Memory Builder Practice Tools
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How to Build Greater Cognitive Capacity

We used to say a student was “smart”, as if that’s a fixed lifetime condition. Now we know our intelligence can be changed. Here’s how to foster it.

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Limitations on Working Memory Training Skills Programs

• Effects are modality specific
• Greatest gains from those most needy
• Usage affects durability
• Computer programs have greater outcome reliability
• Visual-spatial duration effects higher
• Personality style affects results


Neuroplasticity is Remapping the Brain.

Here are the Rules for Skill-Building:

1. Begin with baseline and end with progress
2. Students absolutely must buy in to it.
3. Skill must be coherent to the student with increasing challenge and complexity.
4. Their brains need error-correction.
5. Students need 12-15 consecutive min./day, 3-5/wk./2mos
6. Once they get it right, they still need practice.
Brief Memory Types

**SHORT-TERM**
Can you hold and recall the content in your head (as is) for seconds or minutes?

**WORKING MEMORY**
Can you recall, hold and then **MANIPULATE** the content in your head for seconds or minutes?

How to Foster Short-Term Memory

Strategies for Short-term Memory

1. Call-response strategies
2. Games (Simon Says, cards, etc.)
3. Clapping repeat activities
4. Ask students to repeat the directions
5. Partner/group practice w/# add-ons to form a story.
6. Repeat all prior sounds, words, or sentences, then add another
7. Partner, buddy or teacher speaks, student writes the content

Temporary “Workarounds” for Working Memory

1. Allow more time for **notes**. Use the **“pause”** technique. Every few minutes, pause to let content sink in.
2. **Chunk** content into smaller chunks to aid understanding, then review.
3. **Prime** the learning to create an attentional bias to the content.
4. Use gesturing to lighten the WM load.
5. Do a fast physical **activity** 1st to activate dopamine.
Getting Started:
What is Working Memory?

What is in Our Working Memory?

The content is...
- sounds, called a “phonological loop”
- pictures, or visual-spatial “sketchpad”

AND
- it is held for seconds or moments
- it is manipulated or processed by our brain

How Do I Implement This?

Your Real Goal is to Foster Beneficial Neuroplasticity

Following the “Rules” Explicitly Will Create Brand NEW Connections in Your Student’s Brain

I ALWAYS follow The RULES
Your Real Goal is to Foster Beneficial Neuroplasticity

The Core Skill is Work!
- Short-term memory is retrieval.
- Working memory is retrieving, then juggling or manipulating the information in your head.
- Tell students, “This is hard. Tough, hard things are good for your brain. Only hard things change it and help you get smarter.”

Impact of Working Memory Training on Gray Matter in 5 Days

Is This Change Possible?
Working Memory and Attentional Skills Improved

A new software program from cogmed.com was used for 5 weeks. Students showed significant levels of improvement in many areas of executive function including working memory and attention.

Subjects: Two random high school student groups with learning difficulties were selected. The Experimental participated in an interactive working memory training program. The Control group received neutral program for same time.

Pre and post tests on measures of vocabulary, academic attainment (spelling and arithmetic), and working memory before and after training showed the training group performed significantly better.

Working Memory Practice Fosters Connectivity

Working Memory Training Shows Gains in Learner Brains
Get Up to Speed Before You Start Teaching WM

Buy-In is Developmental

K-5 STUDENTS:
Use the “bigger kid” challenge, simple reward, teacher enthusiasm, curiosity, affirmation, friendship-maker, be gross and use mystery.

GRADE 6-12 STUDENTS:
Be edgy/risky, use peer pressure, challenge, stair-step the activity, cooperative, status-builder, experimental and use relationship.

Need Site for Scrambled Words?
http://www.enchantedlearning.com/english/anagram/numberofletters/

This site gives you countless ideas for word scrambles. These are excellent for building working memory when done mentally.

Building Content for Working Memory

K-2 CONTENT:
• letters of alphabet
• Simon says
• Sing-alongs that build
• phonemes (repeat/addr)
• clapping games
• word basket (start small & grow slowly)
• spell 2-3 letter words (forward, then backwards, then add)

3-5 CONTENT:
• new vocabulary
• word basket
• Simon says (w/2, 3 adds)
• repeat directions
• play an instrument
• spell 3-7 letter words (forward, then go slow backwards)
• grow sentences (start w/ 4-5 words & grow)
Building Content for Working Memory

SECONDARY
- New required vocabulary
- File folder (vs. “word basket”)
- Simon says (w/2, 3 adds)
- Repeat directions
- Spell 4-10 letter words (forward, then go slow backwards)
- Add-ons: grow sentences (goal is 4-5 words & grow)
- “Ultimate Add-ons” is grow paragraphs (each person starts with a sentence of 3-6 words, not a single word) and each adds on.

Working Memory Practice

http://www.memoriad.com/exerciese.asp

PRACTICE TOPICS INCLUDE:

- SPEED CARDS
- NUMBERS MARATHON
- BINARY DIGITS
- MENTAL ADDITIONS
- MENTAL MULTIPLICATIONS
- MENTAL SQUARE ROOTS
- MENTAL CALENDAR DATES

Resource:
See the chapter on cognitive skill-building; it has working memory descriptions and activities

7 Steps to Make Your Success Happen; Use ALL 7!

Use ALL 7!
Know the Process Up Front

1. Make it a Priority (8-12 wks.)
2. Buy-in & Relevance
3. Perfect Practice Over Time
4. Increase Challenge & Complexity

Memorize The Process Below; Use it with Every WM Activity

1. Use Pre-post test w/ Evidence of Learning
2. Buy-in/Set Meaningful Goals
3. Use Interdependency
4. Quick Initial Learning Curve
5. Increasing Challenge & Complexity
6. Quality Feedback for Learners
7. Apply 10/12 min/day.3-5x/Wk. for 3 mos..

Be Sure to Get Buy-In or Your Student’s Brain Will Not Change

Elementary Social Hooks
Use the next grade level as a challenge or “draw”, simple privilege, have more fun, raw teacher enthusiasm, deep curiosity, positive affirmation, be gross, friendship-maker, physical activity and a cool mystery.

Secondary Social Hooks
Be edgy/risky, use peer pressure, a strong challenge, stair-step the activity, work with friends, gain status, be experimental, help them find their voice, solve local problems, work for something huge, get into college, competition and engage in new relationships.
Short-Term & Working Memory Activities You Can Use Every Day

**In Your Seats**
- Word Box
- Digit Span Game
- Spelling Words Backwards
- Content “Add-on” Builders
- Instant No Planner Activities

**Up & Moving**
- Call-back Songs While Walking
- Simon Says Variations
- Add-on Songs
- Clapping Repeats
- Learning Names

**Locate Your Content to Use**

1. Review the week’s class content
2. Use weekly vocabulary works
3. Use COCs (“circle of challenge”) for students to share 1 word or 1 sentence of content, then the next person rephrases it and adds a new word or sentence.
4. As students get better, they will integrate ALL previous words or sentences to build new sentences.

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**Plan Working Memory Pathways:**
Do NOT Mix These Below

CHOOSE
- AUDITORY
- MATH
- SCIENCE
- VISUAL
- LANGUAGE
- ARTS
Building Content for Working Memory

**K-2 CONTENT:**
• letters of alphabet
• Simon says
• Sing-alongs that build phonemes (repeat/add)
• clapping games
• word basket (start small & grow slowly)
• spell 2-3 letter words (forward, then backwards, then add)

**3-5 CONTENT:**
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Ideas for...

**K-2 ELL Special Needs**

START WITH SUCCESS IN MIND!

Frame these as “Memory Games” to Build Your Brain and Make You Smarter

Buy-In Strategies Include

Use the next grade level as a challenge or “draw”, gain a simple privilege, have more fun, raw teacher enthusiasm, deep curiosity, positive affirmation, be gross, reinforce identity (“You are a leader, right?), use friendships, fun as a physical activity and help solve a cool mystery.
Q: What does your brain have to do, in order to create words out of these 3 letters?

T-P-A

Go ahead and share your answer with your neighbor

First, Before You Start…

- The core skill in Working Memory (WM) is to be able to picture and move around in your head images or sounds.
- Start where students are at. Ensure your students can picture and hold that picture in their head.
- Ask students to cover up two small objects, then tell a partner what’s under each one. Then ask them to move their hands around (while still on top of the object) and be able to recall it, after moving it from side to side and top to bottom. The goal is: recall what is hidden!

Start with Small Objects that Can be Covered with a Hand

Show a Picture, Then Ask Them to Recall It. Then Ask Them to Modify the Picture.

Here are Some Ideas for HOW to do That.
Start with Paired Pictures

Then Ask Students to Switch Pairs in their Mind

Picture Big Objects

Then Medium Objects
Build a Visual Memory Grid

- Show a 9-box grid, then hide it.
- Ask students to draw one.
- Then ask them to visualize it.
- Then ask them to mentally number the boxes 1, 2, 3 on the first row. Then do the middle row mentally with 4, 5, & 6. And finish up with 7, 8, & 9.
- Then start practicing, “Close your eyes and point to where the #3 is… now #9, now number 4, etc.
- Once students can recall boxes, then numbers, then you can start asking them to mentally put small items in each box.

Ask Students to Look at These Visuals for 5 Seconds, Then Draw Them Out Without Looking at the Visual
When Students Can Visualize…

- Now you can start with other things.
- Use pictures: “Put an apple in your box #3. Now put a banana in box number 7.”
- These are core beginnings of holding things in the brain and moving them around.
- From this skill stage, you can move to repeating two letter words forward, then backwards. Then you keep building.
For the Next Activities…

• Ask partners to face each other, but the one furthest from the front of the room can see the screen, and the other can’t.
• One reads the directions to the other (who can’t see the screen) and asks them to respond.
• Start simple, and do variations for 2 weeks, then increase skill level for the next 2 weeks. Give this 10-12 weeks to see good progress.

Spell Words Backwards (Just 1 at a time)

“Do” (as in “Do this…”)
“Me”
“So”

Spell Words Backwards (Just 1 at a time)

“He”
“To”
“By”

Repeat numbers forwards, then in reverse order & then add up

3 - 6
8 - 4
7 – 9
6 - 2
4 – 1
8 – 5
Repeat numbers forwards, then in reverse order & then add up

5 - 8
7 – 4
2 – 9
4 – 2 – 3 - 1
3 – 1 - 6 – 5

Spelling Words Backwards
Say… “Do”
Say… “Me”
Say… “So
Say… “He”
Say… “To”
Say… “It”

Rearrange the Letters to make 3 words from each string

A - T - R
W - N - O
T - P - A
A - E – R

Building Content for Working Memory
SECONDARY
• New required vocabulary
• File folder (vs. “word basket”)
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• Repeat directions
• Spell 4-10 letter words (forward, then go slow backwards)
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Keys to Success

- Start small, start easy
- Make this a game as a “brain-builder”
- Do this with 10 consecutive minutes, 3-5X/wk.
- Go for 2-3 months or don’t do it at all
- Stay with ONE track; numbers OR letters, do NOT do both. I only show them for demonstration

Person A (Numbers)

“Person A” reads, “Person B” repeat numbers in reverse order, and then small to big

```
3 - 6 - 4
7 - 9 - 2
4 - 1 - 8 - 5 - 6
```

“Person A” reads to “Person B”

Adding number strings:
The listener keeps adding the numbers in their head as the talker gives them new numbers.

```
9 - 3 - 6 - 4 - 4 - 8
8 - 5 - 2 - 7 - 9 - 3
4 - 1 - 8 - 5 - 6 - 9 - 2
```
Say these numbers to your partner- They repeat them: 1) in reverse order and, 2) then smallest to greatest value

8364
3792
4395

Person B
(Numbers)

“A” reads, “B” repeat numbers in reverse order, and then small to big

5 - 1 - 8
6 - 3 - 4
9 - 2 - 6 - 7 - 8

Say these numbers to your partner- They repeat them: 1) in reverse order and, 2) then smallest to greatest value

297
895
416
Say these numbers to your partner - They repeat them: 1) in reverse order and, 2) then smallest to greatest value

297
895
416

Say these numbers to your partner - They repeat them: 1) in reverse order and, 2) then smallest to greatest value

7253
4861
3597

Person A
(Language Arts)

Spelling Words Backwards

Say… “Do”
Say… “Me”
Say… “So”
Say… “He”
Say… “To”
Say… “It”
Rearrange the Letters

to make 3 words from each string

A - T - R
W - N - O
T - P - A
A - E - R

Alphabet Warm-up

Partner repeats letters in reverse order

Say… “MZ”
Say… “BQK”
Say… “FWX”
Say… “ZNR”
Say… “GLPT”
Say… “XETS”

Rearrange the Letters

(Say one set of 3 letters to partner...They make 2 words from each)

W - N - O
A - E - R
E - T - S - A
S - A - P - N

Spelling Backwards

Say… “So” (as in “So what…”)
Say… “Eat”
Say… “Fresh”
Say… “Squash”
Say… “Hygiene”
Person B
(Language Arts)

Alphabet Warm-up
Partner repeats letters in reverse order
Say… “WQ”
Say… “XDK”
Say… “PBV”
Say… “ZIEC”
Say… “EFOA”
Say… “RPSJ”

Spelling Words Backwards
Say… “Do” (as in “Do this…”)
Say… “The”
Say… “Daily”
Say… “Rhythm”
Say… “Absence”

Rearrange the Letters
(Say one set of 3 letters to partner...They make 2 words from each)

\[
\begin{align*}
A & - T & - R \\
T & - P & - A \\
P & - S & - O & - T \\
E & - T & - A & - L \\
\end{align*}
\]
Plan Your Content WITHIN a Lesson

✓ If you drop it OUT of a lesson, you’ll be looking for the time or place for it and you’ll lose the daily discipline.
✓ Embed the WM practice inside a daily math session, or inside an English class or as part of the daily “Brain Builders” segment of your day (K-5).

WM Lesson Planner
1. Content to use planned
2. Objectives created
3. Evidence of learning listed
4. Buy-in established to use as “hook”
5. Interdependency created
6. Feedback set up
7. Rules of the activity & goals stated
8. Activity begins
9. Ending progress assessed
10. Debrief the learning

Last Reminders
❖ Use your imagination; just stay within a discipline. Do not mix math and language arts working memory activities
❖ Know the “gist” of the activities and design your own for your students. Always work your students at their “edge” of capacity.
❖ Everything I show you are just samples. There are thousands of teachers all over the country doing this. You can do this, too.

Persistence
➢ Stay with this
➢ This is a lifetime skill that will get strengthened by everyday usage in school
➢ It is a game changers for students
➢ They will literally GET smarter!