All Kinds of Minds
ONLINE MEMORY MODULE

Workbook and Reference

Q. E. D. akom

Choices for Learning - Choices for Life

Online Memory Module:

TABLE OF CONTENTS:

About this Module

Welcome:

Welcome to the online Memory module. This module will help you to describe memory, including its components and how they are organized, identify a student's strengths and weaknesses, and to select appropriate strategies based on those strengths and weaknesses. Below you will find information to use as a reference for navigating through this online learning experience.

Before you begin:

- Print a copy of this Workbook and Reference to have available along with something to write with.

- Verify that you have the minimum system requirements:
    o   A broadband (Cable or DSL) connection is highly recommended.
    o   Speakers or headphones and a sound card are required as audio is used throughout the course.

- Review the following module navigation tips:

    o   While this module was designed with flexible navigation, we recommend that you proceed through the module components consecutively.

    o   Practice activities are designed to reinforce key concepts and are not scored.   We recommend that you attempt a practice activity for each aspect of memory.

    o   If completing the module in several sessions, use page 3 in this workbook, "Tracking Your Progress," to track your overall progress through the module.

    o   You will need to pause the video during the practice sessions to have time to work on the activity before the next screen with answers are shown.

    o   Module completion time will vary among users, but generally, we anticipate that it will take approximately 2-3 hours to review all of the content in this module.

o

Module Completion:

Certificates are $5 each. After submitting payment on the Online Module page, participants will need to submit their reflection questions responses for the module to info@qedfoundation.org. Please note in email that the $5 payment has been submitted. The reflection questions are located in the downloadable workbook. Certificate submissions are not required in order to complete the module.

Help and Assistance:

If at any time during the module you need assistance, you may reach us via:
- E-mail : info@qedfoundation.org.

Tracking your Progress

Use this page to track your progress through the module.

❑ **Introduction** – Introduces the three students

❑ **Neurodevelopmental Framework** – Memory as part of the framework and objectives of the module

❑ **What is Memory?** – Defining memory and its four components

❑ **Warm-up Activity** – Short matching activity

❑ **Aspects of Memory** - Use the chart below to track your progress through each of the four aspects of Memory.

	Short-Term Memory	Active Working Memory	Long-Term Memory Consolidation	Long-Term Memory Access
Explore				
❑ Key Ideas				
❑ Strategies				
❑ Signs of Strength				
❑ Signs of Weakness				
Develop				
❑ Deeper Content				
❑ Case Story				
❑ Important Terms				
❑ Assessment Tactics – 1				
❑ Assessment Tactics – 2				
❑ Assessment Tactics - 3		■	■	■
Practice				
❑ Practice Exercise				

Putting the Pieces Together

❑ Kendrick – a 3rd grader

❑ Lucy – an 8th grader

❑ Mark – an 11th grader

Warm-Up Activity

Draw a line from each statement to the corresponding aspect of memory on the diagram.
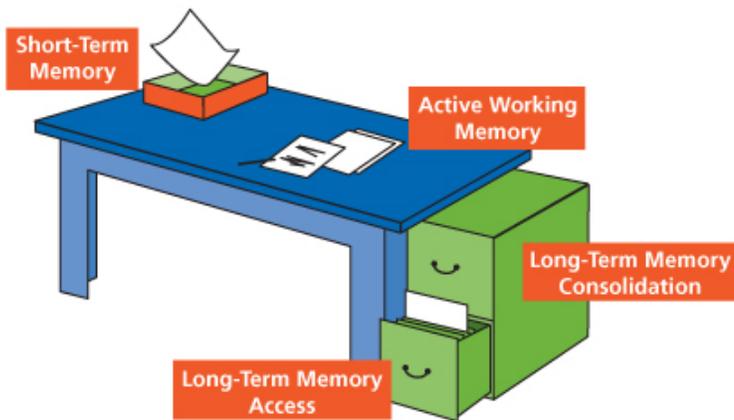
1. Briefly registering new information

2. Excelling at multiple choice or open-ended questions could indicate a strength in this aspect of memory

3. Mentally juggling information while using it in some way

4. Recalling details on a diagram just seen a moment ago may indicate a strength in this aspect of memory

5. Storing information for recall at a later time

6. Retrieving facts, skills, and experiences after an extended delay

7. Trouble answering questions of any kind, including those that give prompts or hints, may indicate a weakness in this aspect of memory

8. Managing multi-step mental math calculations with ease may indicate a strength in this aspect of memory

Short-Term Memory:

Signs of Strength, Weakness, Strategies-

Signs a student's short-term memory is operating well:

> copies from the board or screen efficiently, not needing to look up very often

> paraphrases or summarizes easily

> readily follows instructions

Signs a student's short-term memory is *not* operating well:

> frequently has too look up when copying from a board or screen

> struggles with paraphrasing or summarizing

> gets confused with instructions

Some strategies for students whose short-term memory is not operating well:

> Give directions with short, declarative sentences and basic vocabulary

> When giving directions use key words or phrases on a consistent basis so that students become familiar with the format of directions

> Provide visual backup for oral instructions, such as by displaying them on a board/screen or with symbols or pictures

> Color code items in the room to enhance student understanding of instructions (such as green folders for work to take home, red folders for work to keep in the classroom)

> Model good summarizing and paraphrasing, including how to condense information into a few concise points

> Have students practice paraphrasing in pairs or small groups, possibly starting with fun material or topics of interest and then progression to more academic content

> Provide explicit cues about the upcoming speed of information (e.g., "I'm going to move through these diagrams quickly for you to get an idea of what they look like together, then we will take each one slowly and discuss it in detail.")

Short-Term Memory:

Practice Activity and Reflection Questions-

Circle true (**T**) or false (**F**) for each statement.

1. Short-term memory is about managing incoming information, so it is closely tied to the production controls of Attention. **T** or **F**

2. Information stays in short-term memory for about five minutes. **T** or **F**

3. A need for lots of repetition of instructions may indicate a weakness in short-term memory. **T** or **F**

4. Short-term memory has a small capacity, usually considered to be seven slots. **T** or **F**

5. Chunking several bits of information together in a slot decreases the capacity of short-tem memory. **T** or **F**

6. Looking up frequently when copying from the board may indicate a weakness in short-term memory. **T** or **F**

7. The visual or verbal format of the information is referred to as modality. **T** or **F**

8. Summarizing material easily may indicate a weakness in short-term memory. **T** or **F**

Reflection questions:

When have you experienced difficulty with your short term memory? How did that feel?

In your work with students, what tasks place the most demands on their short term memory?

What are the best opportunities you have to observe a student's short-term memory?

What strategies will you incorporate into your instruction to help your students who struggle with short term memory?

Active Working Memory:

Signs of Strength, Weakness, Strategies-

Signs a student's active working memory is operating well:

> holds onto beginning of reading passage when reaching the end

> completes multi-step tasks and executes multi-step math procedures

> performs mental math calculations

> simultaneously handles the many tasks involved in writing (like spelling, punctuation, ideation)

Signs a student's active working memory is *not* operating well:

> forgets information from beginning of reading passage when reaching the end

> loses track of multiple steps

> struggles with mental math calculations

> has trouble simultaneously juggling the many tasks involved in writing

Some strategies for students whose active working memory is not operating well:

> Display outlines for students to refer to when summarizing key points of a lesson

> Have students jot down significant information from textbooks on adhesive notes that can be pulled from the book later when studying

> Examine reading assignments and determine where passages can be broken into sections, then require students to summarize or paraphrase after each section, rather than waiting until the end

> Have students keep writing reference materials on-hand, such as sentence starters, vocabulary lists, model sentences for punctuation, topic outline, and proofreading rubrics like COPS

> Coach students to make full use of word processing features, such as how to move blocks of text, simultaneously view multiple windows of the same document, and look up words in the thesaurus

> Allow students to substitute oral presentations for some written work

> Sub-divide large tasks into smaller, shorter, and less complex "mini-tasks"

> Have students get their thoughts on paper for reference, rather than relying on keeping ideas in their heads

> Have students practice mental math computations, possibly using problems from real situations like shopping or going to the movies

> Allow calculators or fact grids on multi-step math problems or when computations are especially complex

Active Working Memory:

Practice Activity and Reflection Questions-

Imagine that you are teaching a multi-step process in an upcoming science lesson. Which of the following instructional approaches would help those students in your class who struggle with active working memory? Check all that apply.

❑ Color code the different steps of the process during instruction and have students use the same color code on their related assignments

❑ Ask students to develop their own questions to answer about the multi-step process

❑ Use key words or phrases within the multi-step process consistently

❑ Require students to employ proofreading strategies such as COPS (i.e., Capitalization-Organization-Punctuation-Spelling) before turning in related assignments

❑ Provide direct instruction on setting goals, including breaking projects into a series of mini-tasks

❑ Have students paraphrase each step of the process before moving onto the next step of the multi-step process

Reflection questions:

During what tasks do you currently make heavy use of active working memory yourself?

_____

_____

What are the best opportunities you have to observe a student's active working memory?

_____

_____

What instructional techniques do you already use to help students mentally juggle information?

_____

_____

What strategies will you incorporate into your instruction to help those students who struggle with active working memory?

_____

_____

Long-Term Memory Consolidation:

Signs of Strength, Weakness, Strategies-

Signs a student's long-term memory consolidation is operating well:
> easily learns new terminology, facts, and procedures
> masters sound-symbol associations for phonics
> recognizes previously encountered patterns
> connects new material with prior knowledge

Signs a student's long-term memory consolidation is *not* operating well:
> studies by rote, rather than strategically
> has particular trouble with cumulative subjects
> struggles to recall information, even when given recognition cues (like multiple choice options)

Some strategies for students whose long-term memory consolidation is not operating well:
> Teach students to transform content when taking notes; for example, place information into self-made tables or diagrams
> Explicitly and frequently connect reading material to student's lives and daily experiences
> Preview the highest priority points to glean from reading material, such as those likely to be discussed in class or asked about on a test
> Coach students to use strategies for storing information, such as mental imagery (like associating a top hat with President Lincoln), acronyms (like HOMES for the Great Lakes), acrostic elaboration (like "King Philips Court . . ." for Kingdom-Phylum-Class), and rhyming (like "i" before "e" except after "c"); such strategies can be used to prompt students to retrieve information during presentations and interactions
> Provide extra instruction and practice regarding the multiple letter patterns (such as "k," "c," "ck," "ch," "que") that can be linked with a particular sound (like /k/)
> Emphasize word families (like take, bake, rake, fake, etc.) to consolidate common letter patterns (such as –ake) and vary words with prefixes and suffixes (like taking, baking, raking, faking, etc.)
> Nonsense words (such as "bik") can bolster sound-symbol pairs in long-term memory because they have to be sounded out rather than identified as sight words; students can practice reading nonsense words or even develop their own
> Show students how to make a flowchart that breaks down a procedure into its component parts
> Ask students to explain the steps of a procedure orally and in writing
> Use acronyms or phrases to improve storage of procedural sequences, such as PEMDAS or "<u>P</u>lease <u>E</u>xcuse <u>M</u>y <u>D</u>ear <u>A</u>unt <u>S</u>ally" for the order of operations: <u>P</u>arenthesis, <u>E</u>xponents, <u>M</u>ultiplication/<u>D</u>ivision, <u>A</u>dd/<u>S</u>ubtract

Long-Term Memory Consolidation:

Practice Activity and Reflection Questions-

Ms. Richland is preparing to have a conversation with Ty's father about some observations she has made that indicate struggles with memory, specifically long-term memory consolidation. What would be some observations she could share with him during their conversation? Check all that apply.

❑   Has problems with perspective in art class

❑   Doesn't recognize previously encountered plot structures in literary works

❑   Labors over writing and makes frequent erasures and cross outs

❑   Has difficulty reading the audience for signs of boredom or disinterest

❑   Struggles to recall mathematical processes and procedures

❑   Keeps a messy book bag and classroom materials are often disorganized

❑   Has trouble remembering related facts, like states and capitals

Reflection questions:

When have you experienced difficulty with your memory? How did you manage the difficulty?

_____

_____

What other metaphors, besides a filing cabinet, might you use to help students understand long-term memory?

_____

_____

What instructional techniques do you already use to help students process incoming information?

_____

_____

What additional strategies will you incorporate into your instruction with your students?

_____

_____

_____

Long-Term Memory Access:

Signs of Strength, Weakness, Strategies-

Signs a student's long-term memory access is operating well:

> retrieves one half of a pair when given the other half (such as definitions with terms, names with faces)

> recalls proper procedure for the problem or situation

> performs well with free-recall (or open-ended) questions

Signs a student's long-term memory access is *not* operating well:

> slow to recall facts

> uses incorrect procedure for a problem or situation

> struggles with free-recall questions (but may perform better with recognition items if Long-Term Memory Consolidation is functioning appropriately)

Some strategies for students whose long-term memory access is not operating well:

> Cue prior knowledge for students, such as by reviewing previously covered material that will relate to the assignment

> Require students to self-test information likely to be used later, such as with end-of-chapter questions or by developing their own practice tests

> Balance open-ended questions with true/false, multiple choice, and matching items (all of which provide cues for memory access), both on tests/quizzes and during discussions

> Start with tasks that tap recognition memory (like multiple choice) and then move to recall memory items (like fill-in-the-blank)

> Provide advanced warning before calling on students or give them upcoming questions to prepare in advance

> Encourage physical counting strategies for math computation, like touch math or multiplication finger tricks

> Provide practice with matching illustrations/diagrams with math word problems or fractions

> Assign study buddies and small group practice; teams can review information learned weeks or months earlier, which is especially important in courses that are cumulative

Long-Term Memory Access:

Practice Activity and Reflection Questions-

Match the term in the left column with the phrase in the right column that best describes a related example of strength.

_____	1. Memory	a.	does well on multiple-choice questions
_____	2. Long-Term Memory Consolidation	b.	readily remembers information, experiences, or skills for assignments and assessments
_____	3. Long-Term Memory Access	c.	recalls math facts with no effort
_____	4. Recall	d.	takes in new information and stores it into preexisting categories
_____	5. Recognition	e.	easily remembers and recalls information
_____	6. Automaticity	f.	easily retrieves dates in history without prompts

Reflection questions:

Which would you say works best for you: short-term memory, active working memory, long-term memory consolidation, or long-term memory access? Why?

_____

_____

How does what you have learned about memory from this module match with your previous understanding?

_____

_____

Which of the various aspects of memory do your students struggle with the most? The least?

_____

_____

What strategies will you incorporate into your instruction with your students who struggle with long-term memory access?

_____

_____

_____

Putting the Pieces Together

Kendrick, 3rd grader

Kendrick …
> has a hard time with math facts and phonics
> struggles with information from science and social studies

Review the work samples and audio clips to the left of the screen to help you determine which aspects of Memory are causing Kendrick problems and which are functioning okay or even well.

Rate Kendrick on a continuum of weakness to strength for each aspect of Memory by placing a mark on each bar. Click on the hints on the screen for assistance.

Short-Term Memory

weak   strong
❑   ❑   ❑

Active Working Memory

weak   strong
❑   ❑   ❑

Long-Term Memory Consolidation

weak   strong
❑   ❑   ❑

Long-Term Memory Access

weak   strong
❑   ❑   ❑

Putting the Pieces Together

Kendrick, 3rd grader (continued)

Choose the strategies you think would be appropriate for Kendrick based on his Memory profile. Check all that apply.

❑ Coach how to capture more thinking and planning on paper when solving complex math problems, perhaps with templates that contain commonly used steps

❑ Nonsense words (such as "bik") can bolster sound-symbol pairs in long-term memory because they have to be sounded out rather than identified as sight words; students can practice reading nonsense words or even develop their own

❑ Provide advanced warning before calling on students or give them upcoming questions to prepare in advance

❑ Display outlines for students to refer to when summarizing key points of a lesson

❑ Work with the student to convert information to different formats, such as transforming sequences into a spatial grid

❑ Preview the highest priority points to glean from reading or listening material, such as those likely to be discussed in class or asked about on a test or quiz

❑ Balance open-ended questions with true/false, multiple choice, and matching items (all of which provide cues for memory access), both on tests/quizzes and during discussions

❑ Provide extra instruction and practice regarding the multiple letter patterns (such as "k," "c," "ck," "ch," "que") that can be linked with a particular sound (like /k/)

❑ Start with tasks that tap recognition memory (like multiple choice) and then move to recall memory items (like fill-in-the-blank)

❑ Coach how to construct brief outlines before starting to write essays, rather than relying on keeping ideas in one's head

❑ Require students to self-test information likely to be used later, such as with end-of-chapter questions or by developing their own practice tests

Additional strategies (optional):

_____

_____

_____

_____

Putting the Pieces Together

<p align="center">Lucy, 8th grader</p>

Lucy …
> struggles to recall information
> does much better when given some sort of hint

Review the work samples and audio clips to the left of the screen to help you determine which aspects of Memory are causing Lucy problems and which are functioning okay or even well.

Rate Lucy on a continuum of weakness to strength for each aspect of Memory by placing a mark on each bar. Click on the hints on the screen for assistance.

Short-Term Memory

weak   strong

Active Working Memory

weak   strong

Long-Term Memory Consolidation

weak   strong

Long-Term Memory Access

weak   strong

Putting the Pieces Together

Lucy, 8th grader *(continued)*

Choose the strategies you think would be appropriate for Lucy based on her Memory profile. Check all that apply.

❑ Coach how to capture more thinking and planning on paper when solving complex math problems, perhaps with templates that contain commonly used steps

❑ Nonsense words (such as "bik") can bolster sound-symbol pairs in long-term memory because they have to be sounded out rather than identified as sight words; students can practice reading nonsense words or even develop their own

❑ Provide advanced warning before calling on students or give them upcoming questions to prepare in advance

❑ Display outlines for students to refer to when summarizing key points of a lesson

❑ Work with the student to convert information to different formats, such as transforming sequences into a spatial grid

❑ Preview the highest priority points to glean from reading or listening material, such as those likely to be discussed in class or asked about on a test or quiz

❑ Balance open-ended questions with true/false, multiple choice, and matching items (all of which provide cues for memory access), both on tests/quizzes and during discussions

❑ Provide extra instruction and practice regarding the multiple letter patterns (such as "k," "c," "ck," "ch," "que") that can be linked with a particular sound (like /k/)

❑ Start with tasks that tap recognition memory (like multiple choice) and then move to recall memory items (like fill-in-the-blank)

❑ Coach how to construct brief outlines before starting to write essays, rather than relying on keeping ideas in one's head

❑ Require students to self-test information likely to be used later, such as with end-of-chapter questions or by developing their own practice tests

Additional strategies (optional):

_____

_____

_____

_____

Putting the Pieces Together

<p style="text-align:center">Mark, 11th grader</p>

Mark …
> struggles with essay exams
> has difficulty with complex math problems

Review the work samples and audio clips to the left of the screen to help you determine which aspects of Memory are causing Mark problems and which are functioning okay or even well.

Rate Mark on a continuum of weakness to strength for each aspect of Memory by placing a mark on each bar. Click on the hints on the screen for assistance.

Short-Term Memory

weak   strong

Active Working Memory

weak   strong

Long-Term Memory Consolidation

weak   strong

Long-Term Memory Access

weak   strong

Putting the Pieces Together

Mark, 11ᵗʰ grader *(continued)*

Choose the strategies you think would be appropriate for Mark based on his Memory profile. Check all that apply.

❑ Coach how to capture more thinking and planning on paper when solving complex math problems, perhaps with templates that contain commonly used steps

❑ Nonsense words (such as "bik") can bolster sound-symbol pairs in long-term memory because they have to be sounded out rather than identified as sight words; students can practice reading nonsense words or even develop their own

❑ Provide advanced warning before calling on students or give them upcoming questions to prepare in advance

❑ Display outlines for students to refer to when summarizing key points of a lesson

❑ Work with the student to convert information to different formats, such as transforming sequences into a spatial grid

❑ Preview the highest priority points to glean from reading or listening material, such as those likely to be discussed in class or asked about on a test or quiz

❑ Balance open-ended questions with true/false, multiple choice, and matching items (all of which provide cues for memory access), both on tests/quizzes and during discussions

❑ Provide extra instruction and practice regarding the multiple letter patterns (such as "k," "c," "ck," "ch," "que") that can be linked with a particular sound (like /k/)

❑ Start with tasks that tap recognition memory (like multiple choice) and then move to recall memory items (like fill-in-the-blank)

❑ Coach how to construct brief outlines before starting to write essays, rather than relying on keeping ideas in one's head

❑ Require students to self-test information likely to be used later, such as with end-of-chapter questions or by developing their own practice tests

Additional strategies (optional):

_____

_____

_____

_____

_____

Glossary

Automaticity	capacity to recall or recognize information with little effort; automatic recall (such as for math facts) frees up mental resources for other tasks (such as solving math word problems)
Conceptualization	integration of critical features composing a class of ideas or objects; includes formation, threading, application, revision, & retention
Active Working Memory	mental suspension of components while using or manipulating them; includes juggling parts of tasks, linking short- and long-term intentions & needs, & freedom from interference
Long-Term Memory Access	retrieval of information, experiences, or skills; includes free recall (minimal cueing) & recognition (extensive cueing, such as multiple-choice)
Long-Term Memory Consolidation	storage of information; includes use of schema, categories, & strategies for accessible mental filing
Memory	storage & recall of information over a brief span, extended periods, or while using or manipulating the information or task components
Modality	the format of the information to be remembered, such as visual or verbal
Processing Controls (Attention)	functions regulating the processing of incoming information
Production Controls (Attention)	functions regulating the quality of academic output & behavioral control
Recall	accessing information from long-term memory, usually without prompts or cues (such as open-ended questions)
Receptive Language	interpretation of linguistic sounds, words, sentences, & discourse (in oral, written, or signing format)
Recognition	accessing information from long-term memory with the benefit of a prompt or cue (such as multiple-choice questions)
Short-Term Memory	brief registration of new information (which may be used, stored, or discarded); includes recoding & entry of modality-specific inputs

Additional Resources

To learn more about memory and the neurodevelopmental framework:

- Use the *Neurodevelopmental Framework* on the All Kinds of Minds website *www.allkindsofminds.org/*

- Read *A Mind at a Time* by Dr. Mel Levine

To learn more about assessing learning problems:

- Read *Revealing Minds* by Dr. Craig Pohlman

- Read *How Can My Kid Succeed in School?* by Dr. Craig Pohlman

To find more strategies to help struggling learners:

- Read *Educational Care* by Dr. Mel Levine

References

Levine, M. (2002). *A Mind at a Time.* New York: Simon and Schuster.

Pohlman, C. (2008). *Revealing Minds: Assessing to Understand and Support Struggling Learners*.
    San Francisco, CA: Jossey-Bass.