

THE DEVELOPING BRAIN

Learning for life...

The human brain mediates our movements, our senses, our thinking, feeling and behaving. The amazing, complex neural systems in our brain, which determine who we become, are shaped early. Signals get sent up the line from brain 1 to 2 to 3 to the cortex. [Neuro-sequential model (B D Perry): the order the brain works in; grows from bottom to top.

Brain 1 ~ Brainstem

Brain stem is the most basic part of the brain - it is there first and ensures survival. Survival is the most important. *The brainstem controls heart rate, body temperature and other survival-related functions. It also stores anxiety or arousal states associated with a traumatic event.*

Moving outward towards the neocortex, complexity of functions increases.

Brain 2 ~ Diencephalon

Sports brain is next - cerebellum - movement. *Together brains 1 & 2 is the reptilian brain ie that's all a reptile has.*

Brain 3 ~ Limbic

The limbic system stores emotional information. Mammals have brains 1, 2 & 3; survival, movement and emotion.

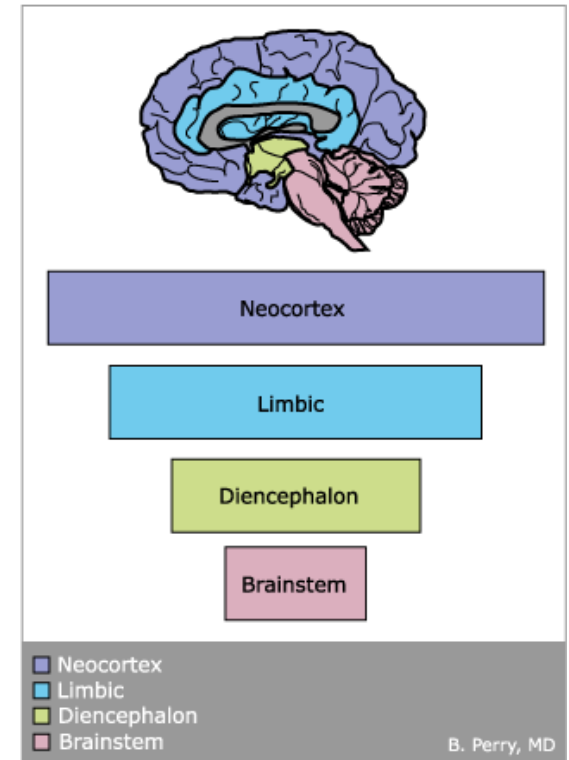
Brain 4 ~ Neocortex

The neocortex controls abstract thought and cognitive memory; planning for the future, empathy and imagination. This takes up 76% of the brain and does all the "flash stuff." Only primates have brains 1, 2, 3 & 4.

Survival creatures, **Movement** creatures, **Emotional** creatures then **Thinking**¹ creatures.

The *gifts* the school talks about in its Positive Behaviour Policy and captured in the parachute graphic of the 21st learner (see below) are just that, gifts. They are given to babies in its very earliest years. Should these gifts be missing in varying degrees, then the behaviours will be generated by the needs of brains 1, 2 & 3 which are not being met. So... temperament + experience = personality.

The Human Brain



1 Bloom's Taxonomy adapted by Eric Frangenheim (Rodin) shows similarly stratified levels of thinking skills from the most basic ie recall to highest order such as design, planning and engineering new information. See chart below.

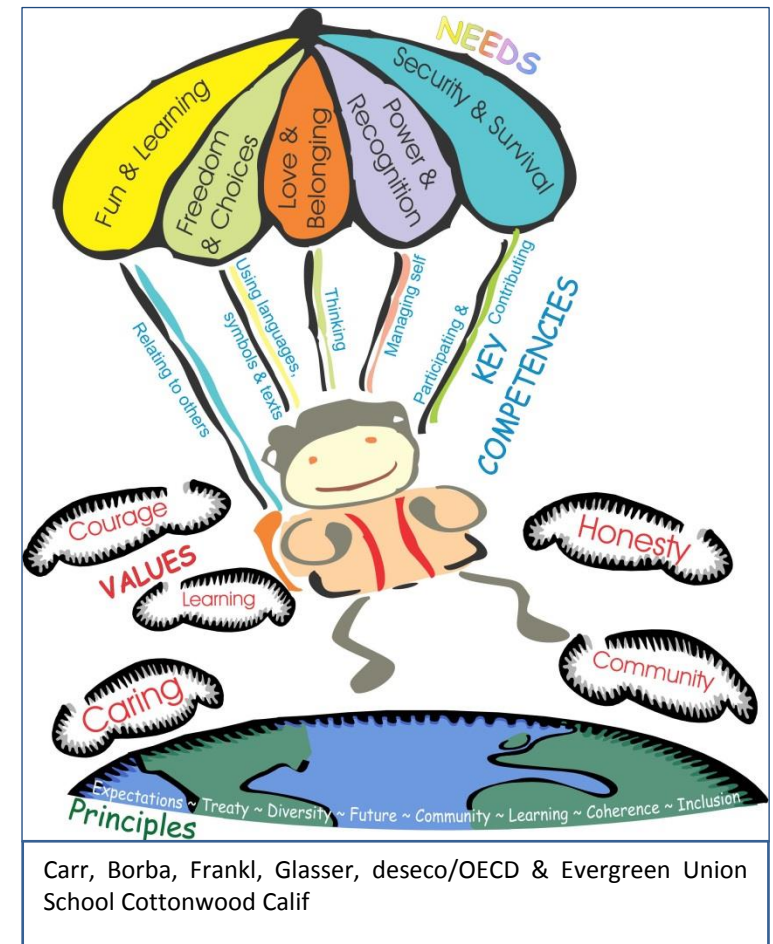
of basic facts (letter formation & tables etc)

In utero and during the first four years of life, a child's rapidly developing brain organises to reflect the child's environment. This is because neurons, neural systems, and the brain change in a "use-dependent" way. Physical connections between neurons — synaptic connections — increase and strengthen through repetition, or wither through disuse. It follows therefore, that each brain adapts uniquely to the unique set of stimuli and experiences of each child's world. Early life experiences, therefore, determine how genetic potential is expressed, or not.

As the brain organises, the lower more regulatory systems develop first. During the first years of life, the higher parts of the brain become organised and more functionally capable. Brain growth and development is profoundly "front loaded" such that by age four, a child's brain is 90% adult size! **This time of great opportunity is a biological gift.** In a nurturing environment, a child can grow to achieve the full potential pre-ordained by underlying genetics. We promote this by fostering conditions of optimal development.

Points of worthy of note

- first three years of life are THE MOST IMPORTANT (*learning for life*)
- the growth of the frontal cortex is experience dependent
- brain trebles in size by age three - from 350g - 1.2kg (only grows about another 200g to full/adult size)
- for most people at 3½ the brain development pattern is already set
- female brain mature 18 - 23 years old
- male brain mature 23 - 32 years old
- just gender and birth order generate advantage or disadvantage
 - first born girl = maximum advantage
 - first-borns don't end up in prison
 - females end up far less often in prison
- attachment is our key survival strategy as a baby
- movement only develops IF the needs of brain number 1 have been met
- 2 years old - emotional age - limbic brain 3 so the *terrible twos* have all the emotions of an adult but no access to the frontal cortex to logically manage their emotions
- children don't interact with other children in the first 2 years - prefer and need adult attention
- attachment relationship is the main affecting influence - goodness of fit with parent temperament is key to the development of attachment
- attachment triggers genes and development
- the earlier you start child care, the less prosocial reinforcement the child is subjected to
- the better this prosocial reinforcement is then the better you will be socially throughout life
- the number of hours in front of a baby's face - the better the outcomes



- the literature strongly supports having a single caregiver at home for the first 2-3 years
- dyadic relationship (interaction between a pair) is a critical factor
- baby is better off with the most responsive caregiver adult - outcomes not as good if the caregiver is an older child
- a good enough job at home is better than being put into care
- cortisol levels need to be kept low in babies - keep it calm
- upset baby sets off cortisol levels in mothers/parents AND other babies
- we have to get the learners out of the brainstem function - poverty, shelter, hunger, food, attachment/relationship... needs/gifts - solid springboard to jump from, not wobbly - a child who has had their needs met can afford the 'risk' of bringing all of their cortex on line
- to really use your cortex your brainstem needs to be calm
- calm brain stem before working with child - meet the needs of brain number 1 first - above all else
- calming the child down is the most powerful thing we can do - children have a different set of scales for different relationships, a different balance between brainstem and cortex functioning
- really can't teach a scared kid to learn - be Miss Honey NOT Ms Trunchbull
- build up trust first and sense of attachment before you can bring in consequences
- leave kids with the same teacher for 3 years - provided that it works
- consistently maintain pro-social responses
- three and a half is the age at which it is statistically predictable to indicate what a child's life outcomes could be. i.e. prison, degrees, employment etc - Celia Lashlie...
- 6 years of foster care did not undo the damage of the first 2 years as against a child left in the orphanage
- 10 years of foster care did undo the damage of the first 2 years as against the child left in the orphanage
- adolescence can begin around the age of 9
 - adolescence produces a shut down in the frontal cortex for about 3 years
 - teen brain 10% of time accesses frontal cortex
 - teen brain 90% of time operates in limbic system ie emotional brain - the home of anger
 - technology as well as real friends - then no need to be concerned
 - technology only, with no real friends - major concern
 - loss of ability to read facial expressions - accurate only about 50% of the time
- 0 - 3 is the most important time and opportunity for us to save society
- brains 1, 2 & 3 needs must be met before the cortex learning needs can begin
- 90% of death row criminals have a poorly developed frontal cortex
 - lack empathy and ability to rationalise - ability to perceive consequences
- traumatic birth doesn't indicate long term effects - yet - ongoing research
- child is affected by the violent video games for 3 hours after playing the video game
- a murderer, 2 year olds and 15 year olds, all have a similar brain scan
- **teach the child when they are 2 rather than endure the tantruming 15 year old**

Sir Peter Gluckman -

Why do we have so many delinquents in NZ -
"Improving the Transition"

- Focus too much upon the acquisition of cognitive skills in the first 6 years of life rather than on social emotional development.
- When social emotional needs have not been met we respond to them punitively.
-

This is why attitudes and emotions really do matter - because they form the foundation for learning.

Writing
rite right!



2

NEEDS ~ COMPETENCIES ~ VALUES

- Early Childhood - Compulsory Schooling (Prim & Sec) - Tertiary Education

Glaser Choice Theory Borba/Frankl The Five Gifts	Te Whariki	Pelorus Transition Bridges	Havelock Values NZ/MoE Values	Key Competencies	School Leavers...	Tertiary Key Competencies
fun & learning mission	Exploration - Mana aotūroa	Being a Learner - Whakaaro	Learning for life... Akoranga making meaning, throughout life, habits of mind, higher order thinking, creativity & adaptability	Thinking	can understand and critique the nature of the world around him/her and make informed decisions	Thinking
power, importance & success competence	Communication - Mana reo	Being a Communicator - Mana reo	Responsibility Kawenga duty, obedience, loyalty/allegiance, honour	Using languages, symbols and texts	is able to engage in learning throughout life	Using tools interactively
safety security	Well-being - Mana atua	Being Well - Kaha	Honesty Pononga truthfulness, trustworthiness, integrity, reliability, humility Courage Toa best effort/quality, self-discipline, enterprising, preparation, organisation, independence, positivity, perseverance	Managing Self	takes responsibility for self; motivated, reliable and confident	Acting autonomously
freedom to choose self-hood	Contribution - Mana tangata	Taking Responsibility - Haepapa	Caring Manaakitia for others & self... fairness, kindness, politeness/tact, understanding, helpfulness, co- operation, compassion, concern, reasonableness, rights, property, respect, courtesy	Relating to Others	can participate effectively in and contribute to a range of life contexts	Operating in social groups
love & belonging affiliation	Belonging - Mana whenua	Being Perseverant - Pūkeke	Community Iwi Whānui ~ Tauira engagement, respect for difference/diversity, exemplary role- model, leadership	Participating & Contributing	has a positive sense of identity	




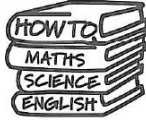


SOME STRATEGIES FOR THINKING AT DIFFERENT LEVELS

<http://www.rodineducation.com.au/cms/pages/Menu/Home/!display.html>

<http://www.itcpublications.com.au/>

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Eric Frangenheim ©

WHAT	1. Some Thinking Skills		WHY	2. Bloom	HOW	3. Some Thinking Strategies	4. Some Co-operative and Collaborative Strategies
Complexity Designing Elaborating Extrapolating Flexibility	Forecasting Formulating Hypothesising Modifying Synthesising	Originality Planning Proposing Risk-taking Organising		CREATE <i>acting like</i> Thomas Edison <i>- always improving, designing, planning</i>	1:4:P:C:R, AGO, BAR, Brick Wall Key, C&S, CPS, Disadvantages/Improvements T, Forced Relationships, MAS, P:M:Improve, Random Input, Scamper, Six Thinking Hats®, "So What is the Problem?", The Ridiculous Key, TWERP, What If Key, Word Association, Y Chart	1:2:4 1:3:Share 1:3:6:Share 1:4:P:C:R Assigning Roles Doughnut Hot Potato Jigsaw Judge Jury Numbered Heads Pairs and RAS Alert Round Robin Setting Group Goals Silent Card Shuffle Think, Pair, Share TRIAD	HOW
Arguing Assessing Choosing Concluding Deciding	Determining Recommending Justifying Prioritising Checking	Rating Judging Selecting Verifying Evaluating		EVALUATE <i>acting like a</i> judge <i>- based on the evidence</i>	Advantages/Disadvantages T, APC, CAF, Decision Making Matrix, Disadvantages/Improvements T, Extent Barometer, FIP, Judge Jury, OPV, PCQ, PMI, Relevant/Irrelevant T, Reliable/Unreliable T, Six Thinking Hats®, Tournament Prioritising, Y Chart		
Arguing Analysing Categorising Comparing Complex Summarising	Distinguishing Debating Deducing Deeper Thinking Differentiating Investigating	Contesting Examining Explaining Identifying Discussing Separating		ANALYSE <i>acting like a</i> sorting tray <i>- examining and breaking up an issue into its component parts</i>	Attribute Grouping, Brainstorming, CAF, Commonalities Key, CPS, Decision Making Matrix, Disadvantages/Improvements T, Double Bubble, Fact/Opinion T, Five Whys? Good/Poor Reasoning T, Icon Prompt, Judge Jury, KWL, Mind Map, OPV, Picture Key, PCQ, PMI, Ridiculous Statement, SWOT Analysis, Silent Card Shuffle, Six Thinking Hats®, T Charts, Y Charts, 5W&1H		
Applying Calculating Compiling Completing	Constructing Demonstrating Extrapolating Illustrating	Inferring Showing Solving Using		APPLY <i>acting like a</i> 'How To Manual' <i>- applying previously learnt data in similar or novel situations</i>	Blue Hat, Brainstorming, CPS, Different Uses Key, Flow Chart, Graphic Organiser, Reverse Listing Key, Silent Card Shuffle		
Describing Explaining Interpreting Summary	Paraphrasing Understanding Simple	Translating Restating Outlining		UNDERSTAND <i>acting like a</i> dictionary <i>- understanding words, concepts, cause-effect and 'reasons for'</i>	AGO, APC, Brick Wall Key, CAF, Cause-Effect, Generalisations, Graphic Organisers, Metaphor, Mind Map, Multiple Intelligence Model, PMI, Reverse Listing, Silent Card Shuffle, Six Thinking Hats®, Visualisation, Visuals, Word Summary		
Defining Remembering Knowing Labelling	Listing Locating Memorising Naming	Fluency Retelling Stating		REMEMBER <i>acting like an</i> encyclopaedia <i>- where one finds information, facts, data</i>	Acronyms, Acrostics, Answer-Question Key, Attribute Listing, Brainstorming, Different Uses Key, KWL, Mnemonics, See-Saw, Silent Card Shuffle, What If, White Hat		
							5. Howard Gardner's Multiple Intelligences WHO <ul style="list-style-type: none"> • Verbal Linguistic (Word Smart) • Logical Mathematical (Number Smart) • Visual/Spatial (Picture Smart) • Body/Kinaesthetic (Body Smart) • Musical/Rhythmic (Music Smart) • Interpersonal (People Smart) • Intrapersonal (Self Smart) • Naturalistic (Nature Smart)

Bruce D. Perry, MD., PhD

<http://www.lfcc.on.ca/mccain/perry2.html>

[Nathan Makare-Wallace \(Brainwave Trust\)](#)

Nathan has been a lecturer at the Christchurch College of Education, lecturing in human development, brain development, language and communication and risk and resilience. Nathan has a background of working with children in counselling settings relating to domestic violence, sexual abuse and childhood trauma. Involved in his background working with and for the local iwi (Ngai Tahu), Nathan has established and managed educational contracts in Christchurch including Parents As First Teachers and Te Waka Huruhurumanu a Ngai Tahu indigenous early learning centre.

<http://www.waikato.ac.nz/research/expertise/staff/MargaretCarr.shtml>

<http://micheleborba.com/>

http://en.wikipedia.org/wiki/Viktor_Frankl

<http://www.wglasser.com/the-glasser-approach>

<http://www.oecd.org/fr/edu/apprendre-au-dela-de-l-ecole/definitionandselectionofcompetenciesdeseco.htm>