**SATURDAY SCIENCE LESSON PLAN SPRING, 2010**

**WEEK THREE**

**LEARNING OBJECTIVES**

* They will be able to list the names of items based on PowerPoint within1 minutes.
* They will be able to compare and contrast the data within 90% accuracy.
* They will be able to transfer the data into graphs at least within 75% accuracy.
* They will be able to list the methods use to memory development.
* They will be able to interpret the data of mnemonic devices activity.
* They will be able to evaluate the differences of bars of the graphs.
* They will be able to design their projects based on research background and question within 30 minutes.
* They will be able to analyze the data of their projects.
* **INDIANA STATE STANDARTS**[The Nature of Science and Technology: Scientific View and Inquiry (Option B)](http://www.indianastandardsresources.org/files/sci/ca_sci_3_1_1_b.pdf) **This is a classroom assessment covering The Nature of Science and Technology: Scientific View and Inquiry (Option B).** [The Nature of Science and Technology: Scientific View and Inquiry (Option A)](http://www.indianastandardsresources.org/files/sci/ca_sci_3_1_1_a.pdf) **This is a classroom assessment covering The Nature of Science and Technology: Scientific View and Inquiry (Option A).** [Color Burst](http://www.sciencenetlinks.com/lessons.cfm?DocID=117) **SOURCE: American Association for the Advancement of Science. In this Science NetLinks lesson, students gain experience in asking questions and conducting inquiries by exploring the separation of colors in water and other solvent. This lesson uses a technique called paper chromatography. This activity helps students gain experience in conducting simple investigations of their own while working in small groups.**

[Properties of Air](http://www.sciencenetlinks.com/lessons.cfm?DocID=156) **SOURCE: American Association for the Advancement of Science. The purpose of this lesson, from Science NetLinks, is to demonstrate that air takes up space, and puts pressure, or pushes, on everything around it. To start the lesson students are asked to write an explanation of what air is. At various points in the lesson they are be asked to revisit their explanations and refine them based on the phenomena they have experienced in the lesson.**

[Physical Health](http://www.sciencenetlinks.com/lessons.cfm?DocID=49) **SOURCE: American Association for the Advancement of Science. The purpose of this lesson, from Science NetLinks, is to identify how germs are spread, the diseases they can cause, and how hand washing can help prevent the spread of germs. In the lesson, students learn about some of the health habits that are essential for maintaining good health. Students engage in both online and hands on activities related to the topic of germs. Students learn that germs cause some, but not all diseases. They also learn the importance of hand washing for preventing the spread of germs, and thereby, the spread of disease.**

[Sink It](http://www.sciencenetlinks.com/lessons.cfm?DocID=125) **SOURCE: American Association for the Advancement of Science. This Science NetLinks lesson is designed to develop students' understanding of sinking and floating. Students first classify a group of common objects by a characteristic of their own choosing. Then they reclassify the same group of objects by their predictions about whether each item will float or sink in water. As a group, they design an experiment to test their predictions (hypotheses).**

[Reaction Time](http://www.sciencenetlinks.com/Esheet.cfm?DocID=22) **SOURCE: American Association for the Advancement of Science. This E-sheet, from a Science NetLinks lesson, has students work in pairs to complete two reaction time activities. They record data during each activity and analyze their results at the end. Click "Display Full Record" and see the Relation field for a link to the lesson this E-sheet supports.**

[Falling](http://www.sciencenetlinks.com/lessons.cfm?DocID=158) **SOURCE: American Association for the Advancement of Science. This Science NetLinks lesson introduces students to gravity as a force, focusing on the concept of falling. They discuss the role of "falling" in relation to everyday objects such as swings, see-saws, water fountains, and more.**

* 3.1.3

Keep and report records of investigations and observations using tools, such as journals, charts, graphs, and computers. (Core Standard)

Explain: Students will write the names of items what they remember from mnemonic devices activity. They will also draw a bar graph which shows the number of items on vertical axis and shows 1st, 2nd, and 3rd activity names on horizontal axis.

* 3.1.4

Discuss the results of investigations and consider the explanations of others.

Explain: They will discuss why they remember easily when they use their sensations. (In the third activity we will give them items with pictures and sounds. We expect them to remember more items from second activity.)

* 3.2.3

Keep a notebook that describes observations and is understandable weeks or months later. (Core Standard)

Explain: Students will write the names of items on their notebooks what they remember from

**MATERIALS**

* 22 folders
* A couple of kids jump rope
* index cards
* posters
* crayons
* posters
* soccer ball
* stopwatch
* ball puzzle

**Teacher Content Knowledge**

Our brain is the boss of our body. It controls about everything we do, even when we're asleep. Our brain has different parts that work together.

1. Cerebrum: The cerebrum makes up 85% of the brain's weight, and it's obvious to see why. The cerebrum is the thinking part of our brain. When you're thinking hard, you're using your cerebrum. You need it to solve math problems, figure out a video game, and draw a picture. Your memory lives in the cerebrum.
2. Cerebellum: It controls balance, movement, and coordination (how your muscles work together).
3. Brain stem: The brain stem is in charge of all the functions your body needs to stay alive, like breathing air, digesting food, and circulating blood.
4. Pituitary gland: Its job is to produce and release hormones into your body.
5. Hypothalamus: It controls the heat in your house). The hypothalamus knows what temperature your body should be (about 98.6° Fahrenheit or 37° Celsius).

MEMORY

Memory is the ability to retain information or to recover information about previous experiences, is a function of the brain. My memory can store facts, sounds, tastes, smells, touch sensations, and my feelings. It works like a computer database. My computer stores all files in different folders and if I need to find one, it can more easily find. My memory works like computer. All data has to be entered oat my memory and saved. If I do not file things correctly or I get them in the wrong folder, then I would be a problem.

 There are generally three types of memory: *sensory memory*, *short-term memory* and *long- term memory*.

1. Automatic(Sensory) memory
2. Short-term memory
3. Long-term memory
4. Automatic (Sensory) Memory: It is the first level of memory which holds a short impression of sensory even when the sensory system does not send any information. It is a high capacity to register of visual data. Information in the sensory memory is not interpreted.
5. Short-term memory: It’s a temporarily storage system and manage information required to carry out complex process such as learning and reasoning. Short term memory holds data from a few seconds to a minute. When you are trying to remember your student’s name who has just been introduced, you are calling on short term memory.
6. Long-term memory: Long term memory is storage of information which is transferred after a few seconds over a long time. There are three types of long memory. These are episodic memory, semantic memory, and procedural memory. Episodic memory is able to hold our personal experiences from our past. When we recount events what we ate for dinner, we are using our long term episodic memory. Episodic memory enables us to recall the events. Semantic memory stores facts and generalized information. Our verbal information, concepts, rules, and problem solving skills are kept here. Semantic memory stores information in schemata. Procedural memory refers to the ability to remember how to put something into use.

How to boost your brain and your memory?

* Try memory games like puzzles and Sudoku
* Get enough sleep
* Read more
* Visualize objects
* Match the unknown items with known items.

**Description of lesson**

**Ice Breaker**

 **SOLEMN AND SILENT:**

Before we start the activity, teachers will explain the activity. The instructors will explain that during the activity students need to control their senses by working in pairs. When it comes to activity; all students must face their partner, look each other in the eyes, and then try to remain solemn and serious. No speaking and laughing. The students who will first speak or laugh, they will be taken out of game. The students who remain standing then will take a new partner and continue the activity till only one person has not smiled or laughed. If you get a pair at the end who are both keeping a serious face, the rest of the students can act as hecklers to disrupt them.

 (Retrieved from:http://www.residentassistant.com/games/icebreakers/solemnandsilent.htm)

Warm up Activity

Speed Match

This activity is a kind of introduction to brain and memory functioning. During the activity, the students will remember the symbol which is appeared on the screen. For each symbol students will say if the symbol matches the previous one or not (The game will continue for forty-five minutes).

We chose the activity above since it is related to sort term memory; thinking faster, trying to give a reaction for a short time.

**EXPLORE**

We will use power point during the activity. We have three following mnemonic devices activity for students.

For first part, we will show them one shopping list which contains ten items on it. Then, we will ask them “How many items can you remember from the shopping list?” and tell them write down the names and the number of items what they remember.

For second part, we will show them “Peg Mnemonic list” which match the items with numbers from one to ten (The items were matched the numbers based on their rhythm resemblances).Next, we will tell them try to memorize the rhythm. And then, we will give them a new shopping list with ten items and will tell them match these items with peg mnemonics. After giving enough time, we will pose the following questions:

* How many of these items can you remember?
* Does the rhyme help you remember items on your list?
* Why do you think rhyme help to remember better?
* How you can create your own rhyme to remember easily?
* Do you use any other methods to remember your shopping list your mother gives it to you, or the names of friends you have already met?

While asking each question, we expect students to think/create/share their own remembering methods ho help in their life.

We will move on the third part of the activity. We will again give them a list which has eight items on it, and then we will show them the photographs/sounds of each items one after another. Then, we will ask them “How many items can you remember from the list?” and tell them write down the names and the number of items what they remember.

For this activity, we will expect that students will remember more items than they remember from first and second parts of the activities. Next we will ask them the reason (Why do you think you remember more items now?). We will give time to think about the reason and make them discuss the importance of learning with using different senses.

**EXPLAIN**

We will begin with an activity to make them question about brain and memory. The teachers will choose two volunteer students to enroll in this activity. We will give a zip-lock bag to one volunteer and a scarf to another volunteer. Each volunteer will measure the length of the zip-lock bag and scarf. Teachers will write the dimensions on the board. Then we will tell the second volunteer to put scarf in to the zip-lock and we will ask the class “What did he do to put this big scarf into this smaller bag?” We expect students to answer the question as following “folding”. After the activity, we will ask to the class to imagine how big their brains would be if the wrinkles were flattened out. Teacher will ask the following question: “Can you fit all this surface area into this much smaller zip-lock bag without folding?” And then, we will ask other questions: “How would be the size of the brain without any wrinkles?” Why do you think the brain is wrinkled?

After discussing about brain lobes and the wrinkles, we will move on to memory. One of the teachers will start telling the following story:

When I was a child, everyday my mother asked me about my day at school. I often reply, “I forgot” and I felt uncomfortable after many questions: “What did you do in gym today?” “What did you do in science class today?” “How was your project going?” Actually, I had problems remembering facts, dates in history, and names of people or sometimes how I spell the words that I learned the day before at language class. How can I improve my memory?

We will give them to enough time to think about it. Since they will have done mnemonic activity before we pose these questions, we expect them to give some methods about memory boost.

This is the story which the instructor will share; when I had memory problems, I and my mother made different exercises. I remembered 5 exercises we did. One is visualization. What I did to remember where my science book was: firstly, I took my science book out of my bag and put it on the wood table. I thought about my science book and wood table and made a picture on my mind which was like different animals sit and eat their lunch. This will helps me to remember where I felt my science book when I am getting ready to school the night before. Second exercise is chaining. This is like visualization, but I had to remember more than one things. When my mum wanted to get something from grocery store, I did chain on my mind. For instance, she wanted eggs, honey, and milk. In my mind, I chain them together in a funny way. How about: “a picture of the bees drinking milk, and eating eggs before they make honey”. This is silly picture but it helps to remember them. Third exercise we did method of loci. This method was used by Romans in the ancient times to remember lists of things they need to do. For instance, think about your shopping list of things, then think about where you would get there, than imagine you will pick up each item at each place. You will get:

Eggs- front door

Street corner- bees make honey

Milk on the floor- front gate

Next method is that we cut the information up into smaller pieces. The largest group of numbers that most people remember is 4.this is the reason why we are grouping our friends’ phone numbers or credit cards numbers. It is easier to remember it! Last method is while we were studying planets we did sentence like:

My Very Educated Monkey Just Swam Under North Pier

The first letter of each word stands for a planet:

Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto

Next, we will ask the same question again: “How can I improve my memory?” We will expect students will tell us all methods.

**BREAK**

**ELABORATE**

 Each student will draw a bar graph which shows the number of items on vertical axis and shows 1st, 2nd, and 3rd activity names on horizontal axis. They will use three different colors of crayons to paint each bar with different color. We will expect students will be able to collect data, transfer data into graphs. Furthermore, we will expect third bar greater than second bar; the second bar is also greater than first bar (Students will probably remember more items after they see the pictures of the items. Therefore, we will expect third bar on the graph will be greater than first and second bars.)

**EVALUATION/ASSESSMENT**

* The students will be evaluated on the basis of their answers during the mnemonic activity, zip-lock bag-scarf activity.
* They will be evaluated based o their graphs (We will look at their graphs to see if they transfer data correctly and if they know how to make graphs).
* They should be able to give correct answers to all (or almost all) questions.
* They will be evaluated based on their performance during the projects.

**References**

<http://www.residentassistant.com/games/icebreakers/solemnandsilent.htm>

[http://kidshealth.org/kid/htbw/brain.html#](http://kidshealth.org/kid/htbw/brain.html)

<http://www.lumosity.com/brain-games/speed-games/speed-match>

<http://teachers.net/gazette/AUG00/poll.html>

http://dc.doe.in.gov/Standards/AcademicStandards/StandardSearch.aspx

**Mind Exercise Group Plan (Prepared by Banu AVSAR ERUMIT)**

Since this week’s topic is brain and memory, I expect mind exercise group will be more enthusiastic to work on their projects.

I have a possible question for their projects if they will not come with a question they want to learn. Here is the question;

Do we get faster the more times we solve a puzzle?

I plan to suggest them the question above because this question might be interesting for their age level instead of a question related to brain and nervous system functioning. I will give them a puzzle if they seem acceptance to search on puzzles. (Jennifer will bring a ball puzzle) I will tell them to complete the puzzle three times. Then, I will tell them write down the time for each completion. (I expect them to solve the puzzle faster over time.) Before their third try, I will tell them to give chocolates if they complete it in two minutes. I assume that they will complete it faster to get the chocolates. Then, I will pose the big question;

“Do we get faster the more times we solve a puzzle?

Then, I will guide them to search on puzzles and memory games. (<http://www.lumosity.com/k/brain-exercises> is a good website to search about puzzles)Then, I will give them individual tasks to complete the projects. Two students will write the writings. The other two will stick the pictures on the posters (I will probably give this task to Chaeyong and one American boy into this group since Chaeyong has language problems and it is better for her to stick pictures instead of writing. I know she gets shy when she does not speak or write. I will make apart Chaeyong and her cousin since they do now work well together.)

I assume that this plan will work. If not, I will suggest them to work on healthy food or physical exercise. They might have chosen mind exercise group without considering any topic. They can find more questions related to healthy food and physical exercise.

**HealtyFood Group Plan (Prepared by Emine SAHIN)**

Nutrition project group was determined their project question the previous class. Their question is: Which countries foods are healthier USA, China, Africa, Germany, Korea, Italy, Turkey, or Thailand? However, this question can be caused discrimination among different countries students while presenting and it is not testable question to collect data. Because of this, the teacher will prepare food cards which show two or three sample foods from different countries. Group members will discuss and choose which food they want to analyze it. And then, the teacher will ask them these following questions: Which grocery store did you visit? What kind of foods did you see in the grocery store? Have you been to the international market? Have you been to the international restaurant? What types of foods did you eat? What kind of foods did you buy? Do countries’ foods are similar each other or different? Did you check food’s label? If yes, what kind of ingredients do they have?

The teacher will assume that each student will visit the local or international grocery store/restaurant and they will list what kind of foods they see. During each question discussion time, teacher will give enough time students to think about questions. They will compare what they record while visiting restaurants and grocery stores. Teacher will also print out the foods’ ingredient and she will stick ingredients onto index cards. Students will use these cards to categorize what kind of ingredients food has. Continued they will draw the table and based on previous class background teacher will ask the following question: How did we decide which drinks are healthy? How do we decide which food is healthy? After group discussion, students will evaluate their data and will suggest several recommendation which helps to answer their question.

Note: Jennifer will take care of physical exercise groups and we will discuss on it.