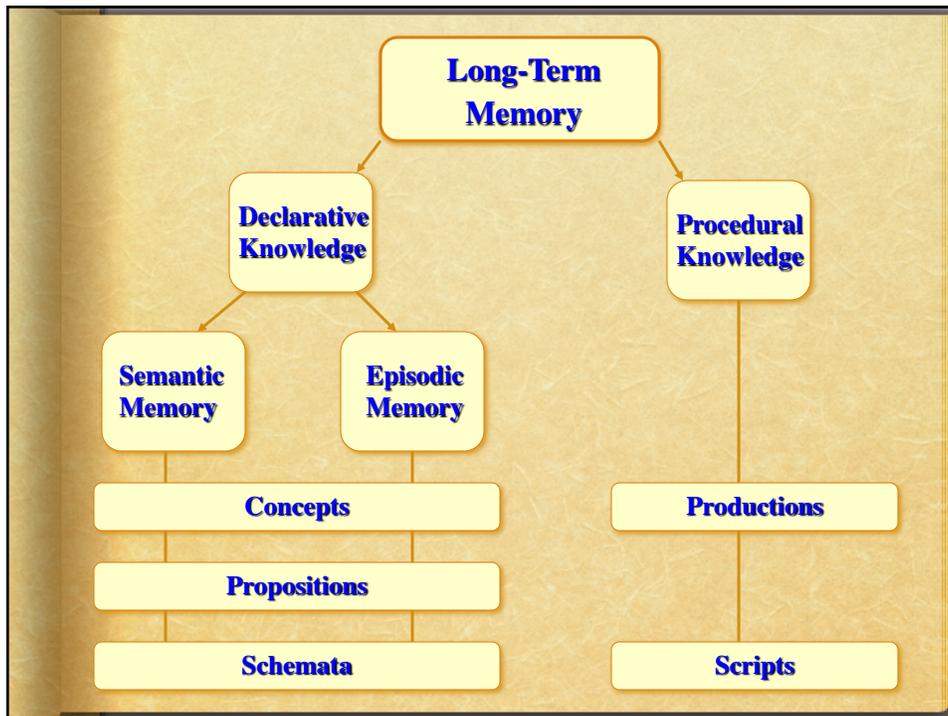


Long Term Memory

Long Term Memory

- ♦ **Similar to a hard-drive on a computer**
 - **Function:** hold information (the file cabinet)
 - **Capacity:** large (unlimited?)
 - **Duration:** long
 - **Saving Information:**
 - ♦ Maintenance Rehearsal
 - ♦ Elaborative rehearsal—encoding

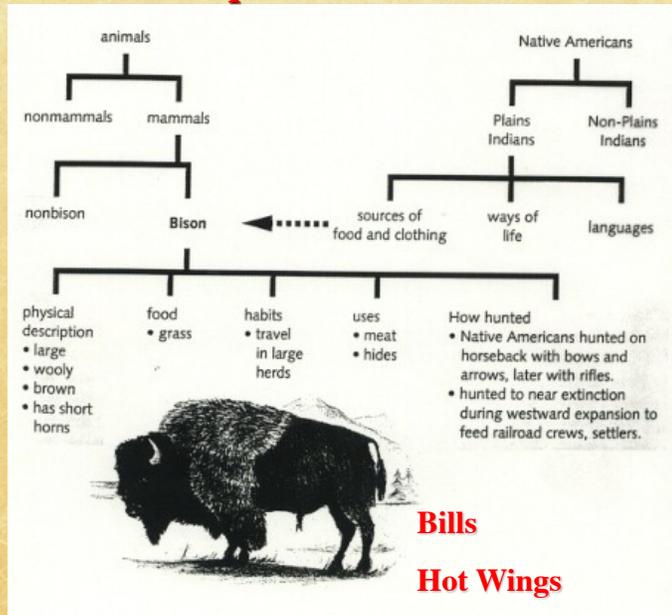
- ♦ **Increasing the odds of saving it:**
 - Time in WM
 - Number of times it enters WM
 - Meaningfulness --i.e. more connections



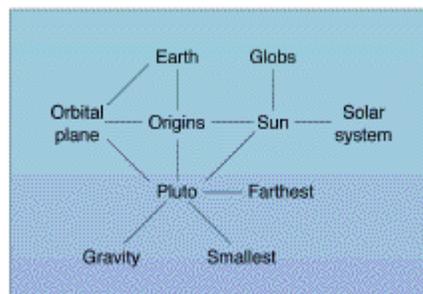
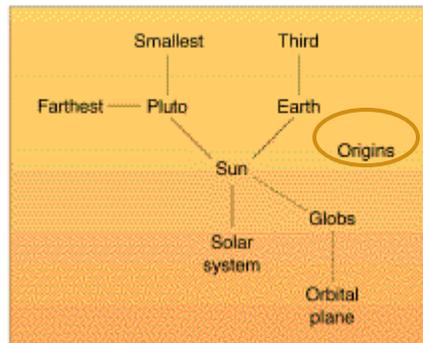
Knowledge Types

- ♦ ***Declarative Knowledge*** – “knowing that”
 1. ***Episodic*** – autobiographical memory, what you have personally experienced in your life.
 - ♦ “Movie reel” in your head
 2. ***Semantic*** – general world knowledge
 - ♦ includes vocabulary, language, relating concepts and idea to one another.
- ♦ ***Procedural Knowledge*** – “knowing how” – eg. Riding a bike

Schema example: Buffalo



Schemata



Context* and *Experience **shape Schemas**

The two boys ran until they came to the driveway. “See I told you today was good for skipping school,” said Mark. “Mom is never home on Thursday,” he added. Tall hedges hid the house from the road so the pair strolled across the finely landscaped yard. “I never knew your place was so big,” said Pete. “Yeah, but its nicer now than it used to be since Dad had the new stone siding put on and added the fireplace.”

There were front and back doors and a side door which led to the garage which was empty except for three parked 10-speed bikes. They went in the side door, Mark explaining that it was always open in case his younger sister got home earlier than their mother.

Pete wanted to see the house so Mark started with the living room. It, like the rest of the downstairs, was newly painted. Mark turned on the stereo, the noise of which worried Pete. “Don’ t worry, the nearest house is a quarter of a mile away,” Mark shouted. Pete felt more comfortable observing that no houses could be seen in any direction beyond the huge yard.

Saturday night

Every Saturday night, four good friends get together. When Jerry, Mike, and Pat arrived, Karen was sitting in her living room writing some notes. She quickly gathered the cards and stood up to greet her friends at the door. They followed her into the living room but as usual they couldn't agree on exactly what to play. Karen's recorder filled the room with soft and pleasant music. Early in the evening, Mike noticed Pat's hand and the many diamonds. As the night progressed the tempo of play increased. Finally, a lull in the activities occurred. Taking advantage of this, Jerry pondered the arrangement in front of him. Mike interrupted Jerry's reverie and said, "Let's hear the score." They listened carefully and commented on their performance. When the comments were all heard, exhausted but happy, Karen's friends went home. (Anderson, Reynolds, Schallert, & Goetz, 1977)

Tony

Tony slowly got up from the mat, planning his escape. He hesitated a moment and thought. Things were not going well. What bothered him most was being held, especially since the charge against him had been weak. He considered his present situation. The lock that held him was strong but he thought he could break it. He knew, however, that his timing would have to be perfect. Tony was aware that it was because of his early roughness that he had been penalized so severely--much too severely from his point of view. The situation was becoming frustrating; the pressure had been grinding on him for too long. He was being ridden unmercifully. Tony was getting angry now. He felt he was ready to make his move. He knew that his success or failure would depend on what he did in the next few seconds.

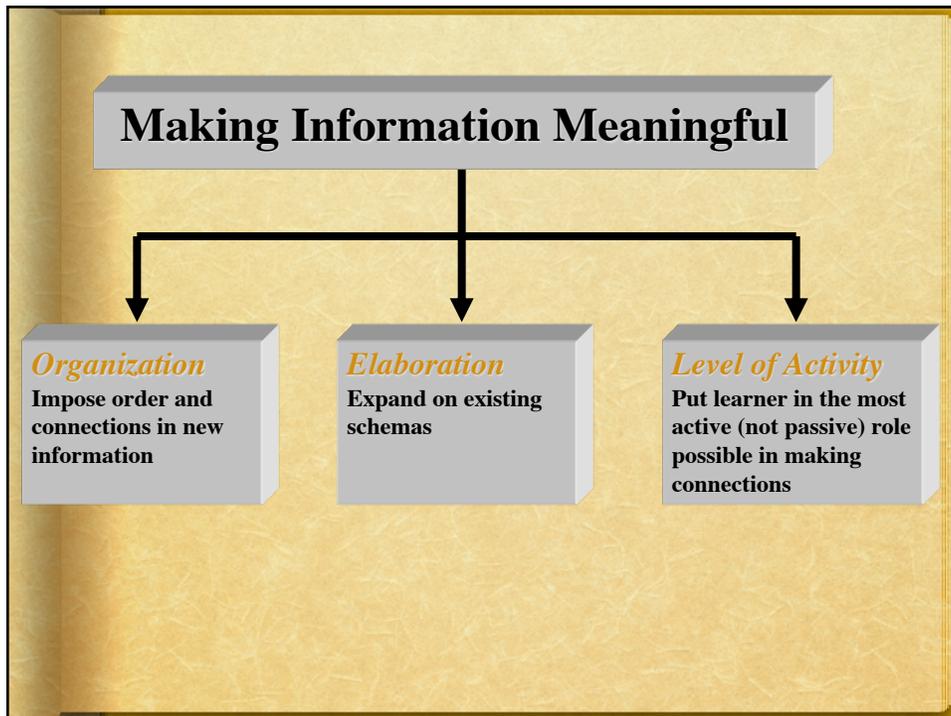
Hocked gems

With the hocked gems financing him, our hero bravely defied all scornful laughter that tried to prevent his scheme. Your eyes deceive, he had said. An egg, not a table, correctly typifies this unexplored planet. Now three sturdy sisters sought proof. Forging along, sometimes through calm vastness, yet more often through turbulent peaks and valleys, days became weeks as the many doubters spread fearful rumors about the edge. At last, from nowhere welcome winged creatures appeared, signifying momentous success. (Dooling & Lachman, 1971)

A simple procedure

Tell me what this procedure is

The procedure is actually quite simple. First you arrange things into different groups. Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to the lack of facilities that is the next step, otherwise you are pretty well set. It is important not to overdo things. That is, it is better to do too few things at once than too many. In the short run this may not seem important but complications can easily arise. A mistake can be expensive as well. At first the whole procedure will seem complicated. Soon, however, it will become just another facet of life. It is difficult to foresee any end to the necessity for this task in the immediate future, but then one never can tell. After the procedure is completed one arranges the materials into different groups again. Then they can be put into their appropriate places. Eventually they will be used once more and the whole cycle will then have to be repeated. However, that is a part of life.



Organizing Information

Making connections among incoming bits of information (internal connections)

- ♦ **Hierarchies**—show progression from broad to specific
- ♦ **Sequences/outlines**—shows linear progression of information.
- ♦ **Matrices**—shows relationships between elements
- ♦ **Models**—unified representation, shows how parts are related
- ♦ **Concept maps**

Elaboration

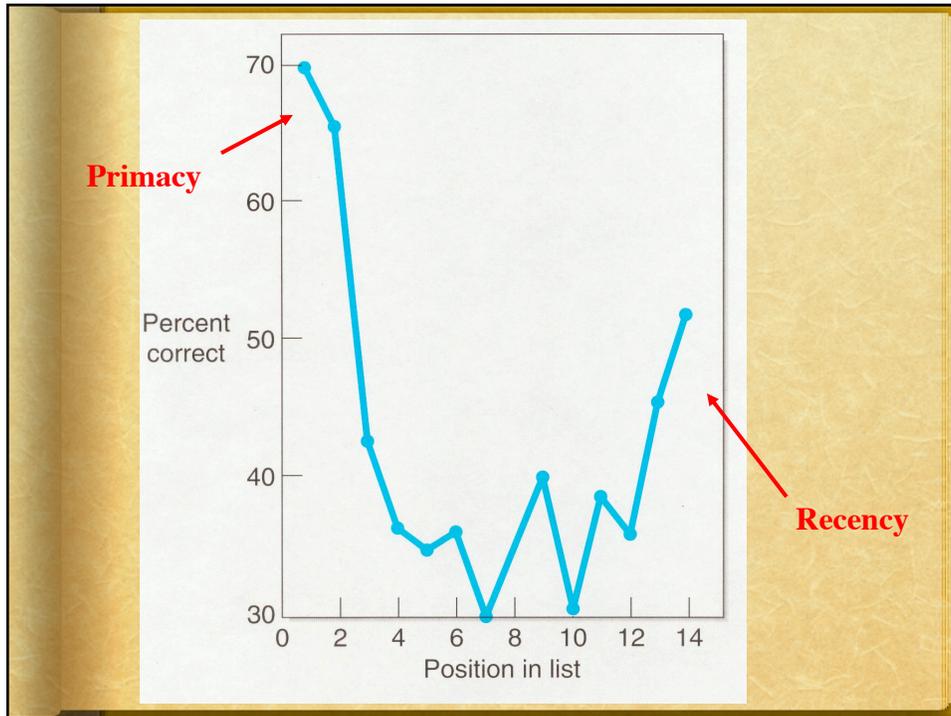
Connecting new information to information you already know (background knowledge)-external connections

- ♦ **Analogies**—recognizing similarities “It’s like....”
 - ♦ Examples / “illustrations”
 - ♦ Stories
- ♦ **Activating prior knowledge**—“what do we already know about....”
- ♦ **Special cases– Mnemonics**—Generated connections (use when there is no background knowledge)

Level of Activity

Depth of Processing

- ♦ Finding **similarities** and **differences** and **generalizing**:
 - ♦ “How are these alike?”
 - ♦ “How are they different?”
 - ♦ “What pattern do you see?”
- ♦ **Explaining**:
 - ♦ “Why?” (e.g., “Why do you suppose Mercury is so hot on one side and so cold on the other?”)
- ♦ **Providing evidence**:
 - ♦ “How do you know?”
 - ♦ Example: “How do you know that people’s perceptions vary?”
 - ♦ Evidence:
 - ♦ Some people saw the young woman in the picture, whereas others saw the older woman.
- ♦ **Hypothesizing**:
 - ♦ “What would happen if?”
 - ♦ Example: “What would happen if Mercury rotated on its axis as does the Earth?”
 - ♦ Hypothesis: The temperature wouldn’t vary so much. It would be very warm on all parts of the planet.



LTM Enhancement

- ♦ Strategic Deliberate Practice--[Overview](#)
- ♦ Encode Visually and Verbally--[Example](#)
- ♦ Block out Interference--[Chart](#)
- ♦ Focus on Organization, Elaboration, & Activity
- ♦ Learn in Depth--[Example](#)
- ♦ Learn in Many Contexts
- ♦ Use Mnemonics for Facts--[Example](#)
- ♦ Build Schemata & Interconnections



Questions that Promote *Deep Processing*

- | | |
|------------------------------|--------------------------------|
| ♦ Similarities & Differences | How are these alike/different? |
| | What patterns do you see? |
| ♦ Explaining | Why? |
| ♦ Providing Evidence | How do you know? |
| ♦ Hypothesizing | What would happen if? |



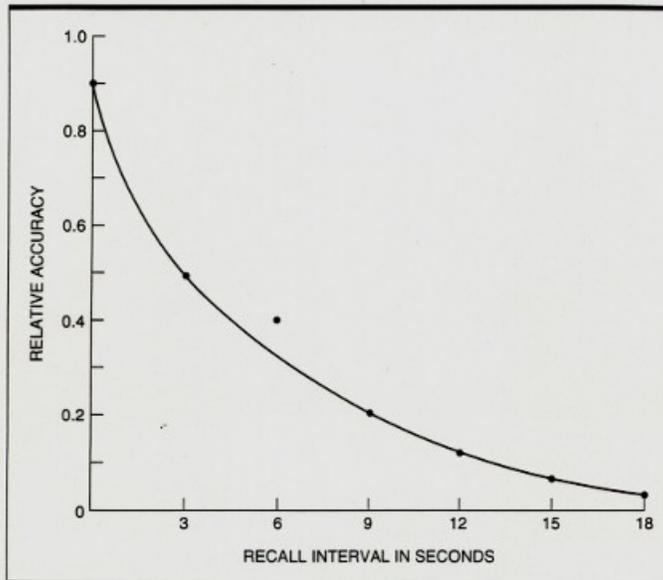
Strategic Deliberate Practice



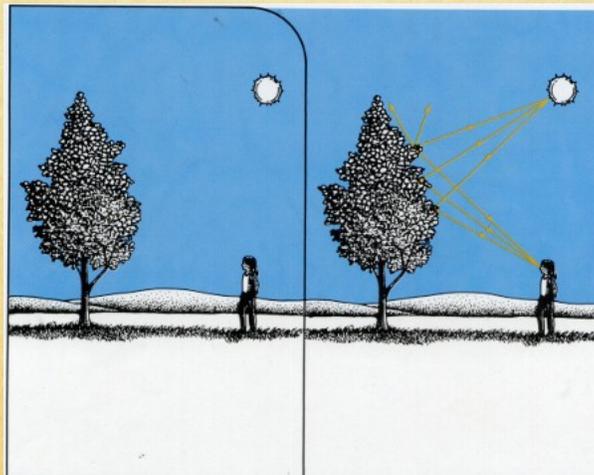
- ♦ Focus on improving specific skills/procedures
- ♦ Automaticity frees up needed resources
- ♦ Which is more effective --massed or distributed practice?

Distributed!





Relative accuracy of recall in the Brown-Peterson task, across a delay interval from 0 to 18 seconds. Subjects had to perform backward counting by threes during the interval. (From Peterson & Peterson, 1959.)



Memory Task

Q. When sunlight strikes the tree it helps the girl to see the tree. How does it do this?

Q. When sunlight strikes the tree it helps the girl to see the tree. How does it do this?

A. Some of the light bounces (is reflected) off the tree and goes to the girl's eyes.



First Letter Mnemonics

♦ Musical Notes: E, G, B, D, F Every good boy does fine

.....
♦ Names of the Great Lakes Homes

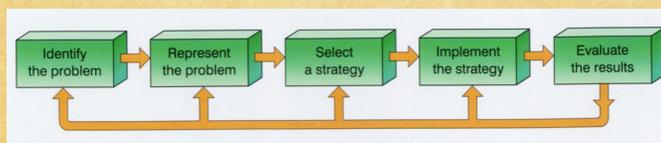
.....
♦ Sine/Cosine/Tangent SOHCAHTOA



Encourage Mental Models

Principle of Least Intervention

- Least* ↑
- 1 Prevention
 - 2 Nonverbal Cues
 - 3 Praise Correct Behavior
 - 4 Praise for Other Students
 - 5 Verbal Reminders
 - 6 Repeated Reminders
 - 7 Consequences
- ↓ *Most*



Mental Model for learning?