



Teacher Guide

Memory Items

adapted from *Neuroscience for Kids-Memory and Learning* website and *Neuroexplorers Brain Link* by Wow Publications

Grade Level 4-12

**Lesson Length
1 class period**

Lesson Summary: Do you remember an item better if you discussed it or held it in your hand as opposed to simply seeing it? Students learn about memory capacity and different ways to remember things.

Standards Alignment

Next Generation Science Standards

- 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- 4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
- MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
- MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
- MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
- **Framework for K-12 Science Education:** Science & Engineering Practices 1,3,5,6,8

National Science Standards – Project 2061: Atlas of Science Literacy reference

- a) Cells: Cell functions – basic needs and basic functions (p. 73, Atlas Vol. 1)

Research on student learning: “Preliminary research indicates that it may be easier for students to understand that the cell is the basic unit of structure (which they can observe) than that the cell is the basic unit of function (which has to be inferred from experiments.” (p.72, Atlas Vol. 1)

Objectives—Students will

- experience different ways of remembering items.
- discuss different methods of remembering.
- know several regions of the brain that mediate declarative type of memory.

Assessment Options

- Graph the results and discuss what the results show.
- Engage students in discussion about remembering information.
- Design other experiments that investigate different ways of remembering.



Materials

- 2-3 large trays -- cafeteria trays work well.
- 2-3 sets of 10-20 small items -- e.g. comb, eraser, toy car, cork, etc.
- sheet/towel to cover the items on the tray
- paper and pencil to write down what is remembered -- a science or lab notebook can be also be used.
- timer (optional)

Note: additional trays and sets of items for each group of students are needed if students will do the "touch and talk" part of this activity.

Procedures

Engage

1. *Preparation:* arrange items on the tray. Cover with a sheet or towel.
2. Tell students that
 - there are items underneath the sheet or towel.
 - they are to look at the items but cannot touch or talk about the items.
3. After one minute - you can use a timer to be accurate - cover the tray and ask the students to write down as many items as they can remember.

Explore

1. Ask the students what additional methods they could use to remember more items.
2. Tell students that the class will try the activity again using a different way to remember items.

Touch-and-Talk Activity

1. Place the additional trays in different parts of the room.
2. Divide students into 2-3 groups (depending on the number of trays available) and ask the groups to go to their respective trays.
3. Inform students that you will show them the items and this time they can touch and talk about the items.
4. Go to each tray and give the students at least 1 minute to touch and talk about the items.
5. After all the students have finished the activity, ask them to write down the items they remembered.



Explain

- (Optional) Plot the results from the first and second activity. Plot the number of items remembered, the number of students who remembered each item, etc. Discuss the results with the students. Look for patterns and see if the class can come up with explanations for the patterns.
- Discuss the anatomy and function of the *hippocampus* and the *cerebral cortex*. If the class did sheep brain dissection, link this activity to their knowledge about the hippocampus.
- Talk about different ways that people remember.
 1. One way is by forming *mnemonic* devices. An example of this is HOMES for the first letter of the names of the five great lakes.
 - H- Huron
 - O- Ontario
 - M – Michigan
 - E – Erie
 - S – Superior
 2. Another way to remember is by forming associations. Associations involve forming mental connections between senses, ideas, memories, and physical movements.
 3. Students can also clump items that may be similar.
- Ask students if they used a specific strategy for remembering the items. Students can refer to the graph to see if items remembered were clumped in a certain way.

Elaborate and evaluate

Direct students to work in groups and ask them to develop their own memory activity. They can either write about their proposed experiment or perform their own experiment.