Day 1 Memory Power

Name: _____   Date: _____

The more you understand about how memory works, the more likely you are to benefit from the tools you learn to improve your memory skills.

When you have a good general understanding of how memory works, different learning strategies make much more sense. You will remember them more easily. You will be able to use these skills in a variety of different situations, because you understand why they work and why they are important. You will be able to recognize which skills are useful in different situations. Not least important, because you understand why they work, you will have much greater confidence in practicing these skills.

We all have natural talent at different things, but improving your memory is something everyone can do. You may have heard people say that your brain is like a muscle and gets stronger with exercise. When people of all ages exercise their brains, their memory and learning improve.

Word and Number Tricks

We tend to pay more attention to things that interest us, even if that information is challenging to learn or understand. So, how do we make it easier to learn and remember things that are more difficult? It helps if we make it more fun.

Acronyms and Mnemonics (pronounced nəˈmänik)

Mnemonics is a big name for making up words or phrases with the same first letter as the things you need to remember. This is especially helpful to remember things that need to be remembered in a specific order. The mnemonic can be a real word or it can just be the first letters of the thing we want to remember that make a phrase that helps us remember. Creating the mnemonic helps logical learners, writing it helps physical learners, saying it out loud helps verbal and aural learners, reading the written mnemonic helps visual learners.

Order of Operations: PEDMAS - First complete items within **p**arentheses, then **e**xponents, followed by **m**ultiplication, **d**ivision (left to right if ÷ is first) **a**ddition, **s**ubtraction (left to right if - is first).
       PEMDAS or "Please Excuse My Dear Aunt Sally" or "Please Eat McDonald's After School"

Mnemonic	Operation	Write the Symbol
• Please	• Parentheses	• _____
• Excuse	• Exponents	• _____
• My	• Multiplication	• _____
• Dear	• Division	• _____
• Aunt	• Addition	• _____
• Sally	• Subtraction	• _____

PEDMAS examples

$2 \times 4 + 3 \times 5 =$
multiply then add
$8 + 15 =$
23

$48 \div 2 \times 12 =$
left to right
$24 \times 12 =$
288

$2^3 + 3 \times 2^2 =$
exponents, then multiply
then add
$8 + 3 \times 4 =$
$8 + 12 =$
20

$(2 \times (3 + 4))^2 =$
parentheses then exponents
(complete all functions inside
the parentheses first)
$(2 \times 7)^2 =$
$14^2 =$
196

Do you remember your order of operations? Try these examples:

$(8 \times 2^2) + 3 =$

$(4^2 \div 2) \times (2^3 + 1) \div 9 =$

$(5 + 5^2 \div 2) - (4^3 \div 2) \times 9 =$

_____   _____   _____

_____   _____   _____

_____   _____   _____

_____   _____   _____

Light Spectrum (colors of the rainbow) **ROY G. BIV**
Red Orange Yellow Green Blue Indigo Violet

Remembering the **Metric System** prefixes order for measurement prefixes
Many Kings Hate Dragons Because Dragons Can't Make Money
Mega, Kilo, Hecto, Deca, Base, Deci, Centi, Milli, Micro

Mnemonic	Prefix	Multiple	Weight - Gram	Length - Meter
Many	Mega	million 1,000,000	_____	_____
Kings	Kilo	thousand 1,000	_____	_____
Hate	Hecto	hundred 100	_____	_____
Dragons	Deca	ten 10	_____	_____
Because	Base	measurement	_____	_____
Dragons	Deci	tenth 0.1	_____	_____
Can't	Centi	hundredth 0.01	_____	_____
Make	Milli	thousandth 0.001	_____	_____
Money	Micro	millionth 0.000001	_____	_____

We will work with more acronyms and mnemonics next class.

To Remember Long Numbers More Easily, Try Chunking Techniques

You can hold only a few items in mind at one time. This reflects the natural capacity of your short-term memory. However, by employing a memory technique called **chunking**, you can increase this limit significantly.

Chunking is especially helpful for remembering long sequences of numbers, such as phone and account numbers 10 to 12 digits long or more.

Short-term memory is the temporary memory storage you use when mentally working with information. For example, that phone number you want to keep in mind for a few moments, long enough to dial it. Or the topic of the conversation you're having right now with your friend. Or the next few steps of a project you're trying to complete.

By chunking - which means breaking long items into smaller, manageable chunks or pieces - you can expand your mind's natural 7-item limit. If you enfold multiple, individual items into a single, larger item (chunk), you'll free extra slots in your short-term memory.

Struggling to remember a long, random sequence of numbers is perfectly normal. In the 1950's, renowned cognitive psychologist Dr. George Miller discovered by experiment the average person can hold only 7 plus or minus 2 (i.e., 5 to 9) items in mind.

We encounter numbers to memorize all the time. Phone numbers, passcodes, PIN numbers, lock combinations, credit and debit card numbers, bank account numbers, house numbers and ZIP codes, social security numbers, and other account numbers... the list goes on and on.

Remembering long numbers is where chunking is most valuable as a memory technique. Clearly it would save time to memorize numbers we use most often, or at least the numbers we are expected to recall on demand such as home phone and cell phone numbers. And what about situations where we need to hold a very long number in short-term memory for several moments?

Direct Chunking with Dashes or Spaces

Suppose you don't want to invest the time to chunk a long number into memorable words or sentences. Or you only need to remember the number for a few moments, then forget it - as when writing down a phone number someone is telling you verbally. In those situations, try direct chunking using dashes or spaces.

Direct chunking is already built in to many common numbers. That's why you usually see spaces or dashes in phone numbers, social security numbers, and credit card numbers. Here's a 10-digit phone number presented without any chunking:

<div align="center">

5558675309

</div>

As you now know, ten digits is above the average capacity of short-term memory. So if someone quickly told you this number out loud, you might struggle to hold it in your short-term memory as you searched for pen and paper.

Here is the phone number again, with dash chunking:

555-867-5309

Now read the chunks slowly, as groups, 555... 867.... 5309. What we've done here is take a 10-item sequence and chunk it into 3 items of 4 or fewer each. Given the limits of short-term memory, holding these 3 chunks in mind is far easier than keeping the string of 10 in mind.

Limiting chunks to 7 numbers or less is the key to success. It would be much less helpful to chunk the phone number this way...

55586753-0-9

... because you'd need to hold a difficult 8-digit sequence in mind, plus the other two digits.

Try Chunking Your Next Long Number
The next time you're presented with a long number that might be useful to remember, try one of the two number chunking methods: the Phonetic-Number technique, or Direct Chunking using spaces or dashes.

When speaking a long number to someone else, be sure to chunk it for them and pause a few seconds between chunks. For example, don't say 9-8-7-8-6-4-7-1-0-0-7 quickly without stopping. Instead, say 987... 864... 710... 07.

What about really, really long numbers? To memorize a number permanently, it helps to employ more senses and more than one technique. Let's try the infinite number for Pi. Pi is used to calculate the circumference and area of a circle.

$$\text{Circumference} = 2 \times \boldsymbol{\pi} \times \text{Radius}$$

$\times\ \mathbf{2}$		$\times\ \boldsymbol{\pi}$
Radius	Diameter	Circumference
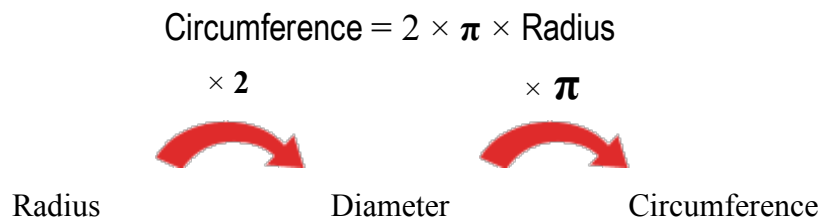
The area of a circle is $\boldsymbol{\pi}$ times the radius squared, which is written:

$$A = \boldsymbol{\pi}\, r^2$$

Area = π × radius^2

Area = $\dfrac{\pi}{4}$ × Diameter^2

Radius

Diameter
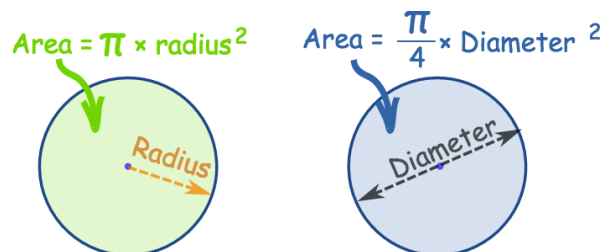
The digits for Pi are infinite. That means there is no end. Memorizing many digits of Pi is a challenge made easier by chunking as well as other memory techniques we will cover.

Here is Pi to 149 digits.
3.141592653589793238462643383279502884197169399375105820974944592307816406286208998620348253421170679821480865132823066470938446095505822317253594 0812

Ready... Set... Memorize

This is not so easy. Let's try chunking.

From left to right, there are 50 chunks for 150 digits.

3.14	159	265	358	979	323	846	264	338	327	950	288	419	
	716	939	937	510	582	097	494	459	230	781	640	628	
	620	899	862	803	482	534	211	706	798	214	808	651	
	328	230	664	709	384	460	955	058	223	172	535	940	812

Chunking from top to bottom. Here are five columns with ten chunks in each.

1	3.14	11	950	21	459	31	534	41	709
2	159	12	288	22	230	32	211	42	384
3	265	13	419	23	781	33	706	43	460
4	358	14	716	24	640	34	798	44	955
5	979	15	939	25	628	35	214	45	058
6	323	16	937	26	620	36	808	46	223
7	846	17	510	27	899	37	651	47	172
8	264	18	582	28	862	38	328	48	535
9	338	19	097	29	803	39	230	49	940
10	327	20	494	30	482	40	664	50	812

Use Flashcards to remember the Pi chunks. Writing them helps physical learners, reading them out loud helps visual and verbal learners, listening to them back from someone else helps aural learners, knowing that most people don't know more than 5 digits of Pi helps logical learners.

We will use additional memory techniques throughout the week.

Exercise you Brain Daily

Many games enhance your physical hand-eye coordination, but there are hundreds that engage your brain with logic, math, and language skills. We will try a number of brain exercise games throughout the week. Since we mostly did math skills today, try some math and logic based games at home tonight.