How Students Learn

• Applying the Information Processing Model to the Learning Process

• Teaching Strategies that work with the Learning Process

• Student Assignments that work with the Learning Process
The Information Processing Model

Stages of the Information Processing Model:
- Using the Senses and the Sensory Register
- Using Short-term Memory
  - Immediate Memory
  - Working Memory
- Facilitating Long-term Storage
  - Transfer
  - Consolidation
Using the Senses and Sensory Register

• Not all senses contribute equally to learning

• What goes into the Sensory Register is hierarchical in nature (threat, emotional salience, relevance/usefulness)

• The amount attended to is affected by “perceptual filtering” - attentional bias helps to determine what gets priority
Short-term Memory Systems

- **Immediate Memory**
  - Approximately 30 seconds ("use it or lose it")

- **Working Memory**
  - Hours or days ("two-way street")
  - Critical for reading, writing, mathematics, problem solving, etc.
  - "Chunking" increases capacity
Long-term Memory Systems

- Information is stored permanently
- Can be stored in a variety of ways:
  - Semantic/Declarative Knowledge
  - Episodic Knowledge
  - Emotional Memory
  - Procedural/Reflexive Memory
  - Automatic/Motor Memory
Long-term Memory Processes

- Storage – “Makes Sense” vs. “Meaningful”
- “Transfer”
- “Consolidation”
- Retrieval
“Teachers spend the majority of their time planning lessons that make sense...teachers need to be more mindful of helping students establish relevance.”

~David A. Sousa~

(How the Brain Learns, 2001)
Lesson Plan Components

- Anticipatory Set
- Learning Objectives
- Purpose
- Input
- Modeling
- Check for Understanding
- Guided Practice
- Closure
- Independent Practice
Teaching Strategies that Work with the Learning Process

- Draw upon previous knowledge
- Make information relevant, not just “make sense”
- Use “attentional bias” to help students attend to appropriate material
- Use repetition, rehearsal, concept formation, “chunking”, and mnemonics to aid consolidation and transfer to long-term memory
- Give students time and opportunities to process new information and practice it
- Provide feedback in a variety of ways
- Encourage students to understand and use the Learning Process to their advantage
Student Assignments that Work with the Learning Process

• Calling up Prior Knowledge
  **What do I already know about this?**
  (journaling, drawing, answering a question, brainstorming)

• Sensory Register and Working Memory
  **How can I make sense of this?**
  (Highlighting notes/texts, outlining, mind mapping, creating “cheat sheets”, vocabulary logs and lists, flash cards, mnemonics, practice problems, concept sheets, etc.)

• Long-term Memory
  **Why should I remember this?**
  (reflective papers, projects, programming, case studies, research, autobiographical activities, poster presentations, etc.)