


## Learning Strategies For Students with TBI

*Darn that hurt !  
Band-aids for Teachers*

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## INTRODUCTION

- A **traumatic brain injury (TBI)** is defined as a blow or jolt to the head or a penetrating head injury that disrupts the normal function of the brain.
- Not all blows or jolts to the head result in a TBI.
- The severity of such an injury may range from
  - "mild," i.e., a brief change in mental status or consciousness to
  - "severe," i.e., an extended period of unconsciousness or amnesia after the injury.
- A TBI can result in short or long-term problems with independent function.  
(Brain Injury Association of America)

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## TBI Statistics


An estimated 1.7 million people sustain a TBI annually

- 52,000 die
- 275,000 are hospitalized
- 1.365 million , nearly 80% are treated and released from an emergency room
- About 75% of TBIs are mild traumatic brain injury

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## TBI by Age and Sex

- Children aged 0-4 years, older adolescents aged 15-19 and adults aged 65 and older are most likely to sustain a TBI
- Almost half a million emergency department visits for TBI are made annually
- In every age group TBI rates are higher for males than females
- Males aged 0-4 have the highest rates of TBI related emergency department visits, hospitalizations and death combined  
(Center for Disease Control and Prevention)



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## Common Causes of TBI in Children


- Motor Vehicle Accidents
- Falls
- Bicycle Injuries
- Sports Related Injuries
- Shaken Baby Syndrome
- Child Abuse

50% of battered children surviving a cerebral insult suffer permanent neurological, intellectual and psychological impairment.

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## Neuroanatomy


- The brain is more susceptible to injury than previous thought
  - Jelly like consistency
  - Not stationary within the cranium
  - Bony projectiles with the cranium
  - Brain tissue is the most delicate of all body tissue
- There are three main structural parts of the brain
  - Brainstem
  - Cerebellum
  - Cerebrum



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### Neuroanatomy continued




- **Brainstem**
  - Consists of three regions, medulla, pons, and mid brain
  - Regulates major life support functions such as heartbeat, wake -sleep cycle, breathing, balance, and coordination
    - Injury may result in global disorder of wakefulness and swallowing disorders.
    - Susceptible to whiplash, acceleration/deceleration injury
- **Cerebellum**
  - Sits at the base of the skull and connects with the brainstem
  - Controls equilibrium, movement and muscle tone.

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### Neuroanatomy continued

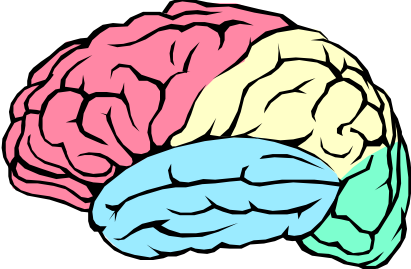
- **Cerebrum**
  - Responsible for the highest functions of thought, memory language and even movement.
    - Cerebrum is divided into two hemispheres
    - Hemispheres are divided by the corpus callosum, which allows for communication between the two hemispheres
    - With the exception of the auditory and visual systems, each hemisphere is responsible for the activities of the opposite side of the body
      - Left hemisphere – Verbal Functions
      - Right Hemisphere – non-verbal functions.
  - Each hemisphere is divided into 4 regions/lobes
    - Frontal
    - Parietal
    - Temporal
    - Occipital



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### Functions Related to Specific Areas of the Brain



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### Frontal Lobes



- Frontal lobe injury occurs most frequently in MVA.
- There is a band of bony ridges on the inside of the skull across from the frontal lobes. Any injury results in the bringing the brain tissue up against these bony parts, and produce some kind of damage.
- Damage to the systems that travel through this specific location produces the most common effects of TBI (Jennett & Teasdale, 1981)

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### Frontal Lobe Functions:

- Attention/Concentration
- Impulse control
- Problem Solving/Reasoning
- Inability to plan
- Confused when presented with too many choices
- Self Initiation ( part of the brain that extends backwards toward the ears)
- Monitoring for errors
  - Ability to use feedback
  - Self-awareness
  - Change behavior in response to praise or punishment
- Mental flexibility

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### Parietal Lobes



- The parietal lobes are found posterior to the frontal lobes. The parietal lobe processes the input of sensations from the body to the brain. Damage here results in the individual not recognizing changes in body state, i.e., hunger, cold, pain.
- The parietal lobe also contains the locator circuits of the brain that tell where things are found and where they are situated in relationship to the body. Mental maps are made here.
- Another important function of the parietal lobe is the high level processing of all the brain's input data. The parietal lobe brings together information to produce understanding. The left parietal lobe provides understanding of verbal information. The right parietal lobes give us the big picture in visual images and forming ideas.

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## Parietal Lobe Functions

- Perceptual Impairments
- Language Comprehension deficits
- Safety issues
- Judgment disorder
- Difficulty making sense of self and others
- Reading on non-verbal information

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## Temporal Lobes



- The temporal lobes are located on the lateral aspect of the cerebral hemispheres.
- Injury to the temporal lobes often impairs the ability to interpret sounds.
- Injury to the back of the left temporal lobe can result in the loss of the ability to understand speech.
- The temporal lobes also contain much of the circuitry of the systems that produces memory and emotional responses

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## Temporal Lobe Functions

- Memory
- Language
- Musical awareness
- Emotions
  - Excessive emotions (e.g., Crying and tearing up a test paper with one mistake)
- New Learning ( may not be able to learn in the usual ways)

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## Occipital Lobes



- The occipital lobes are a small region at the rear of the brain where input from the eyes is processed.
- Occipital injury produces problems in recognizing and identifying visual stimuli.

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## Neurons



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## Neurons

- It is the damage to the neuron that gives TBI it's unique cognitive and behavioral effects.
- The neuron is the basic unit of the nervous system. It consists of cell body, dendrites and axons
  - Dendrites receive the stimuli and conduct neuron impulses from one neuron to another across a synapse (gap).
  - Axon – is a single fiber that conducts impulses away from the neuron to other portions of the nervous systems as well as muscles and glands.
  - Myelin covering.
  - Electro –Chemical properties.

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## Pathophysiology of TBI

Trauma to the head produces both primary and secondary effects.

- **Primary Effects:**
  - Occur immediately following impact as a result of tissue damage directly caused by the blow. Primary effects are not reversible
  - Brain -skull differential movements include rubbing lacerations, especially the orbital frontal area, frontal lobes and the temporal tips.
  - Rotational Shearing
  - Coupe- Contre-Coupe
  - Tissue damage
  - Diffuse axonal injury and neuronal shearing

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## Pathophysiology of TBI

**Secondary Effects:**


- Develop after the injury and is potentially reversible with medical care
- Hemorrhage and rupture of the cortical veins
- Increased inter-cranial pressure
- Infarction – tissue death due to regional blood deprivation
- Anoxia – oxygen deprivation
  - The brain has not metabolic or oxygen reserves, completely dependent on the blood for oxygen
  - Loss of oxygen for less than 10 seconds results in loss of consciousness
- Hematomas - bleeding or blood clotting within the skull
- Edema – brain swelling
- Infection

The main aim of medical management of secondary TBI is to maintain the intracranial environment in as near normal state as possible.

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## Students with a TBI may:

1. Have a history of academic success prior to injury
2. Demonstrate an uneven learning profile, consisting of some intact high level skills and some weakened or lost skills
3. Have a need for compensatory and adaptive strategies to offset specific cognitive losses
4. Exhibit problems understanding large amounts of unstructured information
5. Exhibit problems generalizing and organizing new information
6. Demonstrate inconsistent patterns of performance including day to day variability, uneven progress, periods of rapid learning and plateaus
7. Retain a base of previously learned information that can facilitate rapid relearning
8. Demonstrate poor self control, resulting in off task behavior, impulsivity and distractibility
9. Demonstrate inefficient problem solving
10. Exhibit loss of emotional control, mood swings, increased irritability
11. Experiences difficulty in adapting to changes in routine, and the unexpected
12. Not recognize changes in his pre-injury abilities, personality and behaviors.

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## Developmental Effects of Pediatric Traumatic Brain Injury

- TBI may change the rate and course of development
- Reduce ultimate level of academic and occupational achievement
- Wipes out previously attained skills
- Affect the development of skills not yet mastered. These children may appear to have returned to normal soon after the injury, but later experience substantial disability because the brain injury interferes with the development of a cognitive function at the appropriate time in the developmental sequence.
- Affects ongoing ability to learn new information.
- Children/Adolescents with severe TBI usually see a reduction in long term memory or decreased ability to organize material
- Children With severe TBI fail to add to their knowledge base which can become cumulative and effect overall learning
- High incidence of emotional, psychological and behavior problems
  - Realization that previous self has changed
  - Grieving process
- Loss of friendships and social circles
- Those children with pre-existing behavior and academic disorders, those disorders may worsen over time
- As the awareness of deficits increases, a child with TBI may to avoid situations where they are expected to perform

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“While the two groups share same similarities in learning needs and styles, Students with brain injuries have markedly different needs from those with learning disabilities, including their adjustment to the disability, types of memory and other cognitive difficulties, medical complications, presence of physical impairments, and the day top day fluctuations of impairment experienced during recovery from brain injury...A danger is that institutions will give students with brain injuries standard accommodations without regard for the unique and unpredictable nature of their injuries. Students with brain injuries have different needs than students with LD or other types of disabilities and then frequently require different types of support systems.”

- ( Gardner 2001)

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## **Children with TBI Profiles vs Children with Congenital Cognitive Profiles**

- Sudden onset, with marked before and after changes in physical, academic and social skills.
- Neurological recovery and Improvement – Children with severe TBI experience neurological improvement months to years after injury
- Some consequences of the injury may not appear for months or even years after the injury as the brain matures and class work becomes more complex.
- Students with learning disabilities usually show overall consistent patterns of difficulties in school. In contrast students with brain injuries often show marked discrepancies in their abilities, doing well in some areas and poorly in others
- Uneven progress and unpredictable progress. A burst of progress related to recovery of knowledge and skill that may lead parents and professionals to be overly optimistic
- The ability to learn new information is compromised, while previously stored information remains intact and easier to recall
- Loss – Children with TBI typically retain their pre-trauma understanding of who they are and what they should be able to do
- Students with TBI may rely on previous learning and study habits, even though they are no longer effective. This adds to the burden of returning to school
- Family Grief Reaction – Difficulty mourning the loss of a child still alive, yet changed.

*Children have relatively good physical recovery but are left with severe cognitive and behavior challenges when they are least prepared.*

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## Cognitive Processes

***“The target of treatment is people and their real world pursuits. Therefore treatment efforts generally require a flexible mix of stimulation and retraining, personal and environmental strategies and accommodations and procedures to promote adjustment to disability.”***  
**(Ylvisaker, 1999)**



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## Cognitive Processes continued

There are 4 major educational approaches to be considered for students with TBI to address cognitive, behavioral, social and academic skills. These include:

1. Teaching new skills and concepts
2. Teaching the students to use compensatory strategies
3. Making modifications to the environment to assist a student to compensate for losses in physical and cognitive abilities.
4. Making modifications to teaching approaches


Cognition encompasses all of the mental processes, operations, and systems that are used to explain the acquisition and use of knowledge, and more specifically to explain goal directed behavior. (Flavell et al, 1993)

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## Cognitive Effects

Cognitive effects of TBI may keep the individual from fulfilling their job of being a student. The student therefore needs to be taught another way to be a student.



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## Executive Functions

Normal development of pre-frontal areas of the brain is associated with the Executive Systems.

- Delayed consequences of brain injury become evident when the child fails to mature during expected developmental time frames

Executive Function effects:


- Poor Self Control
- Poor Self Management of Behavior
- Poor Self Regulation

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## Physical Effects

- Seizures
- Headaches
- Fatigue
- Dizziness/ Balance Issues
- Loss of motor function in the preferred hand
- Visual Changes
- Sensori-neural hearing loss




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## Behavior Changes

- 50% of children with TBI have residual psychosocial problems that were not present prior to the injury
- Behavioral problems become more prevalent rather than less prevalent over a 2 ½ year follow-up. Most common problems:
  - Dis-inhibition
  - Socially Inappropriate behavior
- Student’s behavior may be altered by medications.
- Child may not be non-compliant, he may not be aware that his behavior is inappropriate.



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### Behavioral Effects

- Mood Swings
- Irritability
- Low Frustration Level
- Impulsivity
- Poor emotional control
- Ego-centric Behavior
- Rigidity
- Depression
- Poor Judgment
- Aggression
- Perseveration

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### Cognitive Functions in the Classroom

Attention: Is the complex process of admitting and holding information in consciousness.

1. What one attends to is influenced by novelty, significance and motivation to attend.
2. Deliberate control over attention is necessary for effective and efficient information processing
3. Our ability to attend is dependent on individual goals and our motivation to attend.

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### Cognitive Functions in the Classroom

Attention includes the following components:

- Arousal
- Directing attention
- Maintaining attention
- Selecting particular objects of attention
- Filtering out irrelevant information
- Shifting attention between two objects
- Dividing attention between two objects.

Concentration often used to reflection selecting and maintaining attention.

Deliberate control of attention is necessary for effective and efficient information processing in less than ideal circumstances. (Ylvisaker 1998)

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### Signs of Inability to Attend

- Fidgeting
- Difficulty remaining seated
- Difficulty sustaining attention, unable to wait their turn
- Blurting out answers before a question is completed
- Difficulty with follow through
- Shifting from one unfinished task to another
- Failing to attend to details
- Losing needed items to complete a task
- Difficulty listening without interrupting
- Wide range of mood swings
- Difficulty delaying gratification (U.S. Department of Education, 2006)
- Loses track of conversations with peers
- Constantly repeats himself/herself when talking with peers or teacher


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### Strategies for Improving Attention in the Classroom

- Get the child's attention by using a predetermined signal before presenting the material.
- Tell the student your expectations about what paying attention looks like (You look like you are paying attention when...)
- Give the student a time limit for a small unit of work with positive reinforcement for accurate completion
- Create suspense by looking around before asking questions
- Signal that someone is going to have to answer a question about what is being said.
- Ask a simple question to a child's whose mind is beginning to wander
- Provide the student with an advanced organizer, including the elements to be learned and the order in which items will be presented.
- Reduce unnecessary distractions, such as unneeded books papers, pencils etc.
- Alternate physical and mental activities
- Give simple concrete instructions
- State the learning objectives. We will be talking about Paul Bunyan. I want you to listen for...
- Reduce the number of individual tasks on an assignment, e.g., every other math problem, All the odd numbered questions.
  - Stress accuracy over speed


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### Strategies for Improving Attention in the Classroom cont'd

- State what the child will need to complete the task.
- Reduce amount of copying from the board.
- Simplify directions, present in an ordinal fashion.
- Be predictable, structure and consistency are vital
- Provide a window that frames small pertinent information, a straight edge or highlight what the student needs to attend to.
- Support child's participation in class, but warn him that you are going to call on him. Even provide him with the question.
- Assign a learning partner
- Eliminate or reduce the frequency of times measures to evaluate competence.
- Describe behavior expectations...frequently
- Give immediate feedback
- Give student frequent opportunities to get up and move around
- Pace the student's work. Shortened tasks enable the student to sustain attention and encourage that the task is completed.

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### Types of Amnesia

- Retrograde – failure to recall past information and events
- Anterograde – failure to learn and remember new information
- Prospective - failure to recall what you have to do in the future.

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### Memory

“Memory function reflects our experience of the past and allows us at each moment to adapt ourselves to the present and look forward to the future. It is critical to the acquisition and utilization of new information. It is involved with every aspect of how we think, what we do, and how we behave”. (Sohlberg & Mateer, 1989)

Memory and learning new information are the most frequently reported deficits after TBI.

Indicators of poor memory skills:


1. Cannot remember previous day’s presented information
2. Difficulty locating classroom, bathrooms, locker
3. Cannot remember locker combination
4. Constantly losing books and assignments
5. Struggles to learn new information.



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### Memory Strategies


- Establish a routine. Consistency provides the student with stability and security.
- Develop a memory book. Most schools provide students with planners. The format, may be too overwhelming to the student with TBI, Be prepared to come up with Plan “B”
- Pre-teach information. Supply parents, tutors or therapists with materials to introduce concepts to the student. Supply students and family with advance outlines of materials to be covered.
- Frequently repeat information and summarize it
- Chunking
- Use humor. Something silly or funny is easier to remember
- Multiple choice tests. It is often easier for the student with a TBI to recognize the correct answer rather than recall it.
- Review key points at the end of the day with the student.



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### Memory Strategies cont’d

- Graphic organizers
- Mnemonics
- Visualization
- Rhyming
- Furnish cues to the students to foster independence. These cues may consist of an index card attached to the student’s desk as a reminder to turn in an assignment
- Compensatory strategies, alarm watch, personal laptop, calculator
- Link new information with old information
- Have the student repeat information back to you.
- Have the student carry an assignment sheet to each class and make sure that it is filled out correctly
- Demonstrate techniques such as mental rehearsal and use of special words to act as reminders.




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The lessons learned from studies of transfer is that, if you want people to learn something, teach it to them. Don’t teach something else and expect them to figure out what you really want them to do.

(Detterman, 1993)

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### Cognitive Organization



1. Pre-frontal injury is associated with executive function deficits which results in organization impairment.
2. Process of organizing – the means by which people relate and group stimuli with reference to information and organizing schemes already stored in permanent memory.
  - Analyzing information
  - Identifying relevant perceptual and conceptual features
  - Comparing
  - Identifying Similarities and Differences
  - Classifying and categorizing
  - Sequencing
  - Integrating information into larger units
3. “Organization as a conceptual structure is the mental representation of organizational relationships and principles, which is hypothesized to explain the individual’s organization of objects, people and events into predictable patterns” (Ylvisaker, 1998)

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### Indicators of Poor Cognitive Organization

1. Weak or bizarre associations
2. Weak analysis of objects into features
3. Disorganized sequencing of events
4. Weak identification of similarities and differences in comparisons and classifications
5. Difficulty starting and finishing tasks
6. Difficulty maintaining goal directed thinking
7. Ongoing difficulty identifying the main idea
8. May easily get lost in the details
9. No discernable system to how he approaches worksheets. Does not precede in a systematic fashion
10. Cannot give directions to others
11. Gets Easily confused with changes in daily routine


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### Organizational Strategies

The use of compensatory strategies for students with TBI should take into consideration the following three principles:

1. Students with TBI may lack awareness of their new deficits and therefore fail to see the benefits of compensatory procedures. Helping the student understand his/her new profile of abilities and needs after the injury may be critical in the success of acquiring compensatory strategies.
2. Because of the unawareness issue and the emotional challenges associated with a new approach to academic tasks it is often important to have students involved in selecting the procedures that they use to compensate for their deficits.
3. The use of compensatory strategies must be taught to a student, often requiring frequent instruction and practice until the student can use the strategy independently (Ylvisaker 1993)



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### Organizational Strategies cont'd

Disorganized information has been consistently been found to be more difficult to comprehend and to recall than organized information (Dodd and White, 1980)

Helping the child to develop a routine will ultimately lead to organization success. The goal for organization is to

- eliminate tardiness,
- forgetfulness,
- lack of preparedness and
- procrastination.



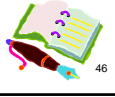
These habits need to be replaced with strategies to ensure the student is utilizing good organization skills. Once again, a consistent approach that is reinforced on a regular basis will be a tremendous help.

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### Organizational Strategies cont'd

- A daily agenda or timetable should be with the student at all times during the school day. Provide positive reinforcement for referring to schedule.
- If you have extra texts, it would benefit the student to have a copy at home.
- Practice sequencing material
  - Break up task into workable and obtainable steps
  - Provide examples and specific steps to accomplish task
- Written checklists of steps for complex tasks with instructions for checking off each completed step in the assignment or task.
  - TEACHH Schedule




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### Organizational Strategies cont'd

- Give the student organizers - graphic organizers, checklists, subtitles, outlines etc. that assist with written work and assignments.
- Written cues for organizing an activity or assignment... First you do this, and then this comes next. Provide reinforcement when each step is complete
- Teach the child how to highlight pertinent information and take notes that are meaningful.
  - Provide the student with a copy of the reading material with main ideas highlighted
- Communicate regularly about progress and strategies for improvement.
- Make sure that you have a positive home-school connection with the support needed to ensure success.
- Provide verbal prompts and cues to ensure the student is prepared. For example, ask the student what needs to be done on the given night. If he answers math, ask what is needed to complete the math. Help with verbal cues often which will eventually lead to the student reflecting back on what's needed.
- Colored-coded materials for each class or subject
- Additional time to get things together at the end of the day.
- Visual cues, such as a green line on the page where the student is to begin and a red line where he is to stop.
- Assist student in keeping materials in a specific place




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### Language

Specific aphasias are not common following TBI. Most children recover language that is adequate for:

- phonology,
- morphology and
- syntax.



Yet, teachers of severely brain injured children rank language problems among the most important deficits that interfere with school performance

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## Language cont'd


### Classroom Indicators

- Changes in spelling
- Changes in reading comprehension
- Changes in written language
- Poor Problem Solving
- Inability to predict outcomes



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## Language cont'd



### General Indicators of Poor Language Processing


- Students may avoid responding to questions
- A delay or lag time may be present before a student responds
- Audible or inaudible rehearsal of speaker's statement
- "I don't Know" Student may know what they want to say but cannot find the appropriate label
- Use of non-specific referents
- Description of desired object rather than specific label
- "Just the facts"
- Poor memory for verbal information
- May use an inappropriate word or substitute a nonsense word for the real word
- Tangential speech.

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## Language cont'd


### Poor Pragmatic Language Skills

- Language is effective when it does what the speaker intends, is appropriate to listener, place and situation and is perceived as socially polite.
- Misread social cues
- Misread tone of voice
- Poor eye contact
- Poor topic maintenance
- Inability to start to stop a conversation appropriately
- Do not establish communication referents
- Provide too much information



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## Language cont'd




### Language Strategies for the Classroom

- Limit length and complexity of verbal and written messages.
  - Always provide both oral and written instructions
  - Get the student's attention before giving directions. Use alerting cues
  - Give one direction at a time
- Do not use figurative or idiomatic speech. Student may understand these figures of speech literally which may lead to confusion and inappropriate behaviors.
- Recognize the student may not understand humor or sarcasm
- Be aware that the student may not understand the requirements of the different 'wh' question words.
- Consider that the student may not be able to start, maintain or end a conversation appropriately. Provide the student with a modal or verbal reminders.
- Use question prompts to help the student share more information and to keep the student's conversation progressing in a sequential manner

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## Language cont'd




### Language Strategies for the Classroom

- Provide a structure to help a student complete an oral or written language task in the correct sequence
- Paraphrase instructions as needed
- Repeat instructions more than once
- Allow the student additional time to respond
- Involve a student in a social skills group
- Offer clear and direct rather than vague commands. E.g. say "Look at your book" rather than "Pay attention"
- Allow the student to check with a 'peer buddy' to check for clarification
- Have the student re-tell/repeat the direction in his own words to check for comprehension
- When introducing new vocabulary provide definitions of terms and visual cues

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## Classroom Indicators of Poor Problem Solving Skills

1. Poor reading comprehension
2. Difficulty understanding math concepts and processes
3. Inability to predict outcomes
4. Difficulty following directions
5. Impulsive Behavior
6. Inability to plan for future events
7. Inability to identify causes of an event
8. Repeat offenders
9. Inability to sequence stories
10. Inability to verbalize reasons for behavior.



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## Reasoning and Problem Solving Strategies


- Use graphic organizers to walk through the problem solving process
- Act as a coach. Talk the student through the current problem.
  - Help the student identify the problem
  - Help the student generate alternative solutions to frequently occurring problems in the classroom
  - Help the student to predict possible consequences of his/her actions.
  - Point out cause and effect relationships
  - Assist the student in setting goals.
- Encourage generalization of newly learned problem solving skills
- Consider the role language plays in interpreting problems and determining solutions
- Recognize the implications of poor problem solving skills on academic performance, e.g., complex math science, comprehension, and sequencing of stories. Provide additional structure such as written steps to complete math problems.

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## Problem Solving Cues

- **What is my problem?**
- **What is my first solution?**
- **What will be the results?**
- **If it doesn't work, what can I try next?**
- **I choose to solve my problem by doing:**



**Problem Solved!**

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## Project Planning Form

- Project:
- Project Due Date:
- Materials Needed:
- Step By Step:



**Stuck? Ask for Help!**

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## Speed of Processing Strategies

Speed of processing refers to the amount of time an individual needs to take in information and make sense of it.

- Recognize that as the student fatigues speed of processing decreases
- Recognize speed of processing can be negatively affected by medications
- Eliminate timed measures to assess learning
- Reduce the amount of work required
- Provide a reader for texts and tests as needed
- Provide the student with a note taker
- Lower difficulty level until speed of processing increases
- Allow extra time for completion of tests and assignments
- Allow frequent breaks to allow the student to re-charge
- For secondary students allow extra travel time between classes


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## Visual Changes

A student may also have experienced changes in visual functioning as a result of the TBI. These may include:

1. Blurred Vision
2. Double Vision
3. Reading Difficulties – words appear to move across the page
4. Sensitivity to light
5. Inability to attend to visual stimuli
6. Loss of visual field
7. Headaches with visual tasks
8. Tracking – inability to move smoothly across a printed page
9. Fixation – difficulty quickly and accurately to locate a fixed object, such as a word on a page.
10. Focus Change – inability to look quickly from near to far and back again without blurring.
11. Changes in depth perception – the student may appear clumsy
12. Peripheral Vision – inability to see what is happening in the surrounding visual field.




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## Visual Strategies

- Present material in child's field of vision
- Allow extra time to process visual information
- Provide student a work area devoid of visual distractions
- Reduce the amount of visual information presented to a student at one time.
- Enlarge printed materials
- Copy assignments on yellow or blue paper to reduce glare
- Provide cues to encourage left to right tracking
- Help the student structure written assignments utilizing pre-folded paper, graph paper, pre- numbered pages, boxes for answers
- A visual field deficit, such as not being able to see portions of a printed page will affect the student's ability to complete an assignment. For example a student with a left field neglect will not see information printed on the left side of the page. Information should be presented in his right field of vision
- Recognize clumsy actions as a result of poor depth perception/ visual spatial planning.



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## Assistive Technology for Students with TBI

Assistive technology has proved an excellent compensatory strategy for children, with visual changes, poor motor control (terrible handwriting) speed of processing and attention and concentration.

*“Assistive technology is any item, piece of equipment, or product system that is used to increase, maintain or improve functional capabilities of a person with a disability”* (TBI Education Organization)



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## Types of Assistive Technology

- Computers
  - Speech Recognition Software
    - Dragon Naturally Speaking – Nuance Communication
    - Windows Speech Recognition in Vista – Microsoft
    - MacSpeech Dictate – MAC
    - LumenVox Speech Engine – LumenVox
  - Screen / Text Reading Software – reads all the text in any given document or application.
    - Text Assist – Mindmaker Inc.
    - Text Aloud MP3 – Next Up technologies
    - Wynn2 – Freedom Scientific
    - JAWS – Freedom Scientific
  - Screen Magnification Software
    - Lunar – Dolphin Computer Access
    - Super Nova – Dolphin Computer Access
    - Magic – Freedom Scientific
    - Zoom Text – Ai Squared

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## Types of Assistive Technology

- Calculators
- Laptops
- Alpha Smart
- Watches
- Tape Recorders
- Specialized keyboards and mice
- Any word processing program for the completion of assignments, even journaling
- Books on CD
- Cell Phones

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## You already know this:


- Use the system that is the simplest and easiest to use
- Develop routines around the technology and teach the students routines over time
- Teach the system to others in the child's environment
- Review the technology to ensure it meets the changing needs of the student
- Involve the student in the selection of the system and in the planning and training for it's use

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## Some Considerations

- Children with TBI frequently have long term physical, cognitive and psychosocial difficulties
- Strategies and accommodations are needed throughout the student's life.
- Recovery from brain injury is inconsistent
- Students with Brain injuries may not be able to predict when they will have difficulty post-injury, until they have attempted it.
- The true effects of the injury become apparent when the student attempts to resume his pre-injury life style
- A variety of specialists may be involved in the student's care, including a speech pathologist, occupational therapist, physical therapist, school psychologist and outside health care providers



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**GOAL**

What do I plan to accomplish?

**PLAN**

How am I going to accomplish my goal?

Materials and Equipment	Steps or Assignments
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

**Prediction**

How well will I do? How much will I get done?

Problems	Solutions
1.	1.
2.	2.
3.	3.

**DO**

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Review									
How did I do?									
Self Rating:									
1	2	3	4	5	6	7	8	9	10
Other Rating:									
1	2	3	4	5	6	7	8	9	10
What Worked?					What didn't Work?				
1.					1.				
2.					2.				
3.					3.				
What will I try next time?									
(Ylvisaker 1998)									
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## **GOAL**

What do I plan to accomplish?

## **PLAN**

How am I going to accomplish my goal?

Materials and Equipment

- 1.
- 2.
- 3.
- 4.
- 5.

Steps or Assignments

- 1.
- 2
- 3
- 4
- 5

## **Prediction**

How well will I do? How much will I get done?

## **DO**

Problems

- 1.
- 2.
- 3.

Solutions

- 1.
- 2
- 3

## **Review**

How did I do?

Self Rating:

1    2    3    4    5    6    7    8    9    10

Other Rating:

1    2    3    4    5    6    7    8    9    10

What Worked?

- 1
- 2
- 3

What didn't Work?

- 1
- 2
- 3

What will I try next time?



## Project Planning Form

Project: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Project Due Date: \_\_\_\_\_

Materials Needed: 1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_

Step By Step:  
1. \_\_\_\_\_  
\_\_\_\_\_  
2. \_\_\_\_\_  
\_\_\_\_\_  
3. \_\_\_\_\_  
\_\_\_\_\_  
4. \_\_\_\_\_  
\_\_\_\_\_  
5. \_\_\_\_\_  
\_\_\_\_\_  
6. \_\_\_\_\_  
\_\_\_\_\_  
7. \_\_\_\_\_  
\_\_\_\_\_  
8. \_\_\_\_\_  
\_\_\_\_\_

**Stuck? Ask for Help!**



## Problem Solving Cues

What is my problem? \_\_\_\_\_

---

---

What is my first solution? \_\_\_\_\_

---

---

What will be the results?

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

If it doesn't work, what can I try next?

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

I choose to solve my problem by doing: \_\_\_\_\_

---

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**Problem Solved !**

## Cognitive Processes Underlying

### Specific Language Skills

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#### Cognitive Process

Ability to recall life/situational context of a word, memory, discrimination, reasoning, ability to determine critical elements of a word.

Cognitive Organization, adequate word retrieval, memory, vocabulary.

Comparison and discrimination of characteristics, analyzing, reasoning problem solving skills.

Linguistic flexibility, adequate word retrieval, good vocabulary

Generate verbal descriptions using several levels of linguistic organization and process several levels simultaneously

Adequate word retrieval, ability to determine a key attribute, adequate vocabulary

Reasoning/logical thinking, verbal reasoning, understanding features of a given word, adequate vocabulary

Reasoning/problem solving, ability to determine the critical element of a word, adequate vocabulary, understand the concept and process for determining opposite words, adequate word retrieval.

Recognition of all critical elements of a word, labels and attributes, Adequate word retrieval.

#### Language Skill

Associations

Categorization

Similarities/Differences

Multiple Meanings

Attributes

Synonyms

Semantic Attributes

Antonyms

Definitions



**Verbal Problem Solving Skills**  
**And**  
**Underlying Cognitive Processes**

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**Cognitive Skills**

Understand what type  
Of information is needed  
Determine appropriate from  
Inappropriate responses  
Use correct vocabulary

Understand questions  
Review possible causes  
Draw from past experience  
Accept and reject possibilities  
Based on likelihood of occurrence

Understand the negative component  
Understand overall meaning of questions  
Determine correct from incorrect  
responses.

Consider all possibilities  
Draw from past experiences

Understand problem  
Determine the probable causes of  
The problem  
Determine how to avoid the problem  
Be able to back track.

**Verbal Problem Solving Skill**

Inferences

Determining Causes




Negative "Why" Questions

Determining Solutions

Avoiding Problems

# Thought Jogger



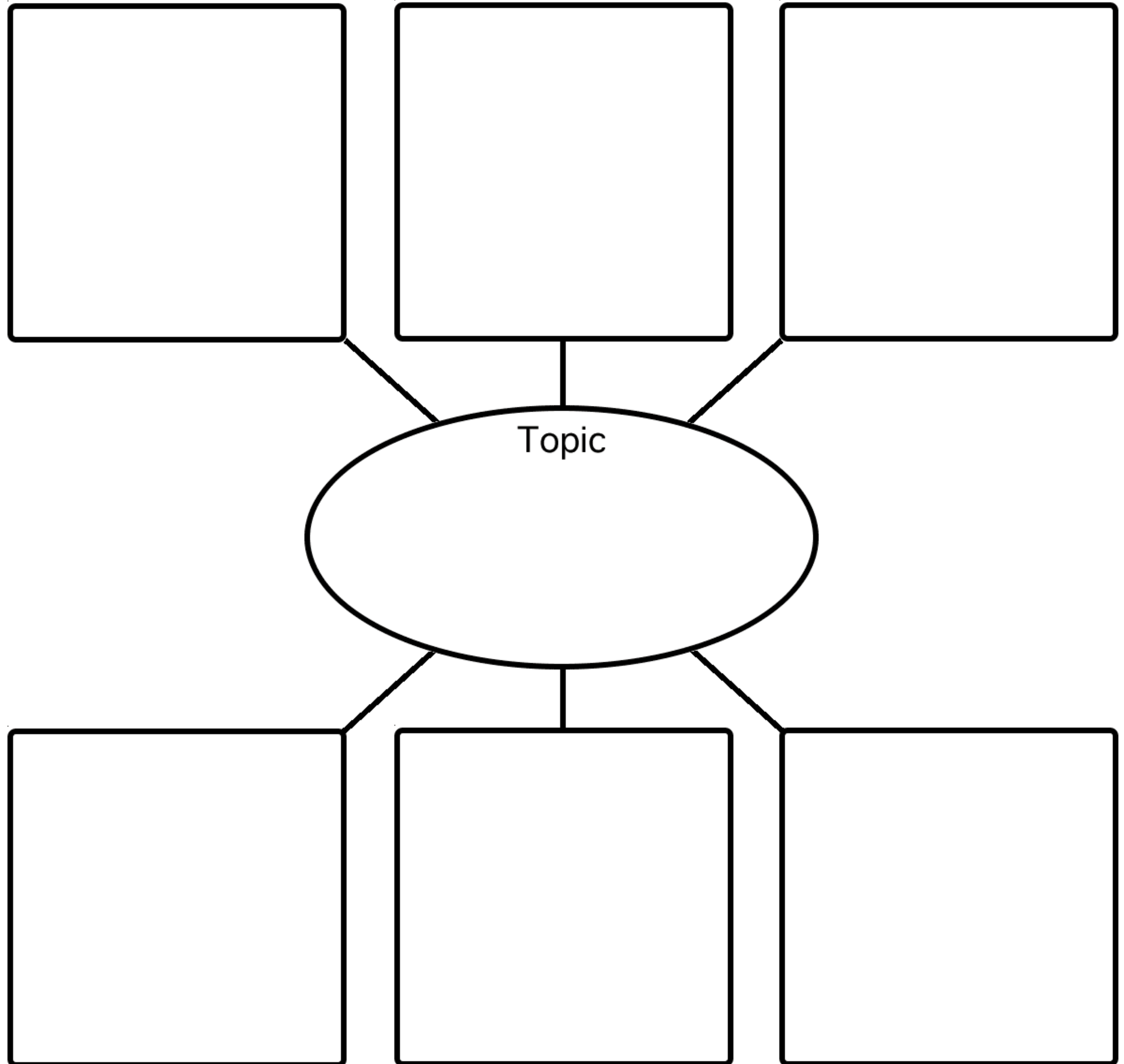
<b>Topic:</b>	
 <p>Where did I learn this?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<b>What do I know about the topic?</b> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
 <p>Where can I look for answers?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<b>What do I want to know?</b> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
 <p>What surprised me?</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<b>What I learned:</b> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Name \_\_\_\_\_



Date \_\_\_\_\_

Put the main topic or idea in the center oval.  
Put related items in each box.



Name: \_\_\_\_\_

<b>K</b> <i>What I Know</i>	<b>W</b> <i>What I Want to Know</i>	<b>L</b> <i>What I Learned</i>

Name \_\_\_\_\_



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Date \_\_\_\_\_

***What I know***

***What I have to find out***

***Finding out***

***What I learned***

