



UNIVERSITY OF  
NEW ENGLAND

Center for Excellence  
in the Neurosciences

# Cognition Outreach Modules

Middle School



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# Learning and Memory

## Short term memory Activity: Number Task and Letter Task

### Directions- Number Task

1. Write the following numbers on a piece of paper:  
12, 3, 15, 6, 8, 20, 1, 17, 5, 2
2. Give the class about 30 seconds to look at it.
3. Ask them what they had for breakfast (lunch etc)
4. Have them write down as many as they can remember.
5. Once everyone is finished use the discussion points to discuss what is happening.
6. Ask them to write down how much sleep they got (see below)'

### Directions- Letter Task

1. Write the following numbers on a piece of paper:  
ABCFBICIABIO
2. Give the class about 30 seconds to look at it.
3. Have them write down as many as they can remember.
4. Ask them what kind of methods they used to remember the numbers (chuncking).
5. Once everyone is finished use the discussion points to discuss what is happening.

## Number Task and Grocery List Explanation

### Number Task- Why?

Short Term Memory is like a workbench. It holds 5-9 pieces of information at a time and only for about 30 seconds. You can only fit so much information into your short-term memory, just as you can only fit so many tools at a workbench. The **pre-frontal cortex** is involved in storing information in short-term memory.

The rule of short-term memory is 7 plus or minus 2 (think phone number w/o area code). After 30 seconds, unless you have processed the information into your long-term memory, it will be lost.

### Letter Task- Why?

Although Short Term Memory holds 5-9 pieces on information at a time, those pieces can be of any size. By “Chuncking” the information into 4 different acronyms, we can increase the amount we retain in short-term memory. Creating “Hierarchies” is another method that works well.

## Long term Memory Activity: Mnemonic Devices

### Directions- Grocery List

1. Ask the class to remember this grocery list:  
honey, dog food, sugar, oranges, ice cream, peanut butter, bread, pork chops, milk, and potato chips
2. Ask them whether they have the whole list memorized.
3. Tell them that if you make it into a story, it is much easier to remember, read them the story. Try to exaggerate movements and elaborate, the crazier the story, the easier it is to remember.
4. Read Passage:

We begin in the kitchen and see **honey** dripping down into the toaster on the counter and a giant St. Bernard eating his **dog food** on top of the kitchen table.

We proceed to the living room, where **sugar** is embedded in the shag carpet, **oranges** are under the sofa pillows, **peanut butter** is stuck between the piano keys, and **ice cream** is in the roaring fireplace.

We proceed up the stairs, with a slice of **bread** on each step. **Pork chops** are floating in the bathtub, **milk** is tipped over on the dresser in the bedroom, and **potato chips** are stuck between the bedsheets.

5. When we get to the supermarket we re-tour my house. Students are asked, “What’s in the toaster . . . on the kitchen table . . . in the living room carpet . . . ?” The chorus of responses not only reflects amusement but also genuine amazement that the list is so easily recalled in the **original order**.

## **Grocery List- Why?**

Since it takes a lot longer than 30 seconds to take a trip to the grocery store, you need a way to get that information into your long-term memory. You can use this for studying as well. When you exaggerate and elaborate stories you are more likely to remember them and will be able to recall them later on.

Repetition and Mnemonics are also two big ones. Repetition helps with retrieval; it is the most important thing you can do to get information into your long-term memory. So when you're studying, start early! This will ensure that information gets into your long-term memory for that test coming up!

Mnemonics is using letters and phrases to remember information. You have probably learned "Please Excuse My Dear Aunt Sally" for math rules or OCEAN for the great lakes. The mnemonic used here is called the "method of loci" (using locations), which always involves putting to-be-remembered information along a familiar route. It uses many principles of learning, including depth-of-processing and visualization.

(All of these activities can be further explained by using the Cognition: Learning and Memory Poster)

# **Sleep**

## **Activity: How Many Hours?**

### **Directions-**

1. Divide the class into the hours they slept last night
  - a. No Sleep
  - b. Less than 4 hours
  - c. 4-6 hours
  - d. 7 hours
  - e. 8 hours
  - f. More than 8 hours
2. Then ask how many numbers they remembered in the first activity.
3. Compare the kids who got less hours of sleep and see how many numbers they

were able to remember.

4. Once everyone is finished use the discussion points to discuss what is happening.

## How Many Hours Explanation

Sleep is extremely important in memory! When you are sleeping your memories are being consolidated and organized. Growth hormone is also secreted during sleep and your immune system reboots itself. The brain also prepares to concentrate and learn new information.

If you are sleep deprived for long periods of time you will be irritable/ cranky, have short-term memory dysfunction, paranoia and hallucinations, and become less attractive!

## Attention

### Activity: Monkey Business

#### **Directions- Monkey Business**

1. This can only be done if there is a projector and a computer is available.
2. Tell the kids to count how many times the players wearing white pass the ball.
3. Ask them if they saw the gorilla (for people who have not seen this video before, about half of them will miss it).
4. Did you notice the curtain changing colors or the player in black leaving the game?

[http://www.youtube.com/watch?v=IGQmdoK\\_ZfY&feature=related](http://www.youtube.com/watch?v=IGQmdoK_ZfY&feature=related)

#### **Monkey Business Video- Why?**

Your brain can only focus on one thing; this is what we call selective attention. When focusing on the white, you ignore the black, missing the giant gorilla.

Remember, we cannot remember what we never paid attention too. Distracted people don't learn. This is important to remember as a student, as a teacher and as a health-care worker (and many other professions).

## Activity: Multi-tasking

### Directions- Task Switching

1. Ask the kids to take out a piece of paper and a pen or pencil.
2. Have them draw three horizontal lines on the page.
3. Have stop watch ready to record the times of the next two steps.
4. Write the phrase- "Multi-tasking is worse than a lie" on the first line and the numbers 1-27 on the second line. Tell them how much time has elapsed when they finish
5. On the third line, for every letter you have to write a number, you alternate between them. Example: M 1 U 2 L 3 T 4.....
6. . Make sure you time this and show the kids how different the times are.

## Multitasking Explanation

### Task Switching- Why?

When you are completing a complex task, multitasking can be very bad. Your brain can only focus on one thing; this is what we call selective attention. Your mind is set to reach a goal, when you're doing your math homework and you are ready to start on your English homework, you're mind is in the process of goal shifting.

fMRI scans show that different parts of the brain were active depending on whether the subjects did single or multiple tasks. When subjects focuses on sorting, the hippocampus—the part of the brain responsible for storing and recalling information—was engaged. But when they were multitasking, that part of the brain was quiet and the part of the brain used to master repetitive skills was active.