**TEXAS CTE LESSON PLAN**

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| **Lesson Identification and TEKS Addressed** | |
| **Cluster** | Human Services |
| **Course** | Counseling and Mental Health |
| **Lesson/Unit Title** | Brain Power |
| **TEKS Student Expectations** | **130.276. (c) Knowledge and Skills**  (2) The student applies mathematics, science, English language arts, and social studies in health science. The student is expected to:  (B) Explain the nervous system of the human body  (3) The student demonstrates verbal and nonverbal communication skills. The student is expected to:  (A) Interpret verbal and nonverbal messages and adapt communication to the needs of the individual  (B) Demonstrate listening skills and techniques to minimize communication barriers  (C) Implement communication skills that are responsive rather than reactive  (4) The student researches career options and the preparation necessary for employment in mental health. The student is expected to:  (A) Identify career opportunities related to mental health  (E) Interpret, transcribe and communicate mental health vocabulary  (F) Investigate treatment options |
| **Basic Direct Teach Lesson** | |
| **Instructional Objectives** | **Students will:**   * Define vocabulary words associated with the nervous system and the brain * Identify and label parts of the brain * Create a diagram of a neuron * Explain how the brain is imaged * Examine how brain injuries impact a person’s behavior |
| **Rationale** | It is important that we develop an awareness of the workings of the human nervous system, particularly the brain. The brain tells every part of the body what to do, how to act and what to feel. It is a key factor in mental health. Research has shown that the brain of mentally ill people varies from the brain of mentally healthy individuals. Understanding the nervous system and brain will provide you with insight on mild to severe mental disorders and disabilities. If you choose a career in the field of Counseling and Mental Health, the information in this lesson will be invaluable. |
| **Duration of Lesson** | Five 45-minute class periods |
| **Word Wall** | **Axon:** Threadlike structure in the neuron that carries signals away from the cell to other neurons  **Central Nervous System (CNS):** Part of the nervous system that consists of brain and spinal cord  **Cerebral Cortex:** Gray mass that surrounds the part of brain that controls functions like problem solving  **Dendrites:** Branchlike part of neurons that receives impulses from other neurons  **Forebrain:** Largest part of brain consisting of left and right hemispheres  **Hindbrain:** Part of brain located at base of skull that is involved in basic life processes   * More vocabulary words can be added to the list. |
| **Materials/Specialized Equipment Needed** | **Equipment:**   * Computer with projector for multimedia presentation * Computers for Internet access for students   **Materials:**   * Brain model (may be borrowed from Health Science Teacher or Anatomy and Physiology Teacher)     **Supplies:**   * Chart paper * Manila folders (one for each student) * Markers (one for each student) * Scissors (one for each student) * Sticky notes (8 to 10 for each student) * Copies of handout   **PowerPoint**   * Brain Power PowerPoint   **Technology:**   * Infographic:   + The History of Madness Within this exciting infographic, you will journey back in time to see how people have evolved in their methods of dealing with madness throughout the years, from Ancient Greece and Rome until the 20th century. Follow this illustrated timeline to increase your understanding of how treatments in the mental health field have dramatically changed since antiquity.<http://www.bestcounselingdegrees.net/madness/> * TED Talks: * Siddharthan Chandran: Can the damaged brain repair itself? After a traumatic brain injury, it sometimes happens that the brain can repair itself, building new brain cells to replace damaged ones. But the repair doesn’t happen quickly enough to allow recovery from degenerative conditions like motor neuron disease (also known as Lou Gehrig’s disease or ALS). Siddharthan Chandran walks through some new techniques using special stem cells that could allow the damaged brain to rebuild faster.<http://www.ted.com/talks/siddharthan_chandran_can_the_damaged_brain_repair_itself>   **Graphic Organizers:**   * Brain Imaging * Brain Power KWL Chart   **Handouts:**   * Brain Power Project Options * Current Event * Personal Word Wall * Rubric for Brain Power Research Oral Presentation |
| **Anticipatory Set** | **Before class begins:**  Take the opportunity to explore the various referenced websites for further information and activities. Secure a nervous system and brain model from the science or health science department of your school and display in your classroom.  Ask students to share what they know about the human nervous system, particularly the brain.  As a class, allow students to play NEUROJEOPARDY.<http://faculty.washington.edu/chudler/jeopardy.html> This will definitely raise awareness of what they “do not know about the neurosystem.”  Distribute Brain Power KWL Chart. Have students complete the first two sections of the chart. The L section will be filled out during Lesson Closure. |
| **Direct Instruction with Special Education Modifications/**  **Accommodations** | Introduce lesson objectives, terms, and definitions.  Students will develop a personal word wall for lesson vocabulary words. Distribute manila folders and Personal Word Wall. Additional words can be added during upcoming slide presentation.  Introduce PowerPoint Brain Power. Prepare students to take notes.  Ask students to fold fingers in and put hands together with knuckles touching. Tell them that this is similar to the brain and is approximately the size of their brain.  Students can also view the media listed below. Links have been added to the slide presentation for your convenience.   * PBS The Secret Life of the Brain <http://www.pbs.org/wnet/brain/> * PBS The Secret Life of the Brain-Scanning the Brain<http://www.pbs.org/wnet/brain/scanning/index.html>   Distribute Brain Imaging graphic organizer to record similarities and differences of five brain imaging methods: PET, CAT, EEG, MRI, and MEG.   * Use brainline.org for information and videos about traumatic brain injuries.<http://www.brainline.org/multimedia/interactive_brain/the_human_brain.html>   Above media has been incorporated into the slide presentation.  Allow time for classroom discussion with questions and answers.  Allow students to play NEUROJEOPARDY.<http://faculty.washington.edu/chudler/jeopardy.html> They will see improvement in their knowledge of the human nervous system.  *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*   * providing extra time to complete assignment * checking for understanding * paired students |
| **Guided Practice with Special Education Modifications/**  **Accommodations** | Allow students to revisit the Personal Word Wall they created during Direct Instruction.  The website <http://faculty.washington.edu/chudler/chmodel.html> has several lessons and ideas for “making” a neuron model. You may choose an activity from this site or allow students to use the Internet to research and create a basic diagram of a neuron, labeling key parts and explaining its purpose.  Guide students through the Brain Cap Activity from Teacher Enrichment Initiatives of The University of Texas Health Science Center at San Antonio to learn more about brain anatomy.  *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*   * providing specific websites or articles from which students can obtain their research information * providing students with a checklist to help them organize and complete activities * allowing students to work with a partner |
| **Independent Practice/**  **Laboratory Experience with Special Education Modifications/**  **Accommodations** | Distribute Brain Power Project Options and Brain Power Project Rubric, Introduce and discuss brain power project options with students and allow them to select a project. Thoroughly discuss rubric components so that students understand how their presentations will be assessed. Students will present findings to the class in an oral presentation.  Guide and monitor students as they work on their projects.  Distribute and review Rubric for Brain Power Research Oral Presentation prior to the start of the assignment so that students are aware of assessment procedures.  Optional: Allow students to view and discuss TED Talk Siddharthan Chandran: Can the damaged brain repair itself? (see Enrichment activity)  *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*   * provide specific websites or articles from which students can obtain their information. * extended time. * students paired with another or work in small groups. |
| **Lesson Closure** | Review lesson objectives, terms and definitions.  As a class, allow students to play NEUROJEOPARDY.<http://faculty.washington.edu/chudler/jeopardy.html>  Allow students to complete the L section of the Brain Power KWL Chart and submit for assessment.  Have students fold a sheet of paper in half, and then in half again, creating four equal sections. Instruct them to label the sections with the following titles: Nervous System, Brain, Imaging and Mental Disorders.  Using a timer, allow students two minutes per section to write down as much information as they can about each topic.  *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*   * encourage participation * verbal praise |
| **Summative/End of Lesson Assessment with Special Education Modifications/**  **Accommodations** | Students will present their research. Oral presentation will be assessed with appropriate rubric.  *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*   * reduce length of assessment * allow to retest if grade is less than passing |
| **References/**  **Resources** | **Articles:**   * Disabled World Toward Tomorrow Links to numerous current articles related to brain research<http://www.disabled-world.com/health/neurology/brain/>   **Images:**   * Nervous System. Digital image. Life in Spite of MS. N.p., n.d. Web. 21 Oct. 2012. <http://www.life-in-spite-of-ms.com/multiplesclerosispictures.html> * Camazine. . N.p., 10 Oct. 2008. Web. 21 Oct. 2012.<http://en.wikipedia.org/wiki/File:BrainLobesLabelled.jpg> * “Intraparietal Sulcus.” Wikipedia.org. N.p., n.d. Web. 21 Oct. 2012. <http://en.wikipedia.org/wiki/Intraparietal_sulcus>>. * “Phineas Gage.” Wikipedia.org. Based on Original Photograph by Jack and Beverly Wilgus., 2 Aug. 2009. Web. 21 Oct. 2012. * “Various Images.” Microsoft Office on Line. N.p., n.d. Web. 21 Oct. 2012. <<http://office.microsoft.com/en-us/images/??Origin=EC790014051033&CTT=6&ver=12&app=powerpnt.exe>>.   **TED Talks:**   * Siddharthan Chandran: Can the damaged brain repair itself? After a traumatic brain injury, it sometimes happens that the brain can repair itself, building new brain cells to replace damaged ones. But the repair doesn’t happen quickly enough to allow recovery from degenerative conditions like motor neuron disease (also known as Lou Gehrig’s disease or ALS). Siddharthan Chandran walks through some new techniques using special stem cells that could allow the damaged brain to rebuild faster.<http://www.ted.com/talks/siddharthan_chandran_can_the_damaged_brain_repair_itself>   **Textbooks:**   * Kasschau, R.A. (2002) Understanding Psychology. New York: Glencoe/McGraw-Hill School Publishing Co.   **Websites:**   * Brain Facts Learn the basics of how the brain’s 100 billion nerve cells are born, grow, connect, and function. Neuroanatomy; Cell Communication; Brain Development.<http://www.brainfacts.org> * Traumatic Brain Injury – TBI & Head Injury Resource  Traumatic brain injury resource. Brain injury facts, information, symptoms and support. Resources for preventing, treating, and living with brain injury.<http://www.brainline.org> * Kids Health KidsHealth is the #1 most-trusted source for physician-reviewed information and advice on children’s health and parenting issues. For parents, kids, teens.<http://kidshealth.org> * Neuroscience for Kids Lessons and ideas for “making” a neuron<http://faculty.washington.edu/chudler/chmodel.html> * Neuroscience for Kids Game: NEUROJEOPARDY<http://faculty.washington.edu/chudler/jeopardy.html> * The Secret Life of the Brain : Scanning the Brain The Secret Life of the Brain on PBS … brain scanning technologies and an illustrated history of brain science.<http://www.pbs.org/wnet/brain/scanning/index.html> * Teacher Enrichment Initiatives – Health Science Curriculum  The Teacher Enrichment Initiatives (TEI) The Teacher Enrichment Initiatives (TEI) involve partnerships between faculty and staff of the University of Texas Health Science Center<http://teachhealthk-12.uthscsa.edu> |
| **Additional Required Components** | |
| **English Language Proficiency Standards (ELPS) Strategies** | * Word wall * Frayer Model * Example/Non-example * Problems/solutions |
| **College and Career Readiness Connection[[1]](#footnote-1)** |  |
| **Recommended Strategies** | |
| **Reading Strategies** | **Current Events:** Assign students to read about the brain. Information can be found in newspaper articles, magazines, journals and online print.  Suggestions:  Magazine cover stories about the brain include:   * “A Thing or Two About Twins,” National Geographic, January 2012 * “The Neuroscience of Identity,” Scientific American, March 2012 * “Teenage Brain,” National Geographic, October 2011 * “The Unlocked Mind,” Discover magazine, March 2011 * “The Brain’s Dark Energy Brain,” Scientific American, March 2010 * “Our Mind-Boggling Brain,” American Scholar magazine, Winter 2010 * “Merging Man and Machine,” National Geographic, January 2010 * Use brainline.org for information and videos about traumatic brain injuries.<http://www.brainline.org/multimedia/interactive_brain/the_human_brain.html> * WebMD Article Gabrielle Giffords’ Brain Injury: FAQ<http://www.webmd.com/brain/news/20110109/gabrielle-giffords-brain-injury-faq> * Current Events – students research using the internet, articles about brain research and write a summary using Problem-Solution format. * Allow students to research for and select articles about topics discussed in this lesson. * Encourage the pre-reading skill of “prediction” as students complete research for their Independent Practice projects. Have them read the titles/subtitles and “predict” what may be contained in the article prior to reading. Predictions may be recorded and compared to their actual findings. |
| **Quotes** | Brain: an apparatus with which we think we think. **-Ambrose Bierce**    That’s your best friend and your worst enemy – your own brain. **-Fred Durst**  Sleep deprivation is the most common brain impairment. **-William C. Dement**  Any man who reads too much and uses his own brain too little falls into lazy habits of thinking. **-Albert Einsten**  The brain is like a muscle. When it is in use we feel very good. Understanding is joyous. **-Carl Sagan** |
| **Writing Strategies** | **Journal Entries:**   * Why is it important to understand the brain and the nervous system? * List three facts that you have learned about the brain and nervous system that you think are important or interesting. * What type of nerve disorders are you familiar with? * Understanding the nervous system and brain will provide us with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * The brain can be imaged by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   **Writing Strategy:**   * Students could submit 3 or 4 questions (including answers) that would be included on a test. |
| **Communication 90 Second Speech Topics** | **Speech Topics:**   * Choose a section of the brain and explain what functions it is responsible for. * Why is it important for older people to participate in “brain games”? * How do you think your life would change if you suffered from a brain injury? |
| **Other Essential Lesson Components** | |
| **Enrichment activity** | * Students can use the Internet to find articles relating to brain injury and research and write a summary using Current Event * Students can use technology to research careers dealing with brain disorders. * Students could research and participate in “brain games.” * Research various types of brain injuries and the result of those injuries. * See service learning suggestions * Extended research of a lesson topic such as brain injury.   Human Services Counseling and Mental Health Math Assessment Problems:  Question 3. Jesse wants to purchase workbooks for each member of the counseling groups he facilitates. The book costs $25 each when bought individually. If he buys more than 10, he can get a 15% discount and free shipping. Not including sales tax, how much will it cost to buy 14 books?  a. $ 21.25  b. $212.50  c. $297.50  d. $358.25  Answer: C  **TED Talks:**  TED is a nonprofit devoted to spreading ideas, usually in the form of short, powerful talks (18 minutes or less). The video below is related to this lesson. Allow students to view the video and lead a discussion concerning the TED Talk.   * Siddharthan Chandran: Can the damaged brain repair itself? After a traumatic brain injury, it sometimes happens that the brain can repair itself, building new brain cells to replace damaged ones. But the repair doesn’t happen quickly enough to allow recovery from degenerative conditions like motor neuron disease (also known as Lou Gehrig’s disease or ALS). Siddharthan Chandran walks through some new techniques using special stem cells that could allow the damaged brain to rebuild faster.<http://www.ted.com/talks/siddharthan_chandran_can_the_damaged_brain_repair_itself> |
| **Family/Community Connection** | **Guest speakers:**   * Neurologist * Physical therapist who works with brain injuries * Family member of brain injury patient * Recognize Brain Awareness Week (March 11 – 17). Brain Awareness Week (BAW) is a nationwide effort organized by the Dana Alliance for Brain Initiatives and the Society for Neuroscience to promote the public and personal benefits of brain research.  See: <http://faculty.washington.edu/chudler/baw.html> |
| **CTSO connection** | **Family, Career, Community Leaders of America (FCCLA)**  <http://www.texasfccla.org/>  **STAR Events**   * Career Investigation: An individual event – recognizes participants for their ability to perform self-assessments, research and explore a career, set career goals, create a plan for achieving goals, and describe the relationship of Family and Consumer Sciences coursework to the selected career. * Illustrated Talk: An individual or team event – recognizes participants who make an oral presentation about issues concerning Family and Consumer Sciences and/or related occupations. Participants use visuals to illustrate content of the presentation. |
| **Service Learning Projects** | Successful service learning project ideas originate from student concerns and needs. Allow students to brainstorm about service projects pertaining to lesson. For additional information on service learning see<http://www.nylc.org>   * Students could participate in a service project for a rehabilitation center that specializes in head trauma. Project would depend on the needs of the facility. * Students could help raise funds for someone from the community that may have suffered from a brain injury. Person might be a soldier that has returned from the Middle East. |

1. Visit the Texas College and Career Readiness Standards at <http://www.thecb.state.tx.us/collegereadiness/CRS.pdf>, Texas Higher Education Coordinating Board (THECB), 2009. [↑](#footnote-ref-1)