

Study skills – KTH

with

Björn Liljeqvist

0730 - 39 41 99

bjorn@braingain.se

BrainGain



<https://sverigesradio.se/sida/artikel.aspx...>
<https://www.svt.se/.../stockholmare-ny-ordforande-for-varlden...>



SVERIGESRADIO.SE

Första svenska ordföranden i Mensa International Björn Liljeqvist - P4 Extra

   Isabella Holz, Monika Orski och 201 andra 23 kommentarer 1 delning

 Gilla

 Kommentera

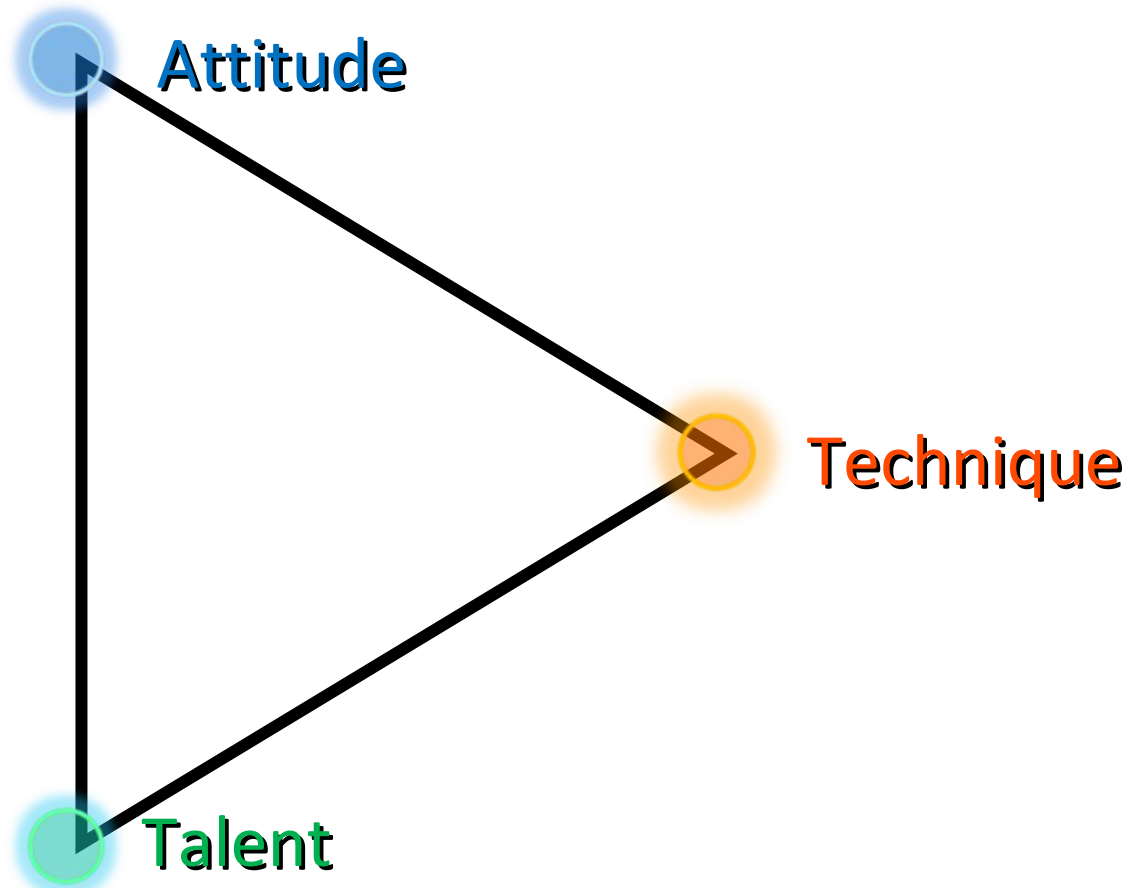
 Dela



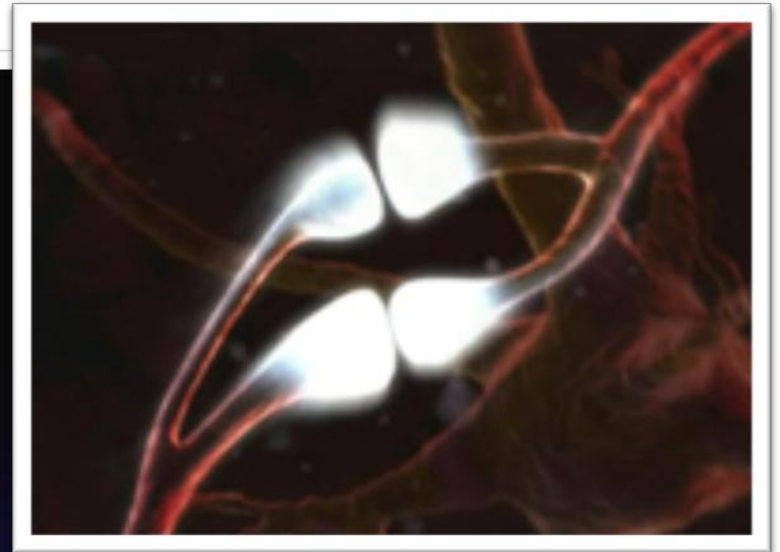
Sven
Nede

Sekre
Anno
Face

$$\text{Results} = T * A * T$$



Biology of Learning



Knowledge as simple facts

Periodic Table of Elements

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																																			
1	H Hydrogen 1.00794	<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p>Atomic # Syml Name Atomic Mass</p> </div> <div style="width: 30%;"> <p>C Solid Hg Liquid H Gas Rf Unknown</p> </div> <div style="width: 40%;"> <p>Metals</p> <p>Alkali metals Alkaline earth metals Lanthanoids Actinoids Transition metals Poor metals Other nonmetals Noble gases</p> </div> </div>																	2																																			
3	Li Lithium 6.941	4	Be Beryllium 9.012182	5	B Boron 10.811	6	C Carbon 12.011	7	N Nitrogen 14.0064	8	O Oxygen 15.9994	9	F Fluorine 18.9984032	10	Ne Neon 20.1797	11	Na Sodium 22.98976928	12	Mg Magnesium 24.3050	13	Al Aluminum 26.9815386	14	Si Silicon 28.0855	15	P Phosphorus 30.973762	16	S Sulfur 32.06	17	Cl Chlorine 35.453	18	Ar Argon 39.948																							
4	K Potassium 39.0983	Ca Calcium 40.078	Sc Scandium 44.955912	Ti Titanium 47.88	V Vanadium 50.9415	Cr Chromium 51.9961	Mn Manganese 54.938045	Fe Iron 55.845	Co Cobalt 58.933195	Ni Nickel 58.6934	Cu Copper 63.546	Zn Zinc 65.38	Ga Gallium 69.723	Ge Germanium 72.64	As Arsenic 74.9216	Se Selenium 78.96	Br Bromine 79.904	Kr Krypton 83.798	19	Rb Rubidium 85.4678	20	Sr Strontium 87.62	21	Y Yttrium 88.90584	22	Zr Zirconium 91.224	23	Nb Niobium 92.90638	24	Mo Molybdenum 95.94	25	Tc Technetium 98.9062	26	Ru Ruthenium 101.07	27	Rh Rhodium 102.9055	28	Pd Palladium 106.42	29	Ag Silver 107.8682	30	Cd Cadmium 112.411	31	In Indium 114.818	32	Sn Tin 118.710	33	Sb Antimony 121.757	34	Te Tellurium 127.60	35	I Iodine 126.90545	36	Xe Xenon 131.29
6	Cs Cesium 132.9054519	Ba Barium 137.327	57-71		Hf Hafnium 178.49	Ta Tantalum 180.94738	W Tungsten 183.84	Re Rhenium 186.207	Os Osmium 190.23	Ir Iridium 192.222	Pt Platinum 195.084	Au Gold 196.966569	Hg Mercury 200.59	Tl Thallium 204.3833	Pb Lead 207.2	Bi Bismuth 208.9804	Po Polonium (209)	At Astatine (210)	Rn Radon (222)	37	Fr Francium (223)	38	Ra Radium (226)	39	Rf Rutherfordium (261)	40	Db Dubnium (262)	41	Sg Seaborgium (266)	42	Bh Bohrium (264)	43	Hs Hassium (277)	44	Mt Meitnerium (268)	45	Ds Darmstadtium (271)	46	Rg Roentgenium (272)	47	Uub Ununbium (285)	48	Uut Ununtrium (288)	49	Uuq Ununquadium (289)	50	Uup Ununpentium (288)	51	Uuh Ununhexium (288)	52	Uus Ununseptium (286)	53	Uuo Ununoctium (294)	

For elements with no stable isotopes, the mass number of the isotope with the longest half-life is in parentheses.

Design and Interface Copyright © 1997 Michael Dayah (michael@dayah.com) <http://www.ptable.com/>



57	La Lanthanum 138.9047	58	Ce Cerium 140.118	59	Pr Praseodymium 140.90764	60	Nd Neodymium 144.242	61	Pm Promethium (145)	62	Sm Samarium 150.36	63	Eu Europium 151.964	64	Gd Gadolinium 157.25	65	Tb Terbium 158.92535	66	Dy Dysprosium 162.500	67	Ho Holmium 164.93032	68	Er Erbium 167.259	69	Tm Thulium 168.93421	70	Yb Ytterbium 173.054	71	Lu Lutetium 174.967
89	Ac Actinium (227)	90	Th Thorium 232.03806	91	Pa Protactinium 231.036889	92	U Uranium 238.02891	93	Np Neptunium (237)	94	Pu Plutonium (244)	95	Am Americium (243)	96	Cm Curium (247)	97	Bk Berkelium (247)	98	Cf Californium (251)	99	Es Einsteinium (252)	100	Fm Fermium (257)	101	Md Mendelevium (258)	102	No Nobelium (259)	103	Lr Lawrencium (260)

Knowledge as facts

Periodic Table of Elements

For elements with no stable isotopes, the mass number of the isotope with the longest half-life is in parentheses.

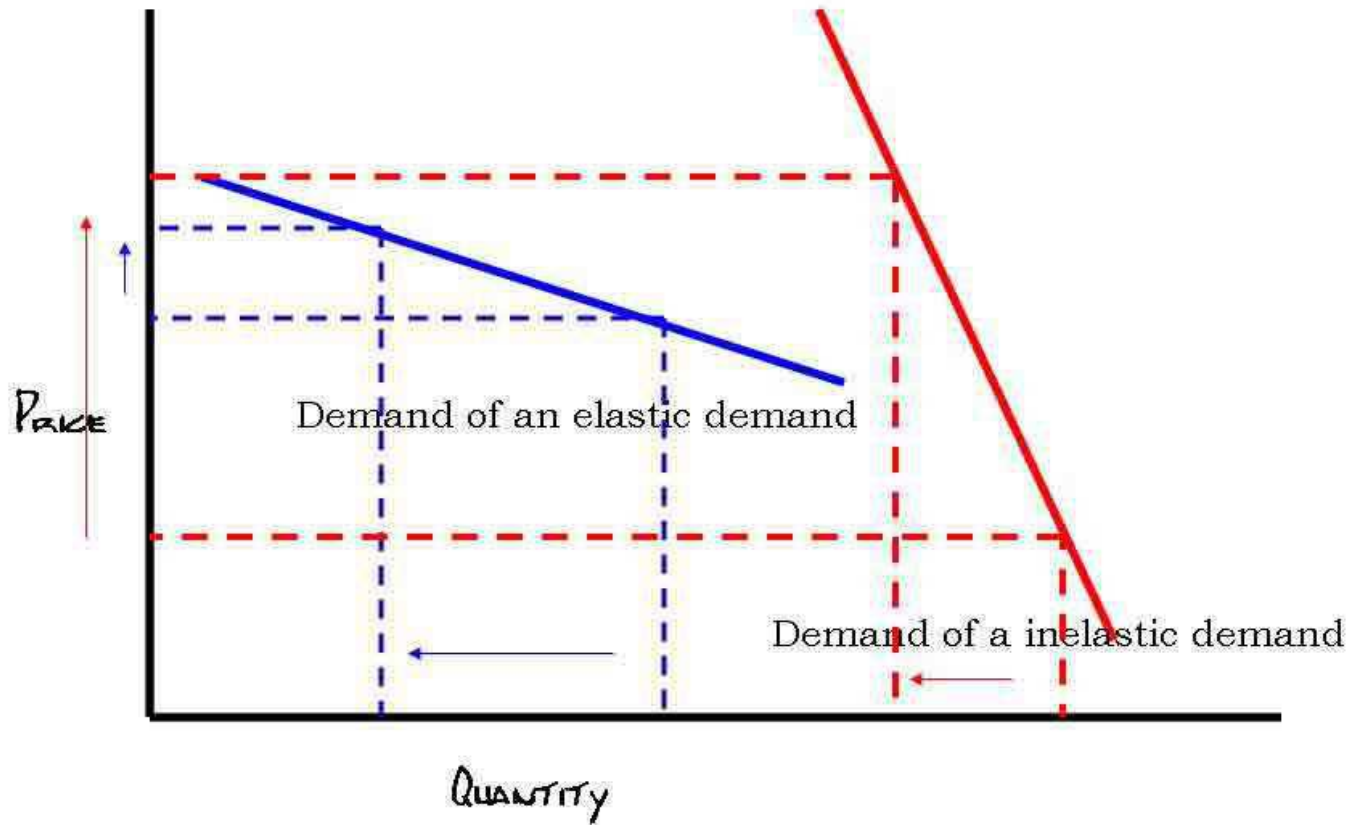
Design and Interface Copyright © 1997 Michael Davitt (michael.davitt@bt.com) http://www.table.com/

Tool: Mnemonics

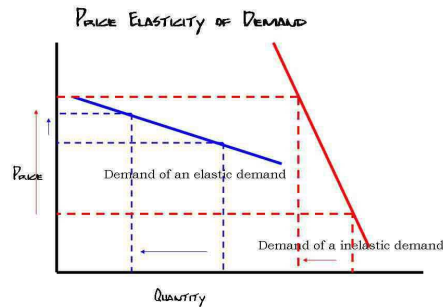
Find or create a connection to something you already know. Think about this connection clearly in your mind, in words or pictures, to create a new memory. Concretize and associate!

Knowledge as comprehension

PRICE ELASTICITY OF DEMAND



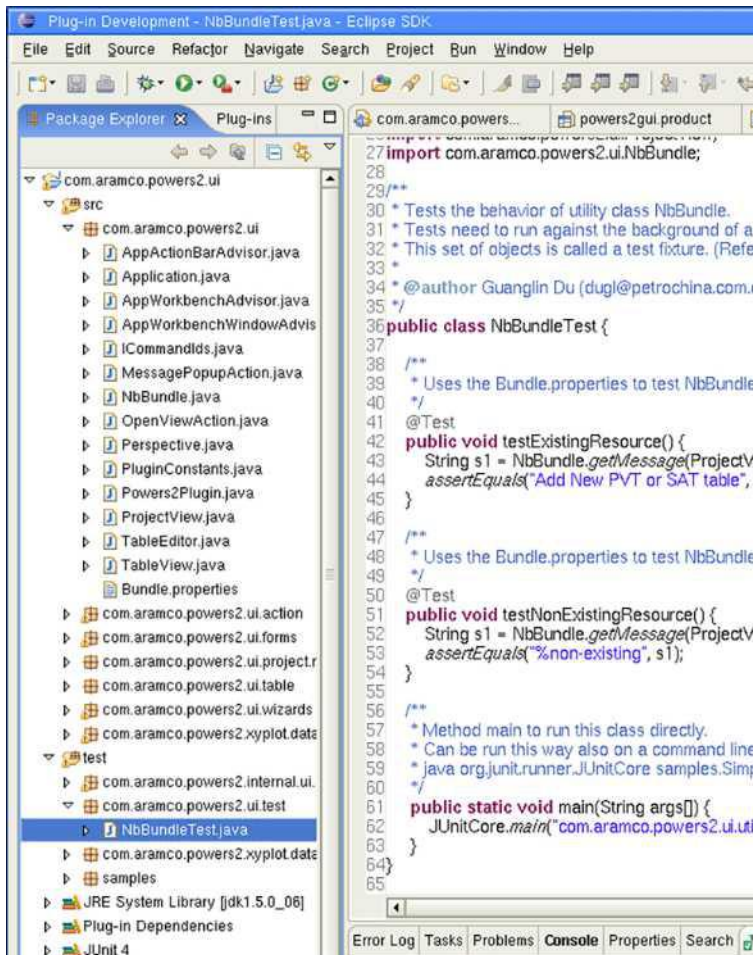
Knowledge as comprehension



Tool: Explain using own words

Read, listen and ask. Express what you feel you understand, to another person, in writing or in your mind. Abstract and exemplify.

Knowledge as skill



$$\mathcal{F}\{g(t)\} = G(f) = \int_{-\infty}^{\infty} g(t)e^{-2\pi ift} dt$$

$$= \int_{-T/2}^{T/2} Ae^{-2\pi ift} dt = \frac{A}{-2\pi if} \left[e^{-2\pi ift} \right]_{-T/2}^{T/2}$$

$$= \frac{A}{-2\pi if} \left[e^{-\pi ifT} - e^{\pi ifT} \right] = \frac{AT}{\pi fT} \left[\frac{e^{\pi ifT} - e^{-\pi ifT}}{2i} \right]$$

$$= \frac{AT}{\pi fT} \sin(\pi fT) = AT [\text{sinc}(fT)]$$

Knowledge as skill

The image shows a screenshot of an IDE with a code editor on the left and a mathematical derivation on the right. The code is in Java and defines a class `MathurdeTest` with a `test` method that prints the result of a Fourier transform. The derivation shows the integral of $Ae^{-2\pi ft}$ from $-T/2$ to $T/2$, which simplifies to $\frac{AT}{\pi T} \text{sinc}(fT) = AT \text{sinc}(fT)$.

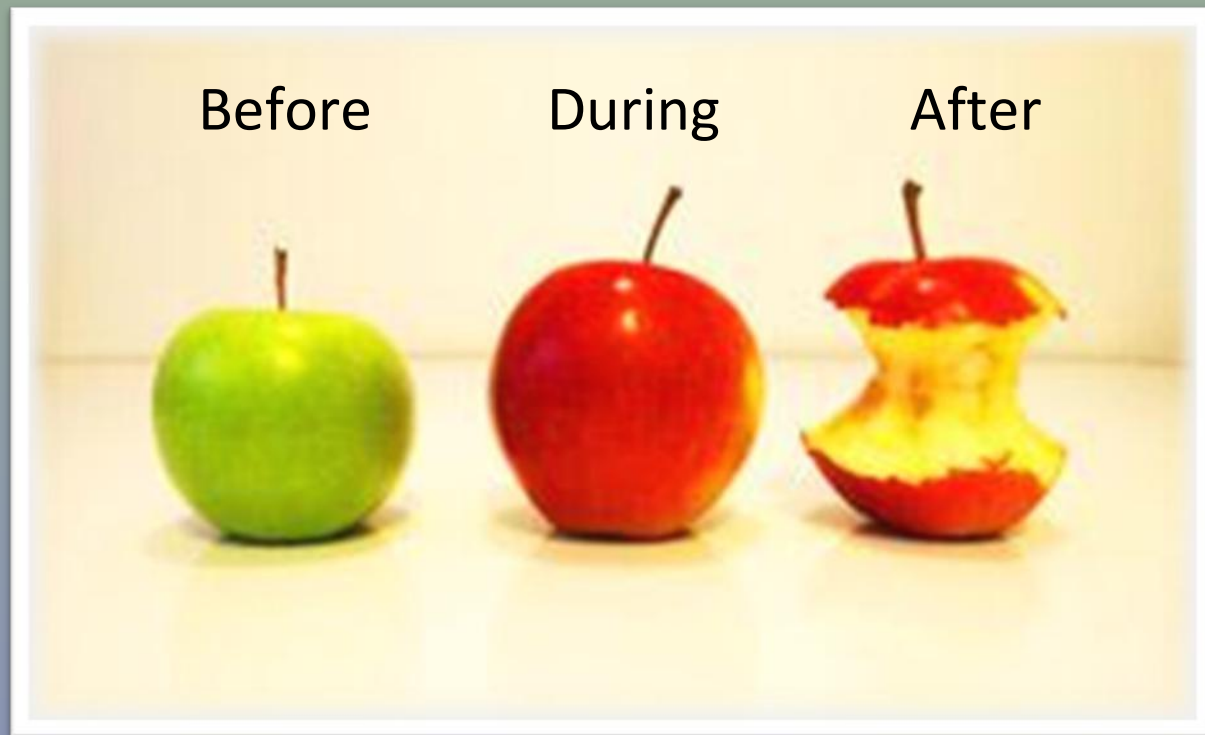
$$\mathcal{F}\{g(t)\} = G(f) = \int_{-\infty}^{\infty} g(t)e^{-2\pi ft} dt$$

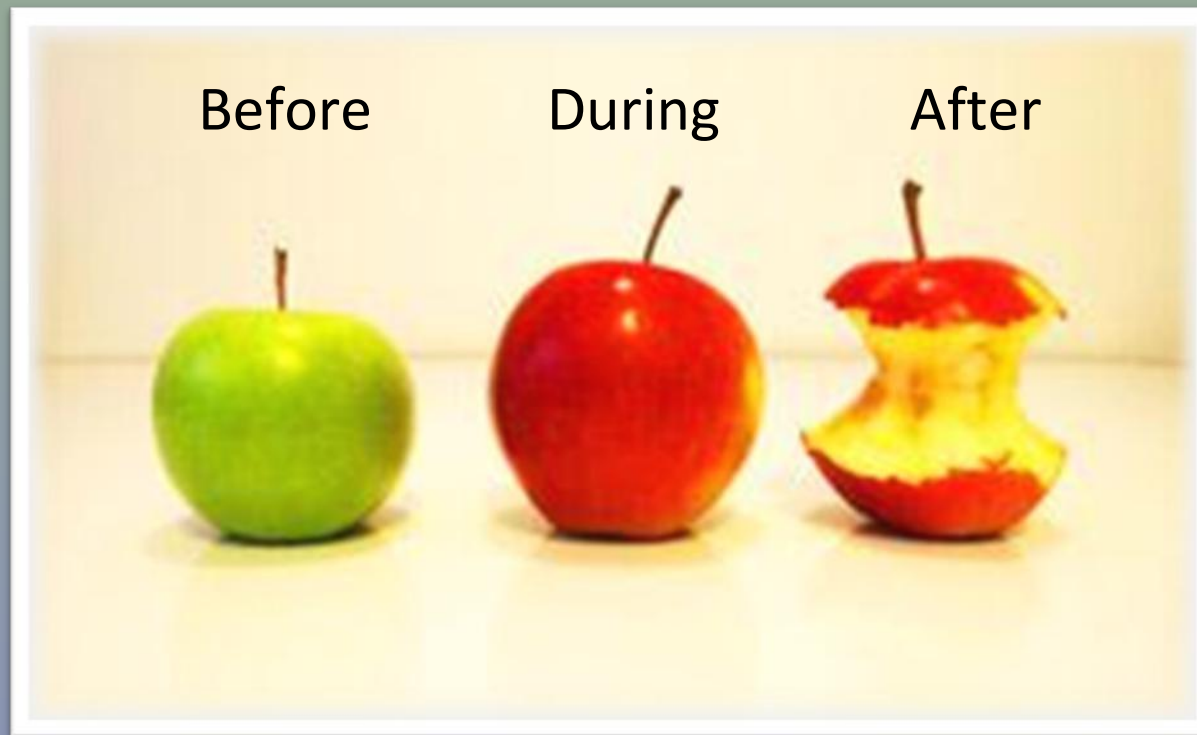
$$= \int_{-T/2}^{T/2} Ae^{-2\pi ft} dt = \frac{A}{-2\pi f} \left[e^{-2\pi ft} \right]_{-T/2}^{T/2}$$

$$= \frac{A}{-2\pi f} \left[e^{-\pi fT} - e^{\pi fT} \right] = \frac{AT}{\pi T} \left[\frac{e^{\pi fT} - e^{-\pi fT}}{2i} \right]$$

$$= \frac{AT}{\pi T} \text{sinc}(fT) = AT \text{sinc}(fT)$$

Tools: Recreate, imitate and experiment
 Look for ready-made examples in your literature and from teachers. Recreate these to learn the basics. Then do exercises with *appropriate level of difficulty* – the point where it's *possible* to solve the task with a little effort.





Spaced, varied and interleaved learning, applied



PROCRASTINATION

HARD WORK OFTEN PAYS OFF AFTER TIME,
BUT LAZINESS ALWAYS PAYS OFF NOW.



Intellectual

Knowledge

Plan

"What to do?"



Practical

Place

Energy

"How to do it?"

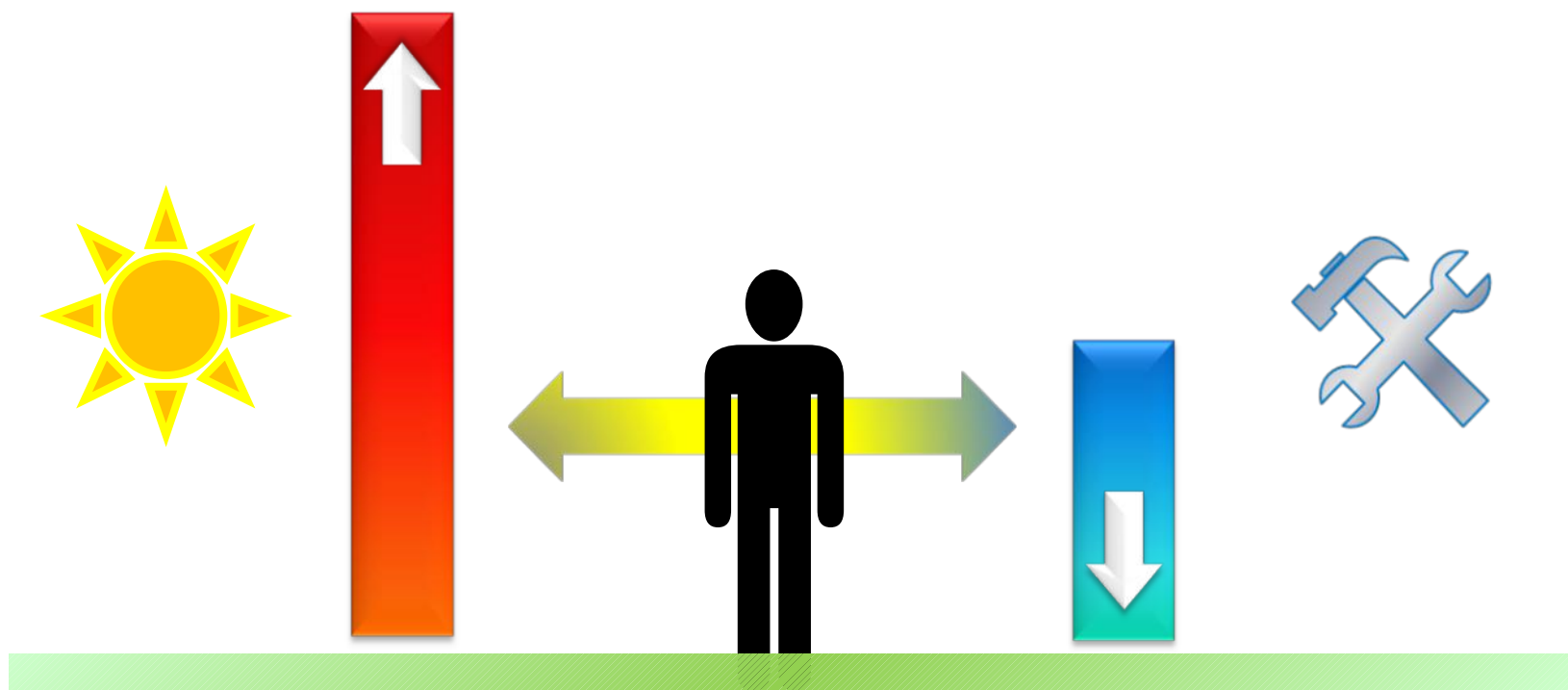


Emotional

Attitude

Motivation

"Why do it?"



Make it ...

	... easy to start	... hard to procrastinate
Think	Break it down.	Focus.
Feel	Make it fun.	"Why I am doing this?" Supportive people.
Act	A place. Energy. Tools	Remove distractions.

FEB	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	X	X	X	X	=	X		X	X	X			X	X	X	X	X	
学	X	X	X	X	X	X		X	X			X	X	X	X	X	X	X
	=	X	X	=	=			X	X		X			X	X			
brain gain	X	X	X	F	F			X	X		F	X			X	X	X	F
	=	=	X	X	X	X			X		X			X	X	X		X
	=	=	X	=	=										X	X	X	
	X	X	X	X	X	X		X	X	X		X			X	X	X	X
	X	X	X	X	X	X			X	X	X		X	X	X	X	X	X
	X	X	X	=	=	X		X	X					X	X	X	X	X
	X	X	X	X	=	X		X	X			X			X	X	X	X
	X	=	X	=	=			X		X	X				X	X	X	X
	X	X	X	X				X		X	X	X	X	X	X	X	X	X
	X	X	X	X	X	X		X	X	X	X	X	X	X	X	M	X	X
	X	X	X	X	X	X		X	X	X	X	X	M	M	M	M	X	X

<http://www.focusboosterapp.com>



http://workflowy.com

The image shows a browser window with the URL <https://workflowy.com>. The browser's address bar and navigation buttons are visible. The website's header includes a navigation bar with "Email:" and "Password:" labels, each followed by an input field, and a "Login" button. A link for "Forgot your password?" is located in the top right corner. The main content area features the "WorkFlowy" logo in a large, blue, serif font, with the tagline "Organize your brain." below it. In the center, there is a dark blue rounded rectangle containing a sign-up form. The form has three input fields labeled "Your Email:", "Re-enter Email:", and "New Password:". Below these fields is a blue button with the text "Sign Up" in white. The browser's status bar at the bottom left shows the URL <https://workflowy.com>.

WorkFlowy
Organize your brain.

Your Email:

Re-enter Email:

New Password:

Sign Up

Forgot your password?

https://workflowy.com

<http://freedom.to>



sign in

Make technology less distracting

Get started now

Block distractions, be productive, and start accomplishing more.

 Like 1.9k

http://getcoldturkey.com

The screenshot shows a web browser window with the URL getcoldturkey.com. The page features a dark background with a grid of dates. A central white box titled "Block When?" displays a calendar where several dates are highlighted in blue, indicating blocked days. To the left of the calendar is a vertical sidebar with social media sharing options: Facebook (24k), Gilla, 919, Tweet, 246, +1, 690, and a Share button. To the right of the calendar, the text "Hate distractions?" is displayed in a large font, followed by a paragraph: "Cold Turkey will temporarily block you off of social media sites, addicting websites, games and even programs! Imagine how fast you could do your work without all those distractions!". Below this text is a blue "Download Now" button. At the bottom of the page, a dark navigation bar contains the Cold Turkey logo and the links: HOME, FEATURES, DOWNLOAD, FAQ'S, and CONTACT.

Hate distractions?

Cold Turkey will temporarily block you off of social media sites, addicting websites, games and even programs!
Imagine how fast you could do your work without all those distractions!

[Download Now](#)

Cold Turkey

[HOME](#) [FEATURES](#) [DOWNLOAD](#) [FAQ'S](#) [CONTACT](#)

Before



Before

Overview

- Literature
- Course plan
- Old exams
- Google, wikipedia
- Older students

Plan

- When?
- What?
- Where?

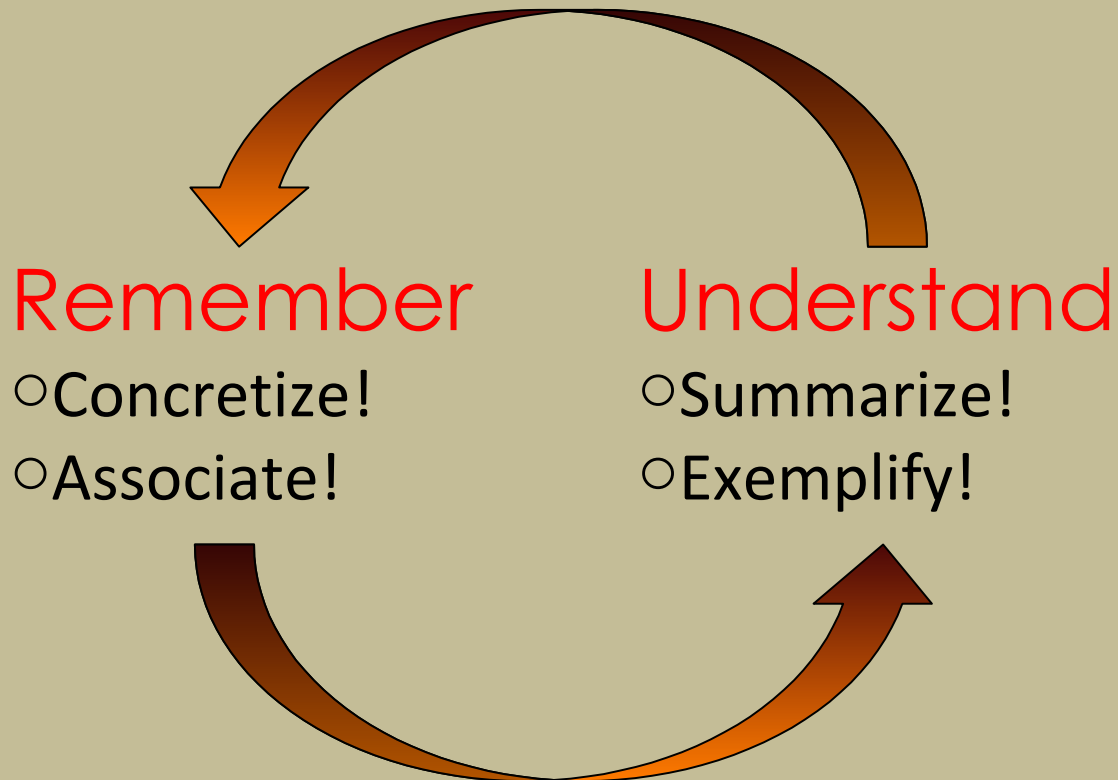
During



During

Study sessions

Many, short and well defined



After

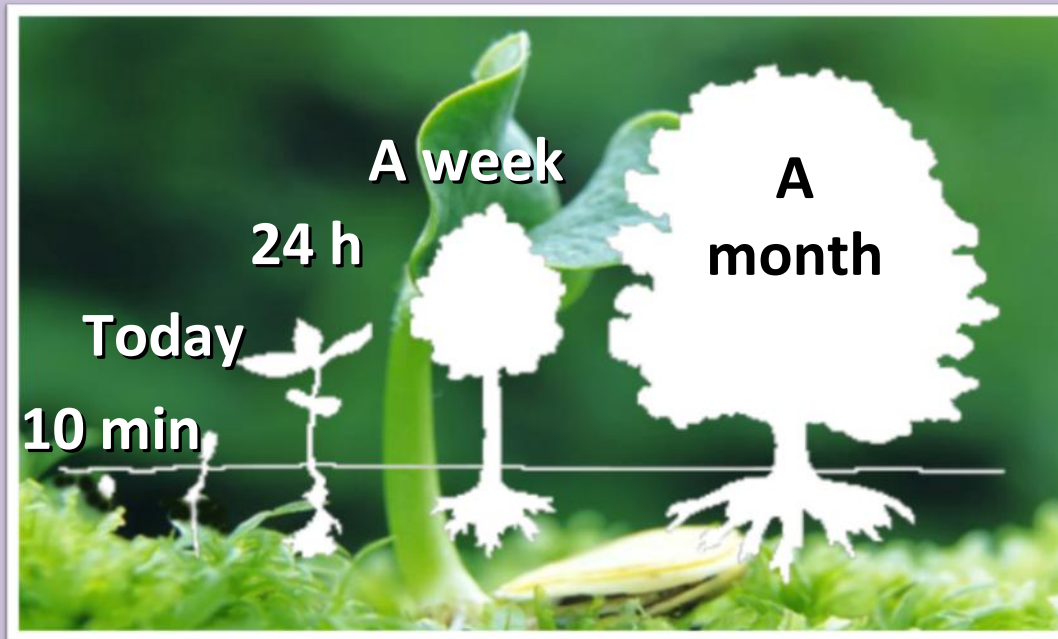


Think...

Tell!

Write.

After



Review the Right Way

- Test yourself
- Ten minute rule
- Study journal

JOURNAL + THREE BOOKMARKS



Yesterday



One week
ago



One month
ago

1. What's the most important thing you learned today? Write it down.
2. Test yourself on the contents of each page with a bookmark.
3. Move each bookmark forward one day.



Home

Docs

Support

AnkiWeb

Friendly, intelligent flash cards.
Remembering things just became much easier.

Download

Remember Anything

From images to scientific markup, Anki has got you covered.

Remember Anywhere

Review on Windows, Mac, Linux, iOS, Android, and any device with a web browser.

Remember Efficiently

Only practice the material that you're about to forget.

About Anki

Anki is a program which makes remembering things easy. Because it's a lot more efficient than traditional study methods, you can either greatly decrease your time spent studying, or greatly increase the amount you learn.

Anyone who needs to remember things in their daily life can benefit from

"No other application, at least on the OS X platform, comes remotely close to Anki in terms of the number and power of features, flexibility

Spaced Repetition

April 24

31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3

-  Today
-  Yesterday
-  A week ago
-  A month ago

Spaced Repetition

April 25

31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3

-  Today
-  Yesterday
-  A week ago
-  A month ago

Spaced Repetition

April 26





31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3

-  Today
-  Yesterday
-  A week ago
-  A month ago

Spaced Repetition

April 27

31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3

-  Today
-  Yesterday
-  A week ago
-  A month ago

Spaced Repetition

April 28





31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3

-  Today
-  Yesterday
-  A week ago
-  A month ago

Spaced Repetition

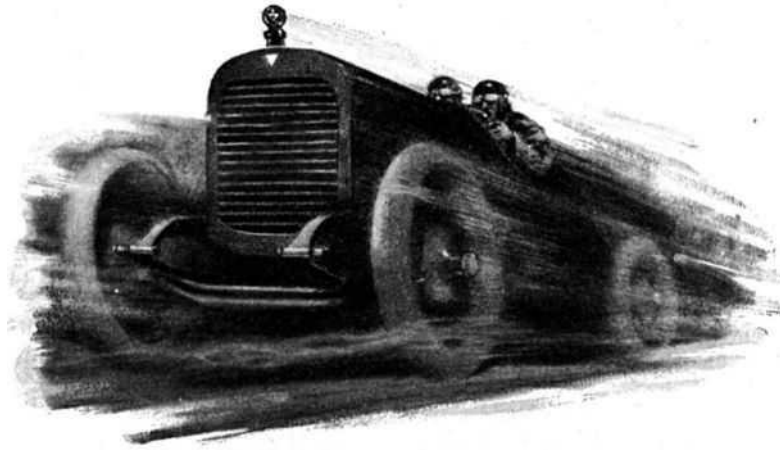
April 29

31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3

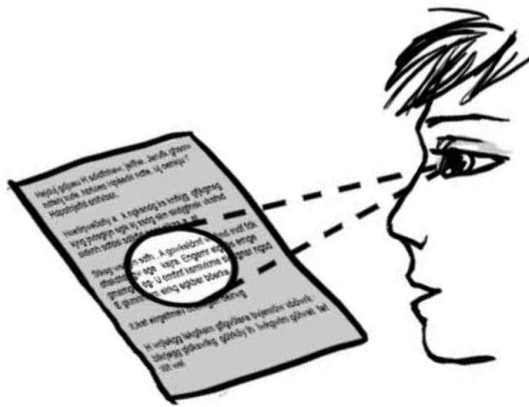
-  Today
-  Yesterday
-  A week ago
-  A month ago

Speed reading

for fun and profit



Factors to account for



- Eye coordination
- Visual range
- Concentration
- Prior knowledge



$$\text{Speed} = \text{Fixations} \times \text{Range} - \text{Regressions}$$

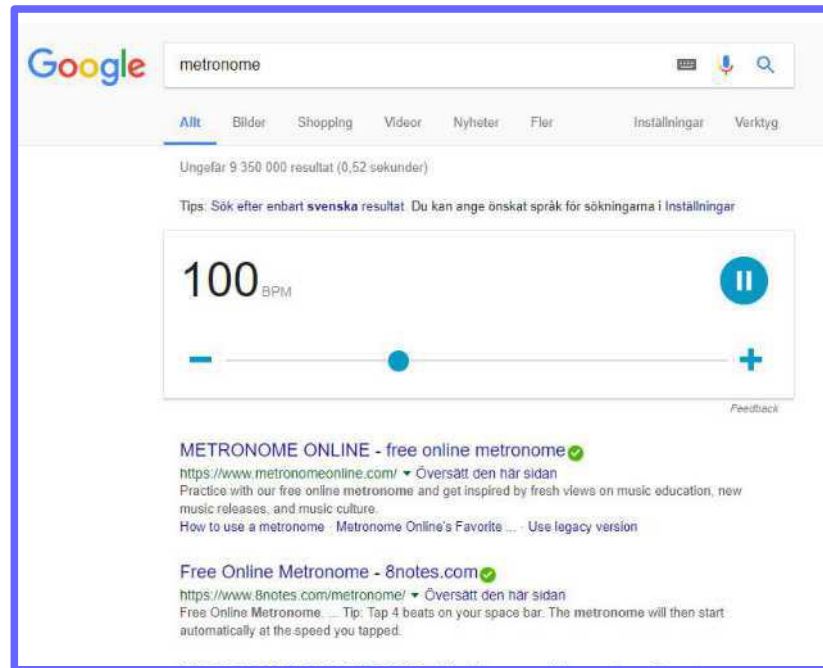
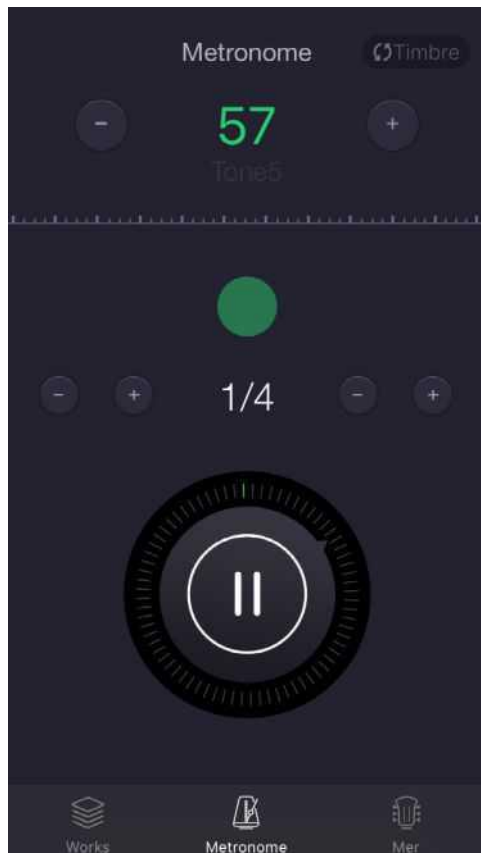
(Words/min = fix/min x word/fix - regr)

Guided reading

..på en och samma fixering. Testa på
en sida i boken med handen och
bort handen och täcka över sig
mycket hinner du uppfatt
övningen är att under de bra
som dina ögon exponeras för
bara med en enda fixering. Gör om detta några
gångar. Se om du kan upprepa något brottstycke
från sidan - då har du beviset på att du faktiskt
kan läsa flera ord i en fixering



Rhythmic practice



Four levels of reading



1. Elementary reading ("the mere text")
2. Inspectional reading ("the book as a whole")
3. Analytical reading ("the author's mind")
4. Syntopical reading ("the whole field")



1. Table of contents

Terminology. Introductions.

Guess and extract.

The contour of the book.

2. Disarm the book!

Relax. Turn a page every five seconds.

No details. Observe and absorb.

The contour of the book.

3. Close reading

20:10:5. What is this text? Why read it?

Read through. Summarize and retell.

Pause and review.

