticism is ruled out
2. Freewheeling is welcomed, the wilder the better
3. Quantity is wanted

59. Creativity and Doodling

What others have seen: bikini and belly button, an olive dropping into a martini glass, (upside down) a lamp, an envelope, a suction cup.

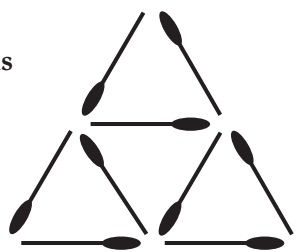
68. Connecting the Dots



69. Pieces of Wood

One needs 18 pieces of wood in order to form the cube shown.

70. Matchsticks



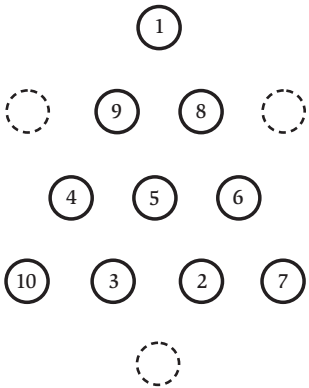
72. Hidden Cubes

There are 31 total cubes with 16 entirely hidden from view. If you are puzzling over the answers, try building the structure with sugar cubes or blocks.

73. Triangles

The figure has 35 triangles.

74. Coin Puzzle



78. Challenging the Left Brain

Jane—3 miles; Sara—140 pounds; Ken—$195.

88. Seeing Squares

You should be able to see up to 30 squares, larger, smaller and in different configurations.