Auditory Memory Test

This test is a useful indicator of auditory sequential memory (digits forwards) and working memory (digits reversed).

Auditory Sequential Memory (Digits Forwards)

This is simply an indicator of how many items the learner can keep in auditory short-term memory. For the average adult, it's about 7 (+ or -2). This was established some time ago by a psychologist called George Miller *(Miller, 1956)*, who researched short-term memory functions.

Working Memory (Digits Reversed)

Working memory is the ability to remember and simultaneously process information. An example would be taking notes in class. A learner has to listen to what the teacher is saying, make a decision about what is relevant to write and start writing what he previously decided was relevant. All the while, he's supposed to be still listening to what the teacher is now saying! This example illustrates that some tasks actually require several tasks to be attended to at the same time.

If you think about it, most aspects of learning (and school life, for that matter) require working memory. In maths, for example, you have to do the following:

- Remember what the question is requiring you to do.
- Retain the numeric information itself.
- Remember what you're supposed to do with each number.
- Remember what stage you're at.

Most verbal instructions require working memory, particularly if they have two or more elements.

If you've got good auditory sequential memory, does that mean you have good working memory?

Not necessarily. Many learners struggle with both aspects. However, it is not at all uncommon for a learner to have good auditory sequential memory, but poor working memory. This is actually quite common for dyslexic learners.

Useful ways of developing working memory:

- Listening comprehension activities, where the learner has to store and interpret auditory information.
- Following a sequence of instructions.
- Doing sentence dictations.
- Numbers reversed exercise, StepsWeb Supporting Activities section
- Listening with the Brain – set of working memory activities (ThinkShop)

Instructions for the Digit Span Test

Always do both aspects, starting with Digits Forwards. Say each set of numbers slowly and carefully, approximately one digit per second. Make sure your voice is completely neutral and you don't inadvertently chunk items.

Explain to your learner that there are no second chances – you're not allowed to repeat items! Make sure you tell your learner that at the beginning, so he knows he has to really concentrate.

Stop when the learner has made mistakes with both items at the same age level.

Digits Forwards		Digits Reversed		Age guide
5 2 6		8 2		4-5 years
4 9 7		3 7		
3 8 5 2		9 2 5		6-7 years
6 1 5 8		4 8 3		
9 6 1 8 2		6 8 2 7		8-9 years
3 1 8 5 9		8 5 1 6		
4 7 3 6 2 9		7 5 1 9 6		10-11 years
5 2 8 3 7 4		3 6 2 8 4		
2 9 6 1 5 8 3		5 2 6 4 9 3		Adult
6 2 9 1 7 3 5		4 7 9 2 1 6		

Instructions to use with learners:

Digits Forward

"I am going to say some numbers for you and I want you to say the same numbers back to me. Listen carefully because I can't say them again."

Digits Reversed

"This time I want you to say the numbers in reverse order – backwards. I'm going to say two numbers and you have to tell me them backwards. Let's have a go." Say the first two numbers, using a hand movement to indicate that they have to tell you the numbers backwards. If the learner has understood, then continue with the other items ***without any further visual reminder!*** From then on, simply mark it as incorrect if they forget and give you the numbers forwards, although one further verbal reminder is acceptable.

When marking responses, it is useful to mark items which are mis-sequenced, as this gives you an indicator of auditory sequencing difficulties. An easy way to do this is to put S in a circle instead of just a x. See the example below:

Digits Forward		Digits Reversed		Age guide
5 2 6	✓	8 2	✓	4-5 years
4 9 7	✓	3 7	✓	
3 8 5 2	✓	9 2 5	(S)	6-7 years
6 1 5 8	✓	4 8 3	(S)	
9 6 1 8 2		6 8 2 7		8-9 years