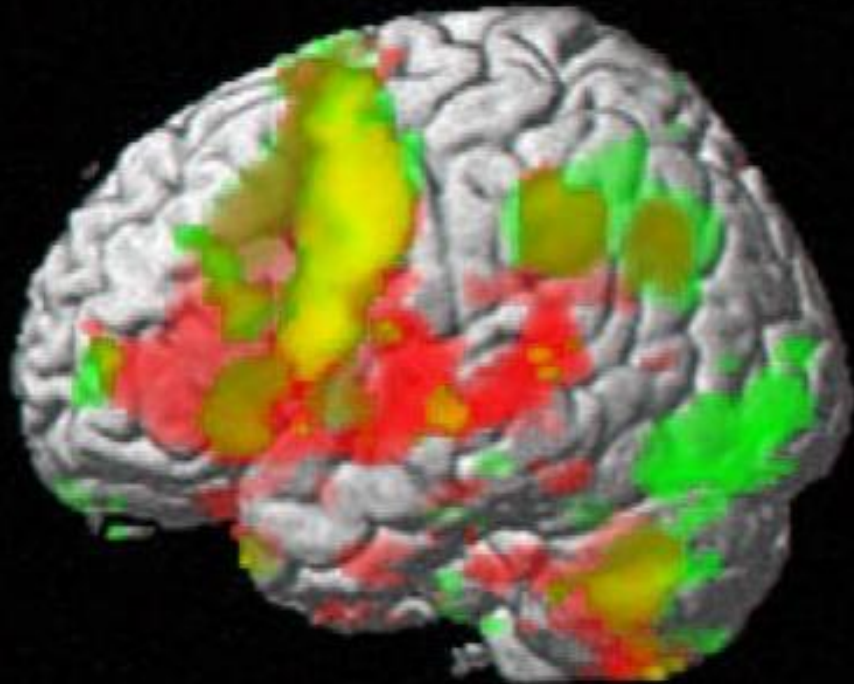


Brain-friendly Language Teaching

How can



researchers?

on the brain help learners and teachers?



Today's Schedule

Time	Topic
09:00 – 10:30	Part 1: Basics of neuro-didactics How do we learn?
	Part 2: Turning the Brain „ON“ The role of emotions for learning
10:30 – 10:45	Coffee break 
10:45 – 12:30	Part 3: Constructing Language Actively Practical examples....
12:30 – 14:00	Lunch break 
14:00 – 15:30	More practical examples how to apply the principles in class... Grammar... Vocabulary...
15:30 – 15:45	Coffee break 
15:45 – 17:00	Applying the principles to your own classes



What do you know already?

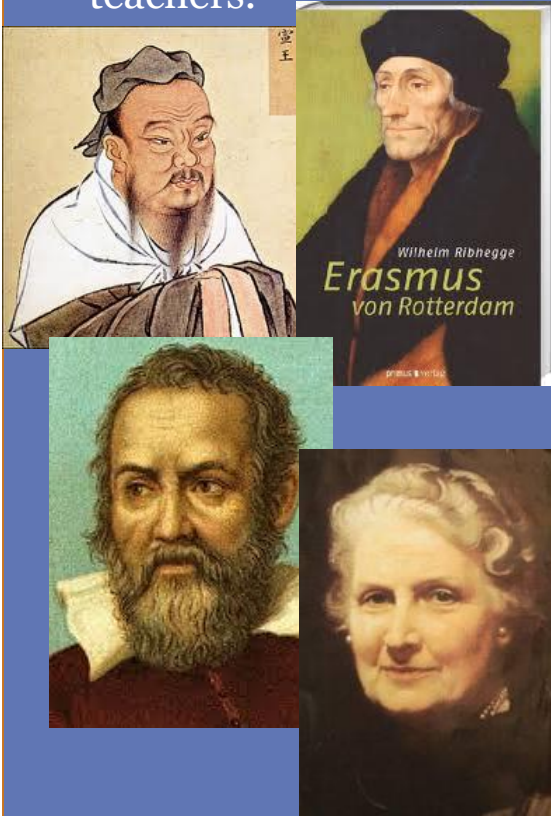
Principles of brain-friendly learning



K	W	L
What I know about this topic:	What I want to find out.	What I have learned

Findings in the neuro-sciences

corroborate the experiences and theories of good teachers.



Average Memory Retention Rates













Today's topics

Part 1: Learning is a physical and chemical process.

**Part 2:
Turning the brain "ON"...**

**Part 3:
Constructing language act**

Checkliste für gehirngerechten Unterricht

- | | |
|---|--|
|  | <ul style="list-style-type: none">• Wie werde ich das Vorwissen meiner SchülerInnen aktivieren? |
|  | <ul style="list-style-type: none">• Was werde ich tun um ein angstfreies, "entspanntes Feld" herzustellen? |
|  | <ul style="list-style-type: none">• Ist das Thema / der Inhalt / der Text wirklich interessant und relevant? |
|  | <ul style="list-style-type: none">• Wie werde ich die neuen Lerninhalte automatisieren?• Wie kann ich das episodische Gedächtnis einbeziehen?• Wie kann ich das Bildgedächtnis einbeziehen? |
|  | <ul style="list-style-type: none">• Wie kann ich möglichst viel soziale Kommunikation erzielen? |
|  | <ul style="list-style-type: none">• Wie werden meine SchülerInnen ihren Erfolg sehen können?• Wie werden meine SchülerInnen ihre Lernprodukte präsentieren? |
|  | <ul style="list-style-type: none">• Welche Schritte setze ich damit meine SchülerInnen Wissen selbst konstruieren können?• Wie vermeide ich unreflektierte Verwendung deklarativer Grammatikregeln aus dem Lehrbuch? |
|  | <ul style="list-style-type: none">• Welche Beispiele authentischer Sprachverwendung „serviere“ ich meinen SchülerInnen um natürliche Musterbildung zu ermöglichen?• Welche Übungsformen unterstützen die Musterbildung? |
|  | <ul style="list-style-type: none">• Wie kann ich möglichst viele Hirnareale gleichzeitig aktivieren? |
|  | <ul style="list-style-type: none">• Wie kann ich auch peripheres Lernen und unbewusstes Lernen unterstützen? |

© E. Pölzleitner

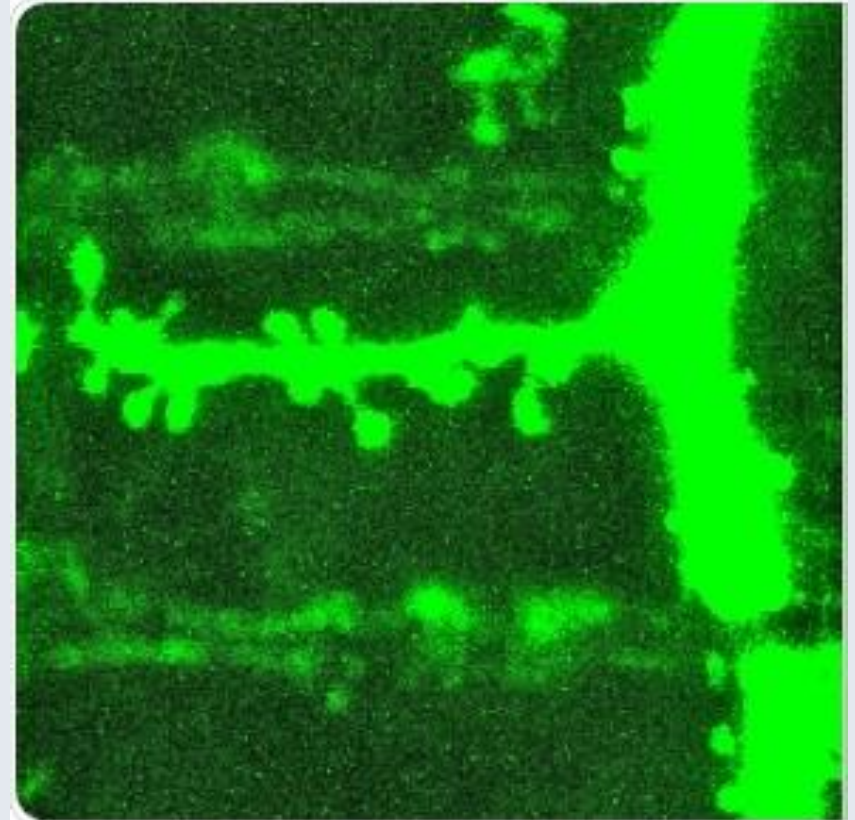
Beispiele für gehirngerechte Sprachlernaktivitäten finden Sie auf <http://www.epep.at>

Part 1: Learning is a physical-chemical process

6

“Teaching is the art of changing the brain. I mean, creating conditions that lead to change in a learner’s brain.”

James E. Zull, p.5

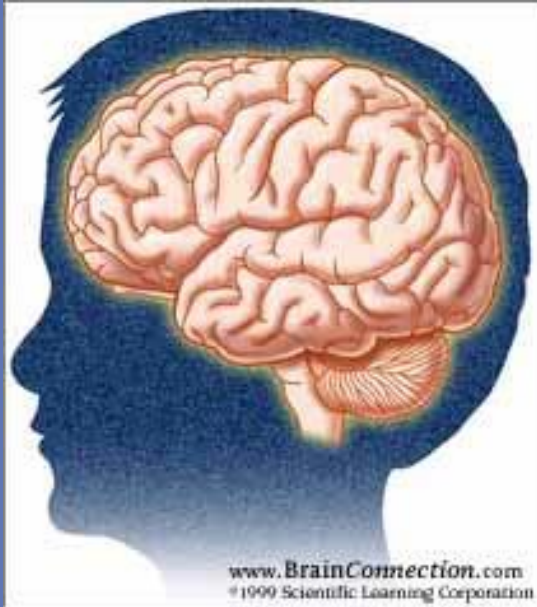


© MPI von Neurobiologie Meyer, in <http://www.news-medical.net/news/20140422/791/German.aspx>



The Brain

How does it work?

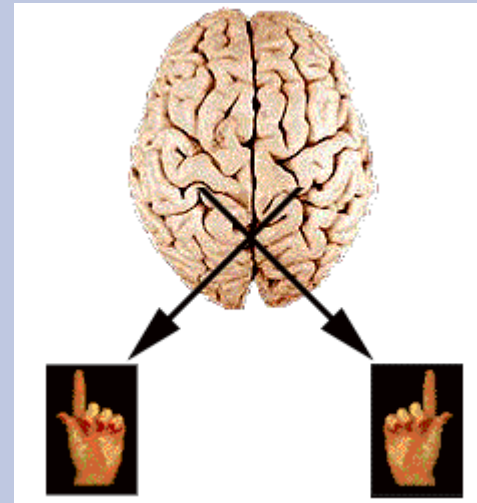


The human brain consists of:

about 100 billion neurons

About 100 trillion synapses

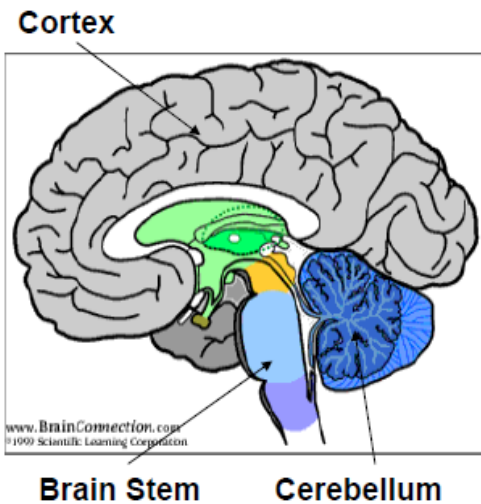
2 hemispheres connected by the Corpus Callosum





The Brain

Parts



Brainstem (Reptilhirn)

Coordinates unconscious processes:
eyemovement, pupil width, breathing...

Cerebellum (Kleinhirn)

Coordinates posture, muscle tension, balance coordination of movement, swallowing, reflexes...
...

Interbrain/Midbrain (Zwischenhirn)

Thalamus,
Hypothalamus,
Pituitary gland (Hypophyse)
...
Drives and instincts
Blood pressure, hormones

Limbic System:

« emotion center »
Amygdala, Hippocampus
Joy, Addiction, Fear...

Cortex (Großhirnrinde)

4 lobes control movement, perception and all higher order processes



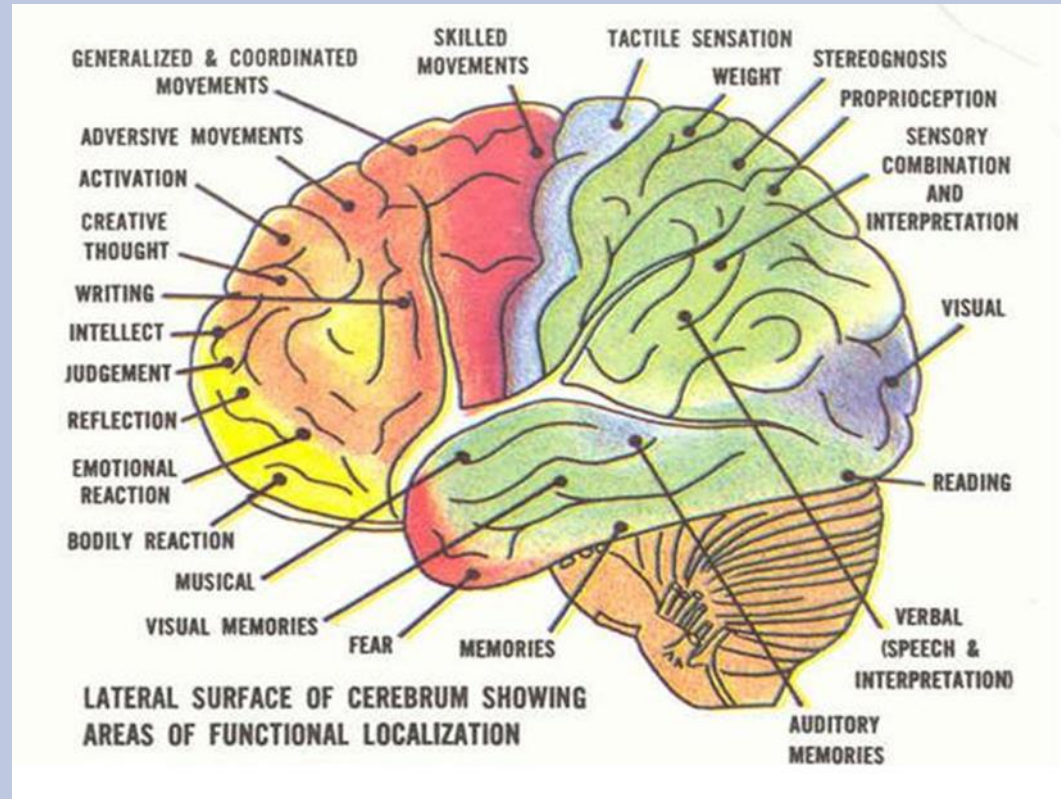
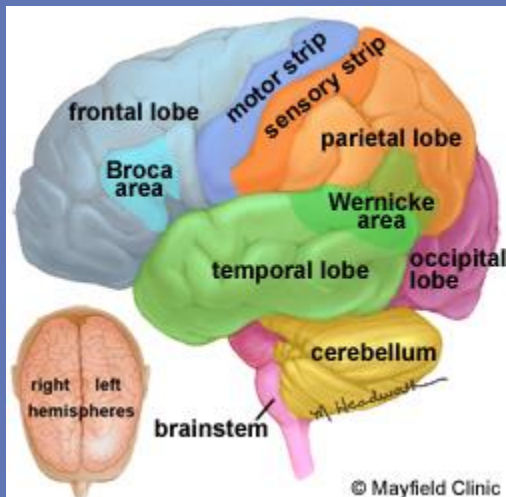
The Cortex

Frontal lobe

Parietal lobe

Temporal lobe

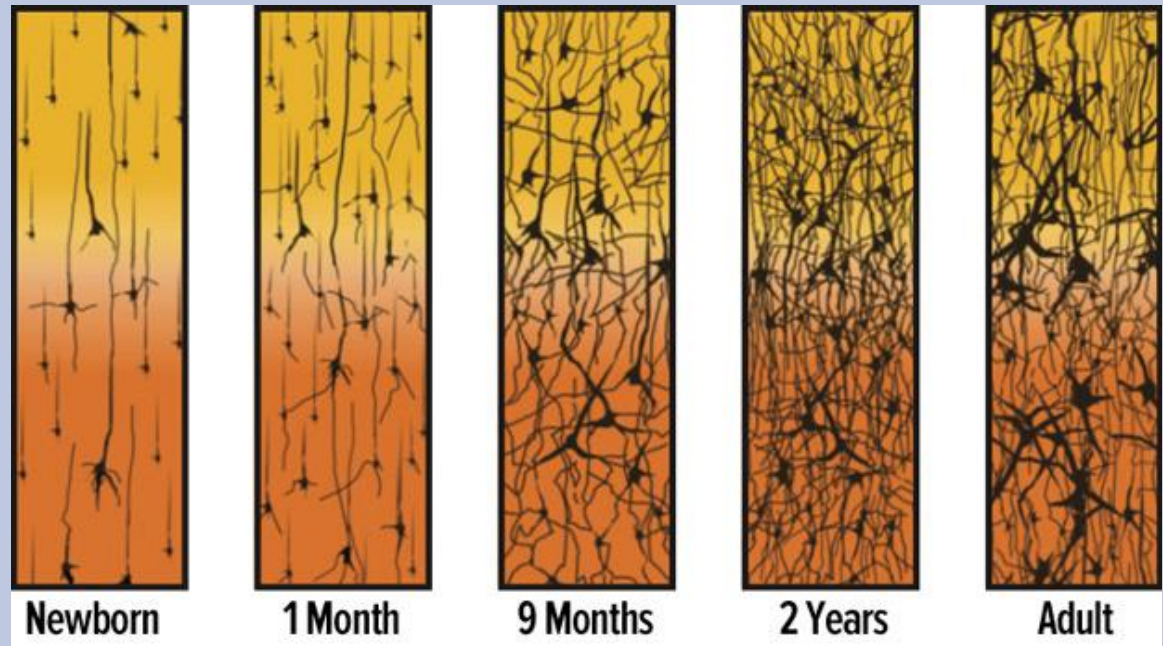
Occipital lobe





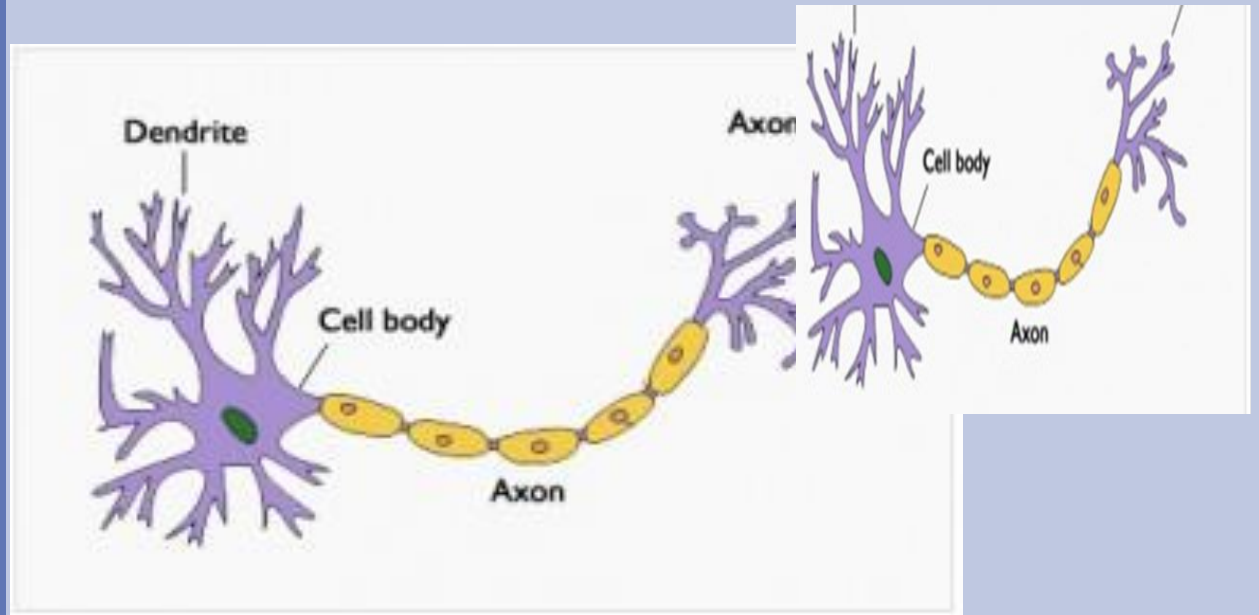
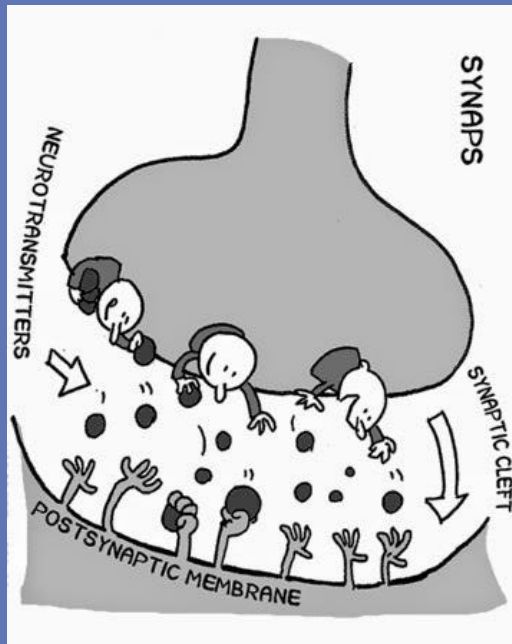
The development of the BRAIN

The development of synapse connections from baby to adult





Signal transmission in neural networks



1 neuron can build up to 10 000 synaptic connections



Electro-chemical signal transmission



Looking into the brain at work





What are the practical consequences?

A little experiment....



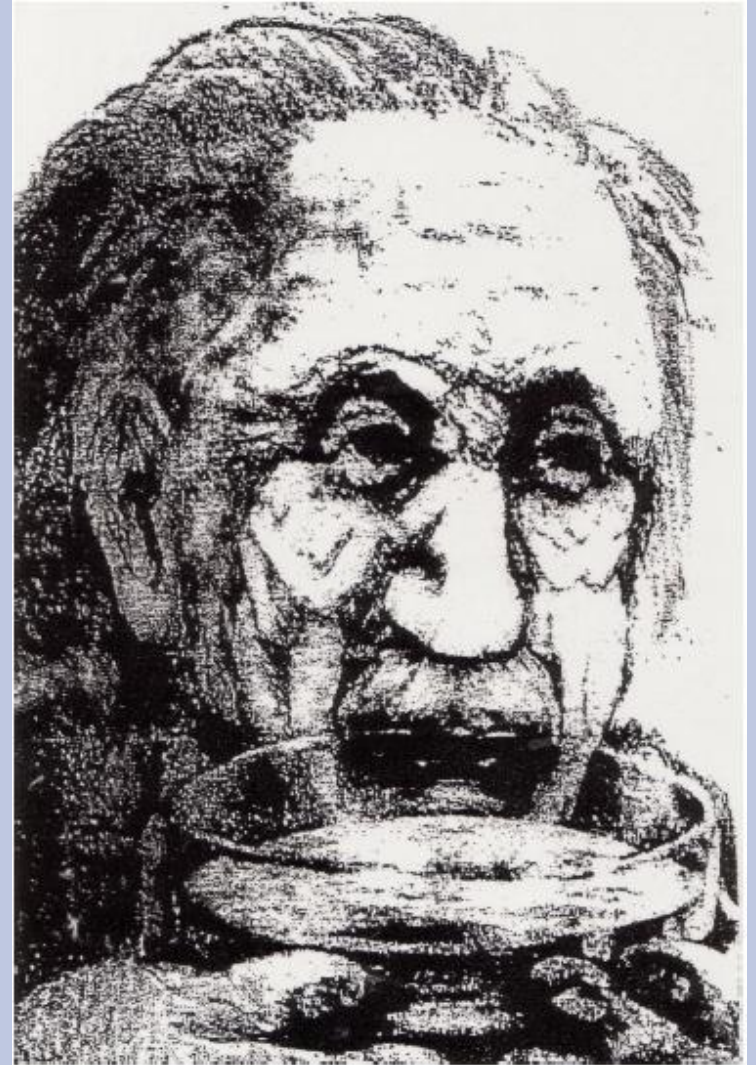
Neurons that fire together wire together





A little experiment...

- Think of a famous physicist...





A little
experiment...

Venus Botticelli





Ein kleines
Experiment...

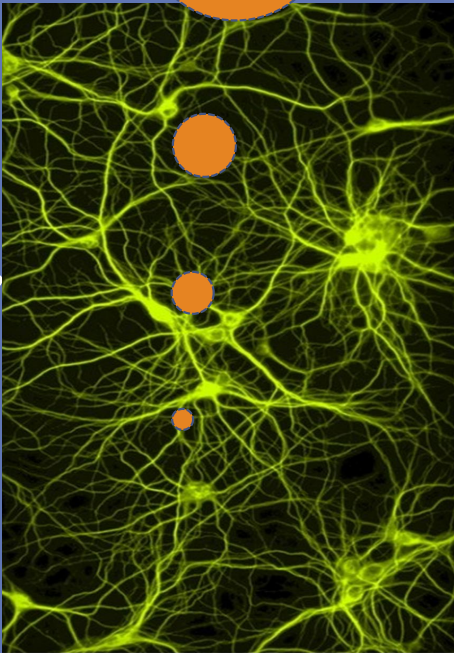
What do you see now?

What do you see now?





Neurons that
fire together
wire together



1. Principle

New information is linked to
existing networks

Prior knowledge structures our
perception.

General overview  details



“Neural networks are knowledge”

“

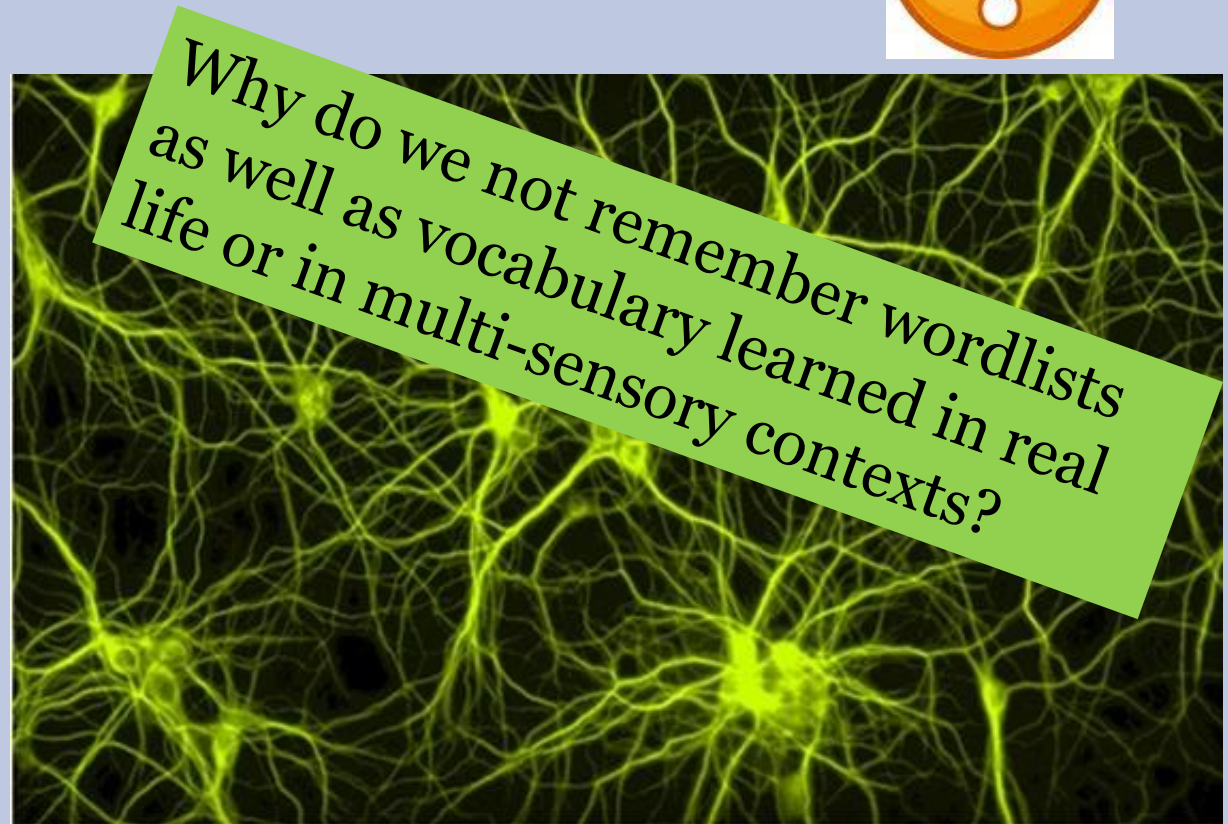
Zull, p.92

Learning =

Growth of synapse connections

Myelination of axones

Applying new knowledge....





Types of Memory

Ultra short-term

Short-term

Long-term

Working memory

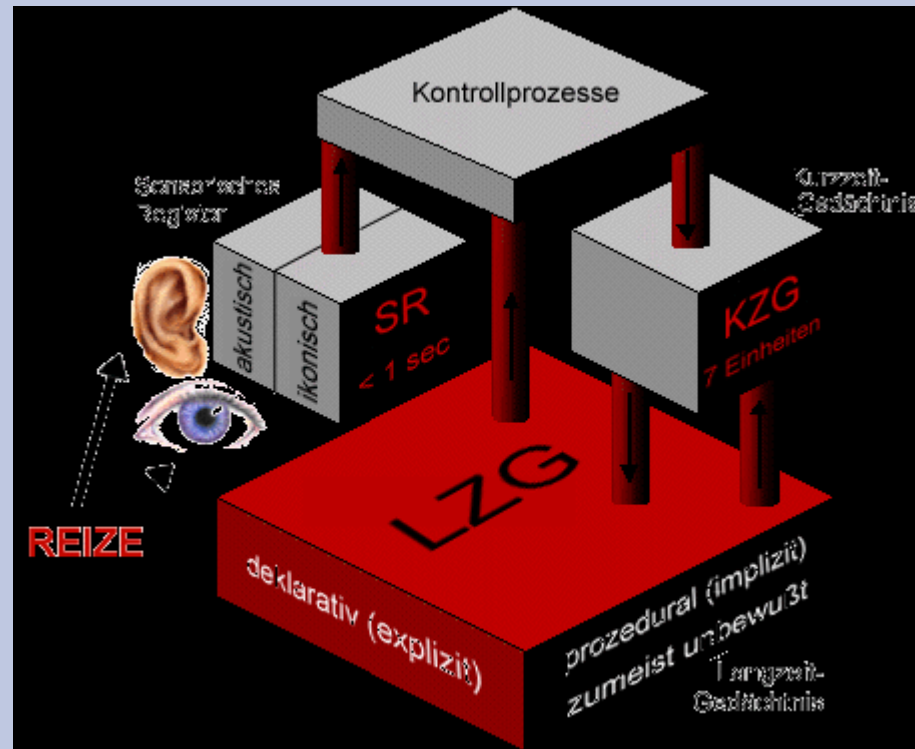
Semantic and
episodic memory

Procedurales GD
Deklaratives GD



2nd Principle

The brain stores different types of information in different ways and different places.





Regular and irregular verbs: Do you know the rules?

Kennen Sie die Regel für die Bildung des Partizip Perfekt im Deutschen?

Können Sie die Regel anwenden?

- Ich « n
Auch ges
- Meine Na
« pierden »
gerne. Letztes Wochenende haben
sie den
- Wir
Tag
Uhr
Verben auf ---ieren bilden das Partizip Perfekt mit ---iert
- Ich « ne
gestern h
mich
.....

Procedural knowledge

Verben auf ---ieren bilden das Partizip Perfekt mit ---iert

Part 2: Turning the brain “on”...

21

**Body, mind
and soul are
interconnected**





3rd Principle

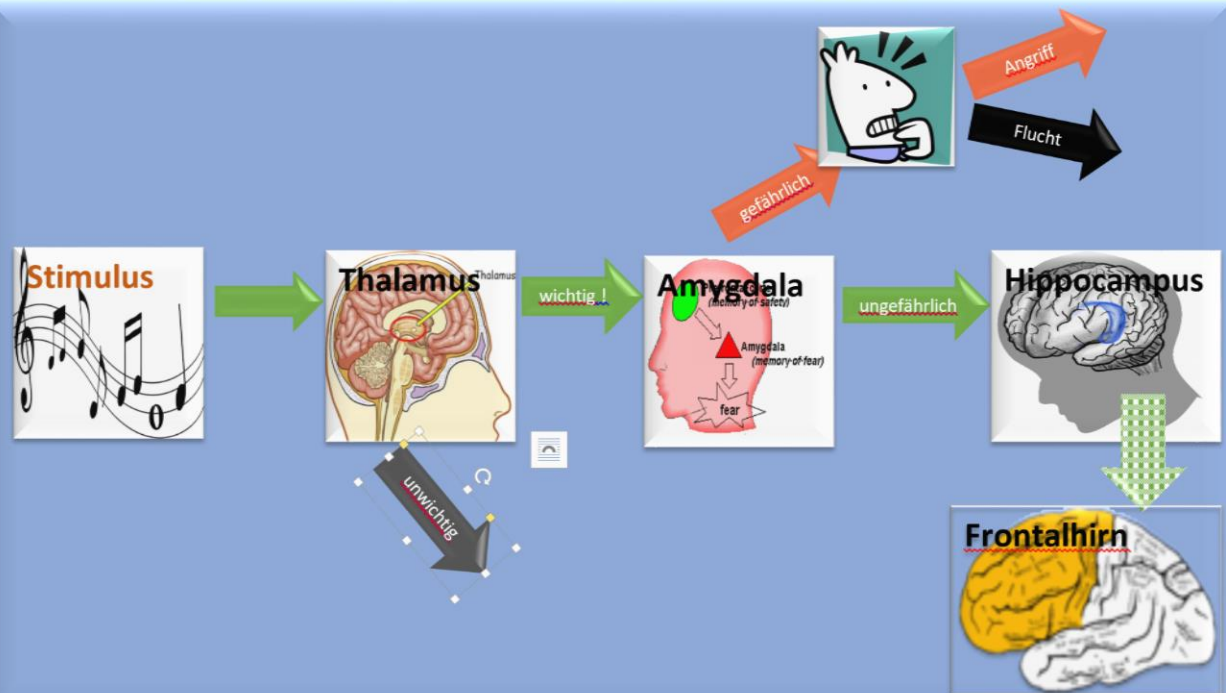
Emotions are the key to the brain:

- Emotionale und soziale Aspekte des Lernens spielen eine mindestens ebenso wichtige Rolle für das Schulgeschehen wie die intellektuell-kognitiven. (Bauer 2006)

Emotions are the
to the brain



The limbic system decides whether information is let in.

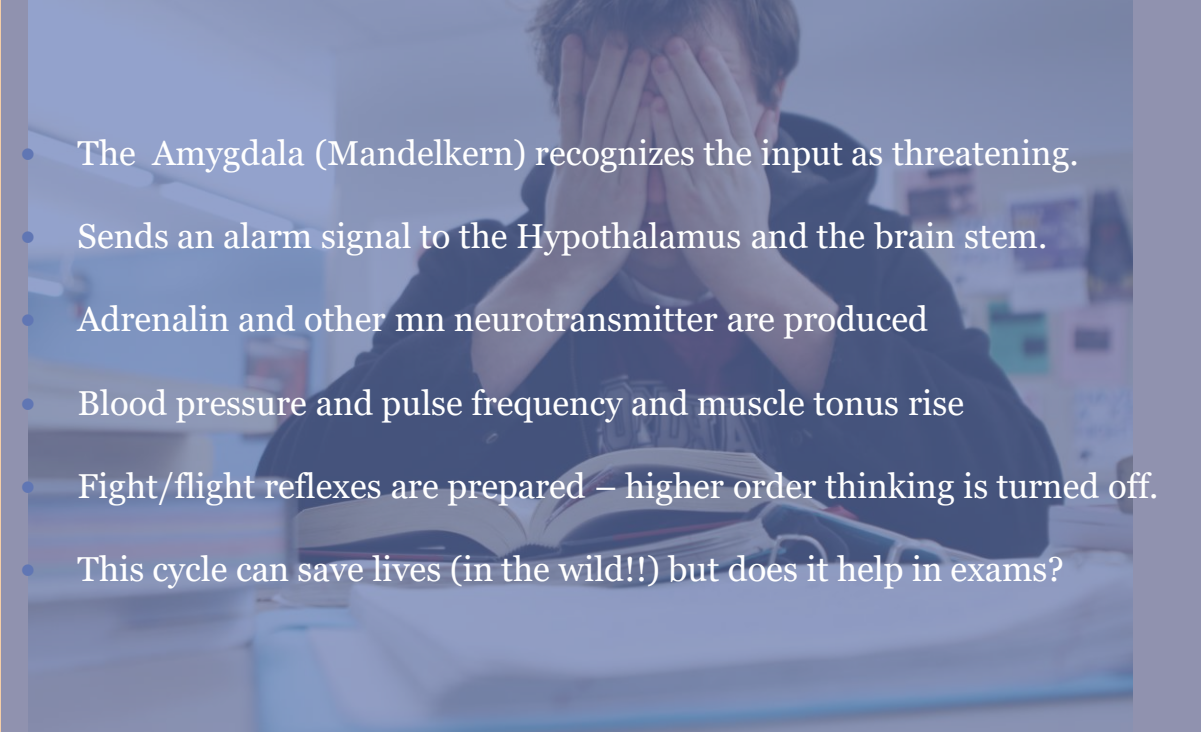




HELP!



“I knew that perfectly well at home, but now I cannot think of the right answer...”

- 
- The Amygdala (Mandelkern) recognizes the input as threatening.
 - Sends an alarm signal to the Hypothalamus and the brain stem.
 - Adrenalin and other mn neurotransmitter are produced
 - Blood pressure and pulse frequency and muscle tonus rise
 - Fight/flight reflexes are prepared – higher order thinking is turned off.
 - This cycle can save lives (in the wild!!) but does it help in exams?



FEAR !!!



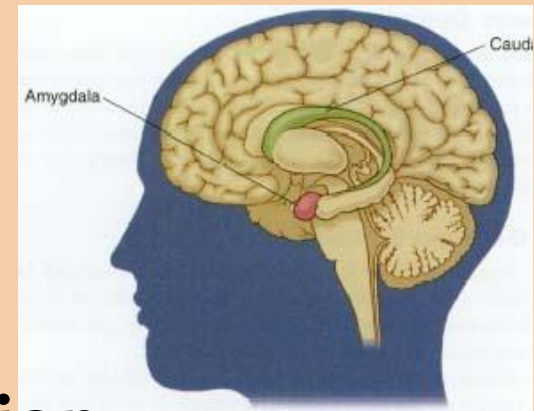
**Alarm-
system!**

AAA

Amygdala-Adrenalin-Anxiety

Produces a cognitive style that facilitates basic, automatic routines

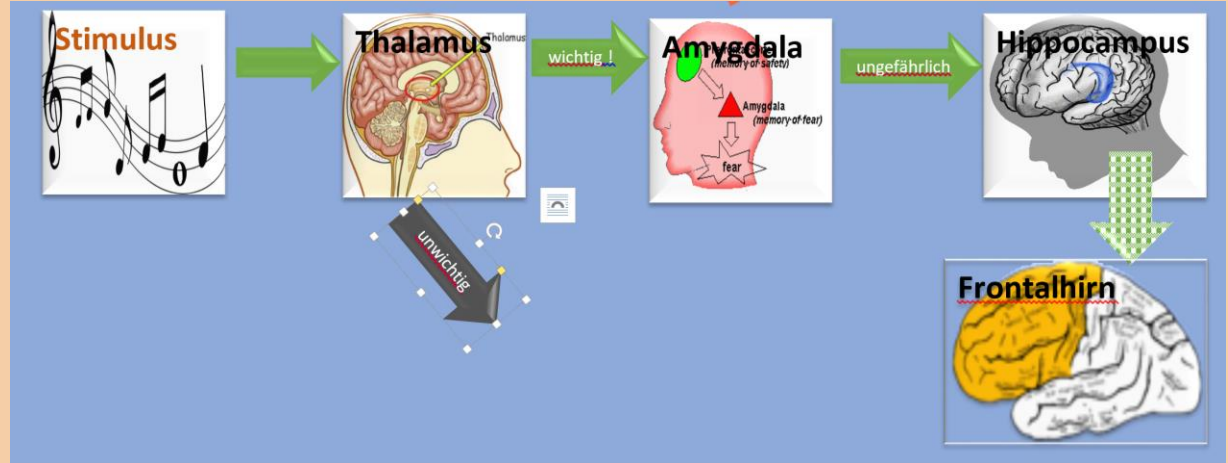
but prevents free associations and higher order thinking.



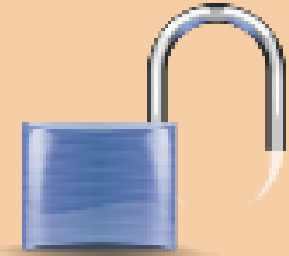
Fight flight reaction



Turning the brain on...



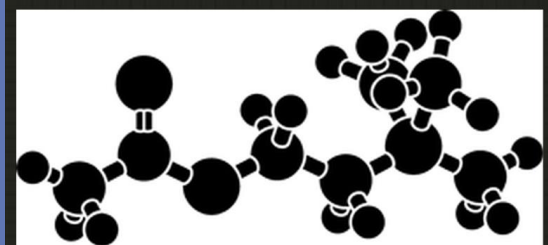
Only if the signal is perceived as important/relevant and if it is not associated with DANGER.



Personal relevance



ACETYLCHOLINE IS LEARNED



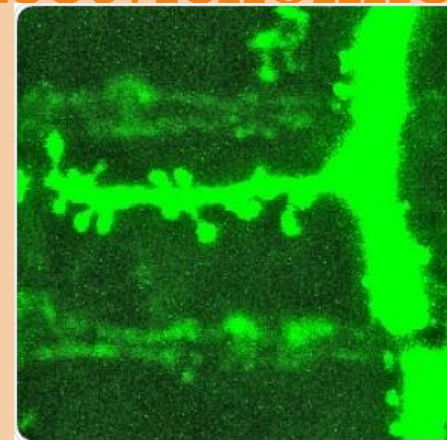
I'm learned.

4th Principle

Long-term learning only happens in meaningful contexts

« Importance is physical »

Acetylcholine



(James Zull, The Art of Changing the Brain)



Is this meaningful?

27

Act

Passive

On
ho

Do you know how ketchup is made?



Do you know how chocolate is made?

lett

Do you know how I-phones are made?

Sa



FIP

format
imagination
pride



Our stuff is cool enough to be published

www.readingiscool.xyz

Lern... Dopamin...

Challenge them!

Trust them!

“Complex learning is enhanced by challenge and inhibited by threat associated with helplessness. (Caine & Caine 2000)”

Follow our blog to learn more about our favorite books.

Lionboy
Presented by Anja & Sophia
a novel by ZIZOU GORDER

Selection
Book cover for Selection by Pilar Ramirez

Divergent
DIVERGENT
Divergent
• Book Information
• Factions
• The Test
• Beatrice Prior
• Critique
Dora-Birgit-Anna



FIP

format
imagination
pride

Our stuff is
cool enough
to be
published

www.gibsters.com

...under the „dopamine shower“

The screenshot shows the Gibsters website interface. At the top, there is a navigation bar with 'CONTRIBUTORS' and 'WHO WE ARE...' links, and a search icon. Below the navigation bar is a large banner image showing a group of people sitting at computers in a classroom or office setting. The main content area is divided into sections: 'The Gibsters' with a search bar, 'RECENT POSTS' featuring three articles with images and titles, and 'RECENT COMMENTS' with a list of user comments and their corresponding article titles.

The Gibsters

What we think and what we do...

Search ...

RECENT POSTS

What exactly is the UNHCR?
You might be interested in "Fashionrevolution.org"
How to write a blog entry
My Life In Asia
Street Food

RECENT COMMENTS

Anna Maria on Life beyond Earth. Does it exist?
Anna Maria on My Life In Asia
Elena on A Day in Dog Sports
Meli on How I learned to love myself? Vegan Lifestyle
Katrin on What a Catch, Donnie! It's Fall Out Boy!

HELP
HOW TO WRITE A BLOG ENTRY

5C
A DAY IN DOG SPORTS

5C
MY PERSONAL EXPERIENCES IN AN ARABIC COUNTRY

5C
WHY YOU SHOULD STRETCH

5C
HOW I LEARNED TO LOVE MYSELF? VEGAN LIFESTYLE

5C
DO YOU KNOW WHERE YOUR CLOTHES COME FROM?

Spooky Stories



Watch and listen to
2c SPOOKY STORIES
read by the
authors themselves.

Graveyard
Horror

A Lady Girl

topic 4

0:00 / 2:43

The image shows a collection of hand-drawn film strips on a grey background. Each strip contains a different illustration: a title 'Graveyard Horror', two figures on a cloud, a black cat, a storm, a title 'A Lady Girl', a figure in a dark tunnel, flames, a landscape with a tree, and a book cover. A speech bubble in the top right contains text. Below the film strips is a video player interface with a blue background, a white box containing 'topic 4', and a progress bar at the bottom showing '0:00 / 2:43'.

FIP

Interactive Posters
With “glogster”



...more examples of cool formats



6th principle

Learning is facilitated by social interaction

Humans are social animals



Mutual appreciation

Peer learning

Exchange of work on Moodle



Part 3: Constructing Language Actively

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How do we learn languages?

How do we acquire vocabulary?

- Do vocab-lists help?

How do we learn grammar?

- How useful are grammar books and grammar exercises in textbooks?



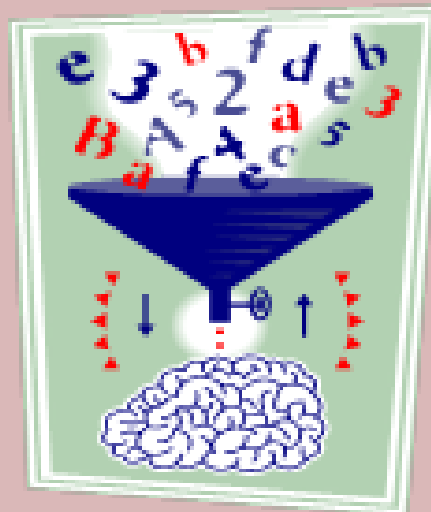
Efficient learning

Follows 5 stages:

1. Concrete observations and experiences
2. Awareness raising
3. Making hypotheses
4. Testing and refining these hypotheses
5. Proceduralization and performance

7th Principle

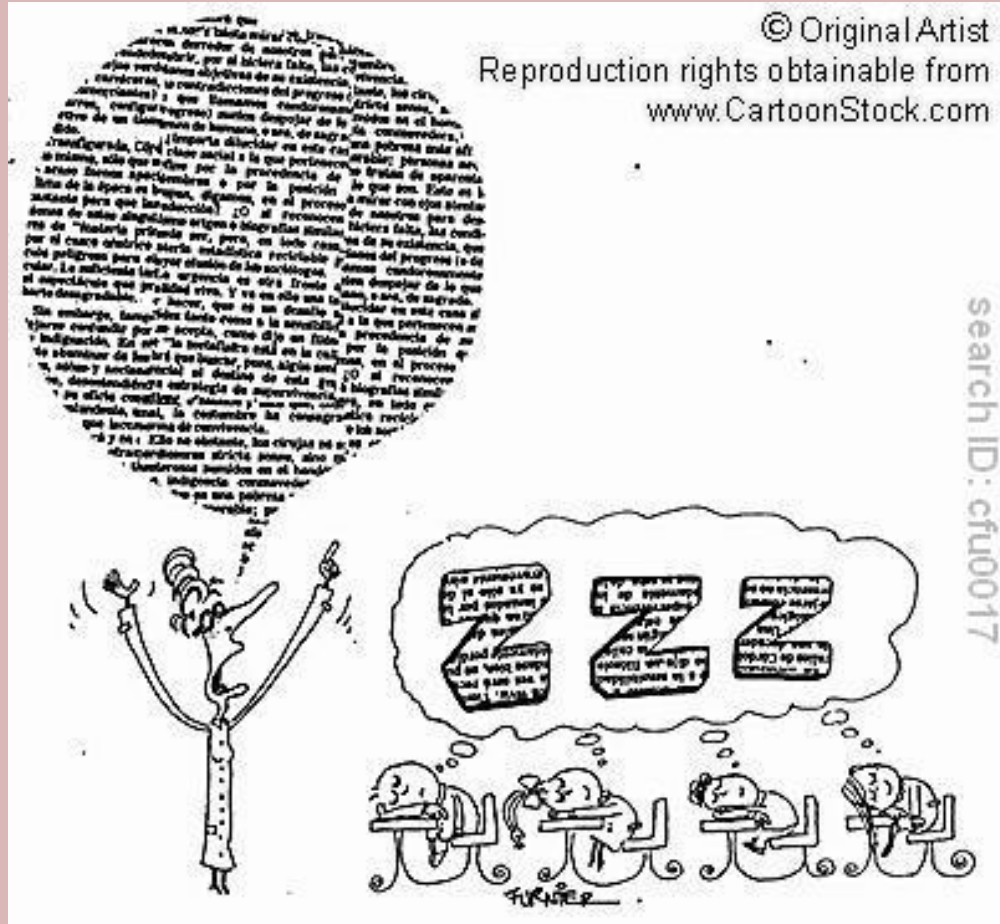
- Knowledge cannot be transferred from the teacher's brain into the learner's brain.
- Learners must actively construct meaning by making associations to prior knowledge.



Durchmachen

Who is working here
Who is learning?

Leise rieselt der Stoff...



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Details stored
in the
hippocampus
are extracted
overnight and
form
PATTERNS

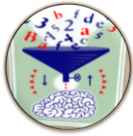
8th Principle:

Extracting rules from examples



« Gehirne besitzen diese Fähigkeit zum spontanen Generieren von Regeln aufgrund von Beispielen « Alles was es hierzu braucht, sind die richtigen Beispiele, und zwar viele davon.

(Spitzer)» (Spitzer)



Understanding grammatical concepts



39

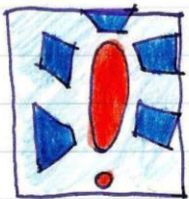
The Past Tenses

- Background
- Circumstances
- Atmosphere



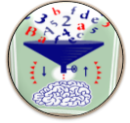
The sun was shining.
The birds were flying.
It was raining.
He was walking.

Past Events / Action



Suddenly the monster came.
It came towards me.
I ran away.
I jumped into the pond.





Grammatical Concepts = Notions Background and Circumstances



40





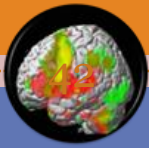
Hypothesis making

Revising and clarifying new concepts

Refugees' experiences

(present perfect tense)





9th Principle: The brain can perform many processes simultaneously. Multi-sensory input facilitates learning

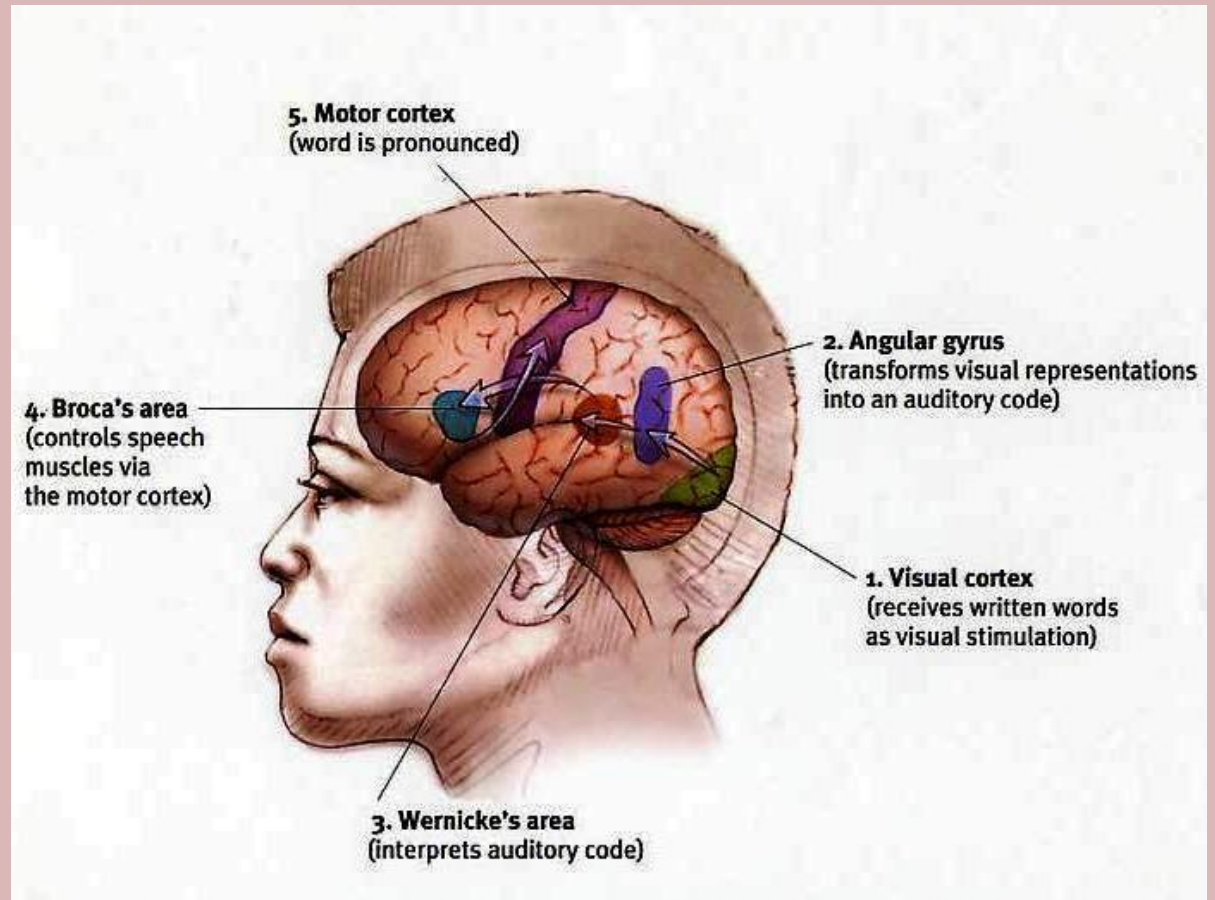
Multi-sensory input:

ISM Model von Ahsen

Images

Somatic Markers

Meaning



It
sounds
right!

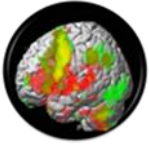
What is
happening in
these brains?



Irregular verbs raps...

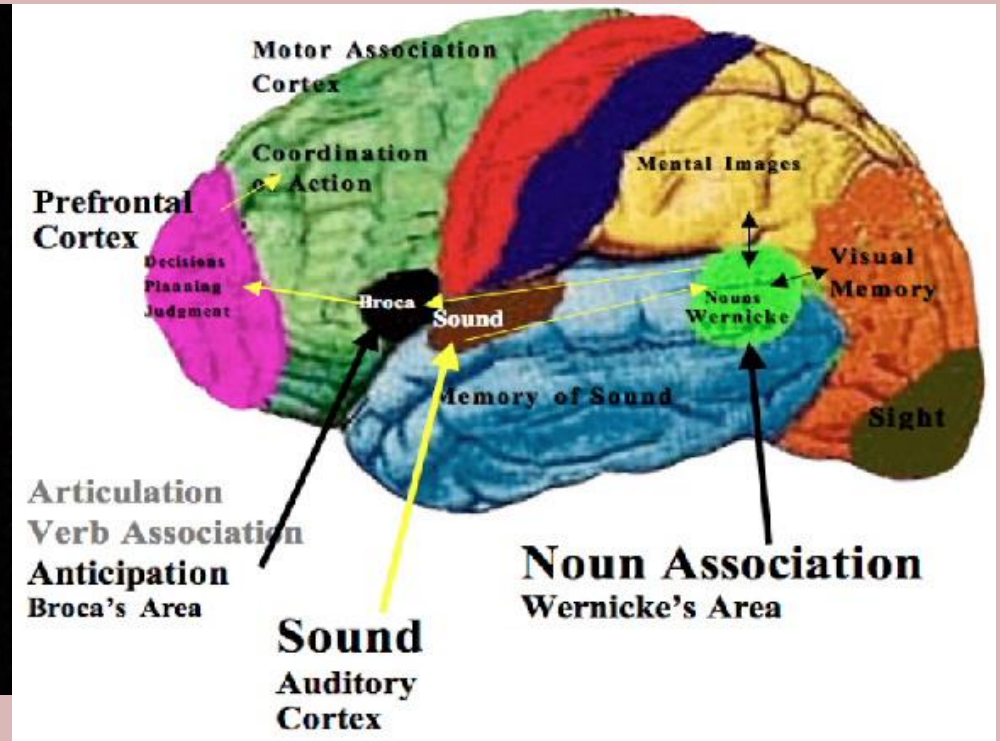
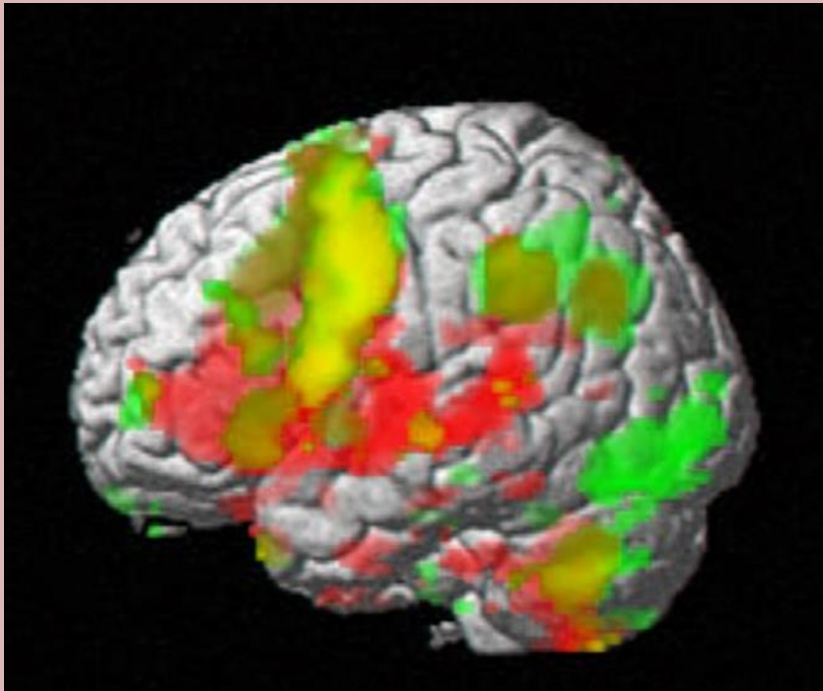
...rather than staring at verb-tables.

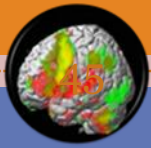




What is happening in this brain?

44





**Movement
enhances
learning**

**VMI:
Manuela
Macedonia**

The Role of Movement

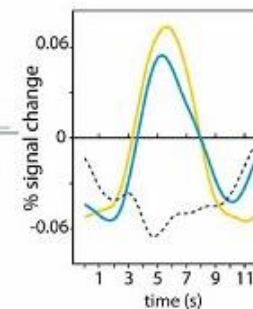
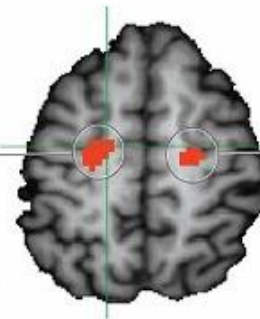
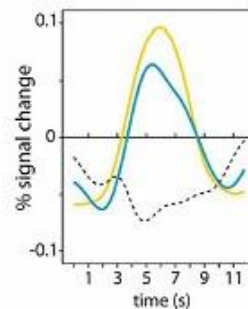
fMRI-study: Motor trace



ruzanego
bridge

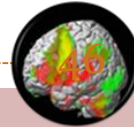


wubonige
cross

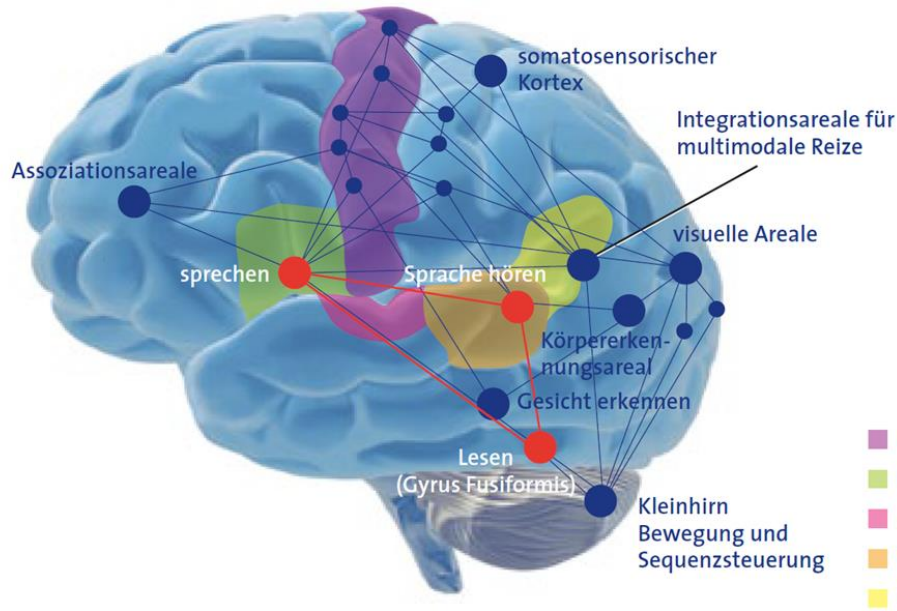


— iconic gestures — meaningless gestures - - - silence

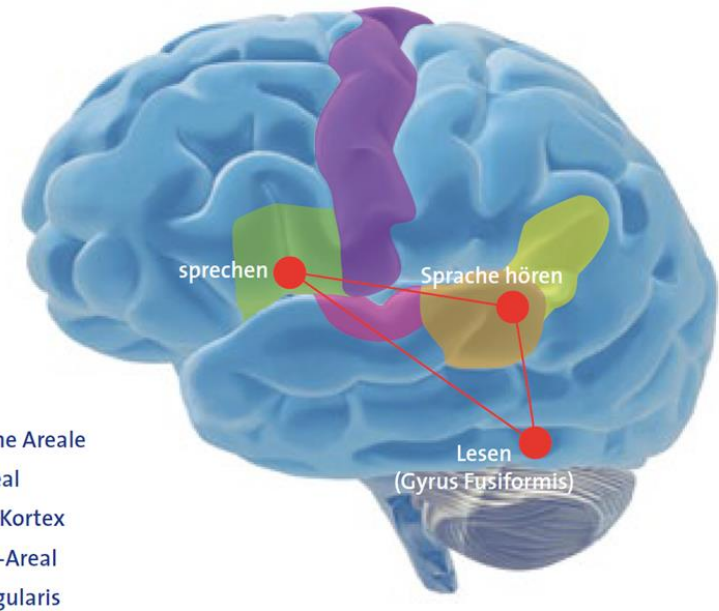
Learning = simultaneous activation of neural networks



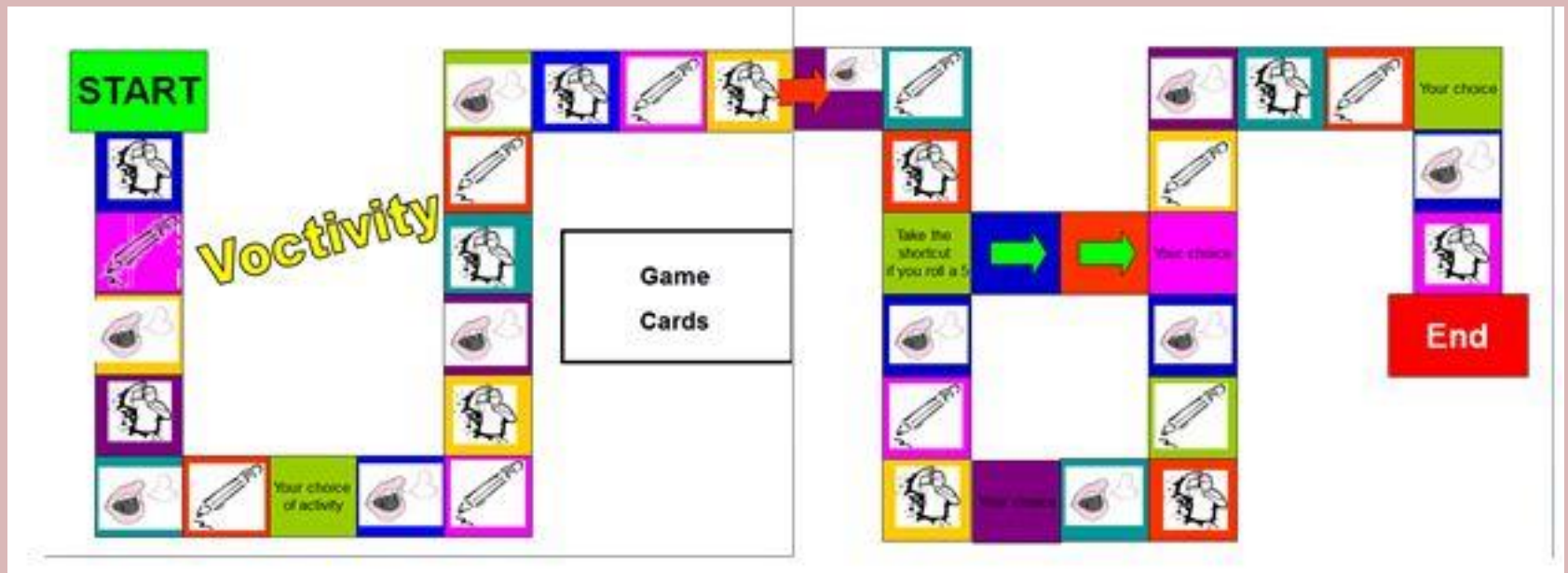
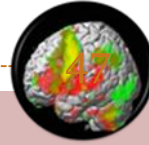
Hirnnetzwerk für ein Wort, das mit Gesten gelernt wird (vereinfacht)



Netzwerk für ein audiovisuell gelerntes Wort (vereinfacht)

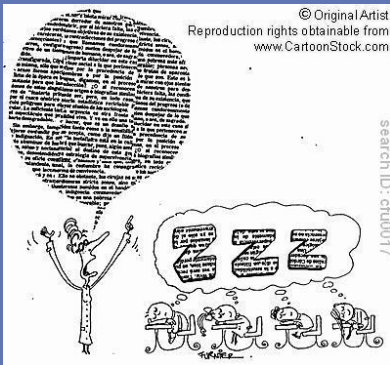


Movement – Speaking – Listening --Drawing





Do you
recognize
this?



Adjectives and Adverbs

How can we put the
presented principles into
practice?

An **adverb** is a word that
modifies verbs, adjectives, or other adverbs.

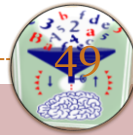
Examples:

*He speaks **slowly***

*She takes it very **seriously***

*He is **especially** clever*

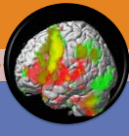
Awareness Raising and Hypotheses building



Teachers' conference:

This is what your teachers said about your class:

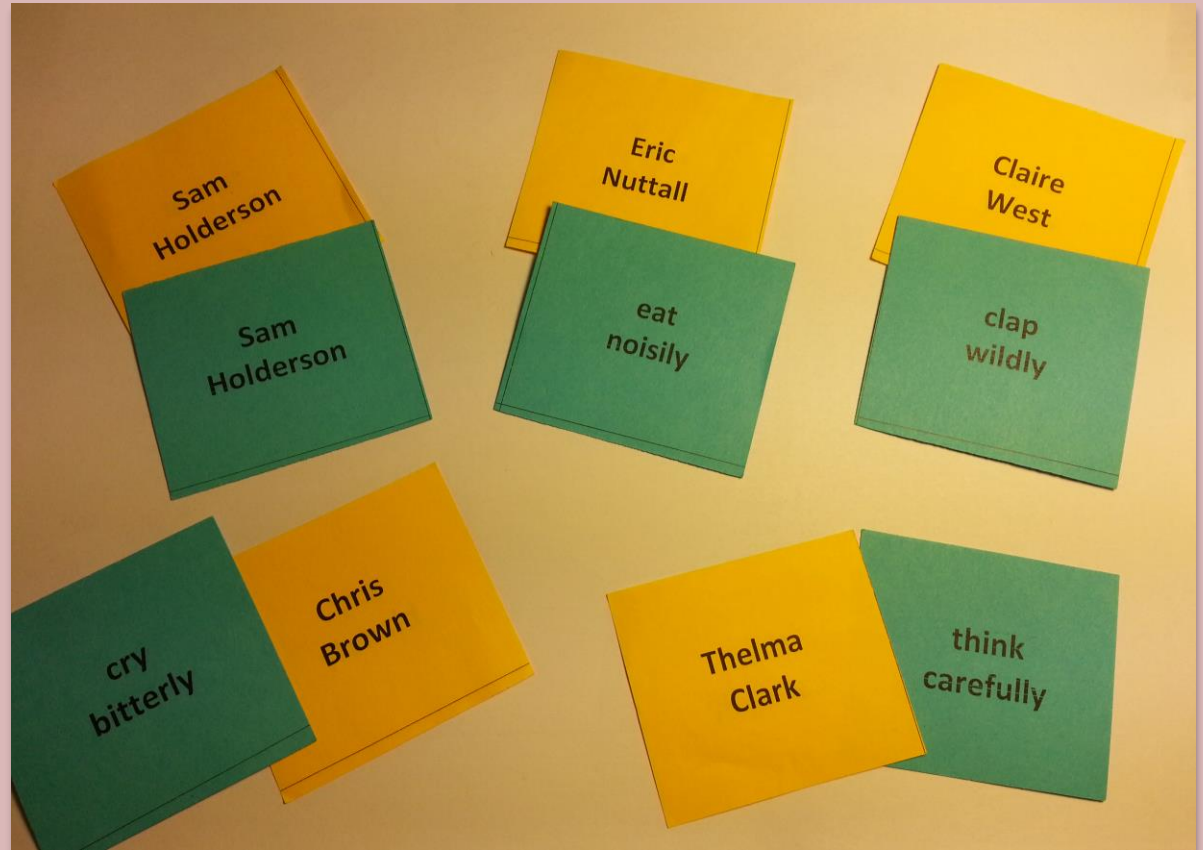
Most students of 2b do their homework regularly.	Some students are a bit disorganized and forget to hand in their homework.
Most students do their work carefully.	Some kids hand in sloppy work.
Most kids work quietly in class.	A few kids are very noisy.
Most students work quickly and efficiently in class.	Many students are nervous during tests.
Some students work slowly but very carefully.	Some kids are impatient.
The class can sing beautifully.	The reading diaries are really beautiful.



Quick Check Grammar Chart

Learning Stages	Awareness raising		↓
	Conceptualization, hypothesis building		
	Proceduralization in scaffolded conditions		
	Performance in real-time context		
Pedagogical Principles	Depth of processing, and mental activity	- ✓ +	↓
	Dual processing (language / world) Authenticity of process	- ✓ +	↓
	Personalization	- ✓ +	↓
	Commitment filter	- ✓ +	↓
	Peer/ social learning and interaction	- ✓ +	↓
	Testing vs. teaching		↓
	This exercise supports learning processes...		☆☆☆

An alternative suggestion...





Conscious and unconscious learning

10th Principle: Learning is a conscious and an unconscious process

- Peripheral learning
- Conscious and focused learning
- Learning/Acquisition





A growing word



Aaaap-
Apfel

Der Apfel, die Äpfel
Ich mag Äpfel.

Ich beiße in den Apfel. Der Apfel hat Kerne.
Ein wurmiger, süßer, saurer, reifer, grüner,
unreifer Apfel.

In den sauren Apfel beißen

...



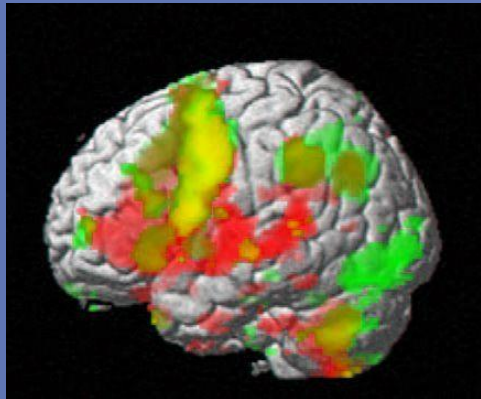
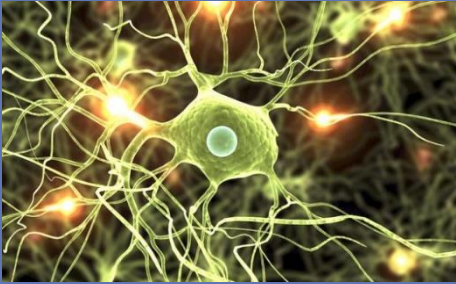
Let's try it out



- to churn....
- to churn butter, a butter churn
- butter is produced by churning cream...
- the Chinese factory churned out cheap copies ...
- Hollywood is churning out sequels of the show...
- I am doing my best to churn out as many stories as I can...
- watching the poor guy made my guts churn...

To cut the long story short... Learning works best if...





Thanks for your attention!

Do you have any questions?



Sources

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Sources

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Test your memory



- **Play with or without a game-board**
- **Whenever it is your turn, pick up a card and explain to the group which of the principles of brain-friendly learning this picture refers to. Sum up the principle in brief.**
- **Give at least one example how this principle can be put into practice.**
- **If you are playing this as a board-game**



Your turn...

1. Groupwork

2. Presentation of group results

Groupwork

- Choose a topic that you are going to teach in the near future.
- How can you teach this topic based on the principles of brain-friendly learning? Use the **checklist** in your handout.
- How can you adapt the materials of your textbook to use more parts of the brain?
- Which of the ideas presented today can you adapt for your own classes?