



UNIVERSITY OF
NEW ENGLAND

Center for Excellence
in the Neurosciences

Therapeutic Interventions for Brain Injury

Grades 6-12

Driving Question: How can brain injuries affect our day-to-day routines, and what are interventions that can assist people to succeed in their daily occupations?

Objectives: Students will be able to...

- Define and describe the roles of different therapies used for brain injury intervention.
- Define the term *occupation* and describe how it can be impaired due to brain injury.
- Create or change objects that can assist people with disabilities due to brain injury.

Next Generation Science Standards:

- MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

Materials:

- Paper
- Pens or pencils

Procedure:

Engage: Ask the students the following questions:

- On a piece of paper, have the students draw or write the routine they would have during a normal day.
- Ask them to describe how their days would be impacted if they couldn't walk, reach, drive, speak, etc.

Explore:

- Discuss the word *occupation*
- Create a Venn Diagram of occupational and physical therapy
- Occupation demonstration
- Read and answer case study questions
- Answer a Global Challenge

Explain:

- Discussion of Occupation: **Occupation:** "...occupations refer to the everyday activities that people do as individuals, in families and with communities to occupy time and bring meaning and purpose to life. Occupations include things people need to, want to and are expected to do."
- Discuss the similarities and differences between occupational and physical therapy using the Venn Diagram.
 - First, allow the students to brainstorm the definition of occupational therapy and physical therapy. Resources:
 - <http://www.aota.org/about-occupational-therapy.aspx>
 - <http://www.apta.org/AboutPTs/>

| Occupational Therapy | Both | Physical Therapy |
|---|--|--|
| - Focused on evaluating and improving a person's functional abilities. - Teaches how to live with an injury and how to improve and carry out daily tasks . - Has holistic approach. - Uses activities of daily living (ADLs) | - Optimizes a person's independence . - Directly treat injuries - Trained in anatomy and the musculoskeletal system. - Teach people how to prevent injury. | - Focused on evaluating and diagnosing movement dysfunction. - Focuses on the injury and treating the injury. - A more anatomical and physiological approach. |

- Occupation Demonstration
 - Ask for a student volunteer.
 - Tell the student to sit on a chair and hand him or her a t-shirt.
 - Tell the student volunteer to put on the t-shirt with only one hand as if he or she is paralyzed in one arm.
 - After the student puts on the t-shirt, have him or her discuss the difficulty of the task.
 - Talk about how people with disabilities may struggle with simple tasks like dressing.
- Case study questions:
 - Read or have another student read aloud the case study. Then answer and discuss the following questions:
 - Allow the students to define **stroke**: The sudden death of brain cells in a localized area due to inadequate blood flow.
 - What are Louise's daily occupations?
 - Dressing, hygiene, pet care, walking, preparing food, eating, driving, etc.
 - How does the paralysis of her right arm and leg affect the occupations? What tasks might be difficult?
 - Reaching for items, lifting items, driving with one hand, getting dressed, walking, etc.
 - What would an occupational therapist do to assist Louise?
 - Teaching her how to dress with one arm, evaluating her house for wheelchair accessibility, giving her adaptive tools to perform activities, etc.
 - What would a physical therapist do to assist Louise?
 - Strength interventions, movement exercises, increase stamina, etc.
- Global Challenge: explain the breadth and depth of disability in our world today.
 - Disability can be temporary or permanent; you can be born with it and/or acquire it.
 - What are different kinds of disabilities?
 - Physical, mental, emotional

- What does our society do in order to include people living with disabilities?
 - The United States has made laws such as ADA (Americans with Disabilities Act), IDEA (Individuals with Disabilities Education Act), and the Rehabilitation Act. Many of the structures built also have **universal design** so that nearly all people are able to use and access buildings.
 - Universal Design: refers to broad-spectrum ideas meant to produce buildings, products and environments that are inherently accessible to older people, people without disabilities, and people with disabilities.
- What can we do to include people with disabilities in the workforce?
 - Universal design is how most buildings are built today and they are being restructured to accommodate people with disabilities. Also, there are laws to create equal opportunities for people with disabilities in the workforce. They are part of the ADA and other laws.
- Consider different cultures. How are people with disabilities in other cultures treated than those in America?
 - Depending on the country, disability is accepted in various ways. In the USA, we try to accommodate disability and provide the same opportunities as able-bodied people. In other countries, such as Ghana, people with disabilities are shunned to be beggars for the rest of their life because they cannot contribute to society.

Elaborate:

- Discussion of Occupation:
 - Name some occupations you do everyday.
 - What occupations do you perform when getting ready in the morning?
- Venn Diagram video resources:
 - <https://www.youtube.com/watch?v=GQnOhpD2vhl>
 - https://www.youtube.com/watch?v=VGvVyOHeJ_s
- Occupation Demonstration
 - Instead of a t-shirt, use a shoe and have the student put it on with one hand and tie it.

- Use any other type of activity such as writing or putting on a sock.
- Change the disability to one where the student can't communicate with words and have him or her give another student directions to the bathroom or a task.
- Global Challenge
 - This video is one minute long and encompasses the viewpoint of someone in a wheelchair who traveled around the world.
 - Pay close attention to the limitations that person faced when traveling.
 - Was he able to go to all the attractions easily? What made it difficult? Was he able to travel on his own?
 - Watch and discuss the following YouTube video: **Travel for All: Around the World in a Wheelchair**
 - <https://www.youtube.com/watch?v=TA4ryRbZeMM>
 - Discuss universal design. What are ways that we create universal design and how can it be improved?

Evaluate:

- Did the CEN Outreach volunteer teach the student objectives?
- Did the CEN Outreach program reach the goals of the teacher?
- Did the CEN Outreach program reach it's own goals/objectives?

Resources:

<http://medical-dictionary.thefreedictionary.com/stroke>

<http://physicaltherapyweb.com/differences-occupational-therapy-physical-therapy/>

<http://www.wfot.org/AboutUs/AboutOccupationalTherapy/DefinitionofOccupationalTherapy.aspx>

NGSS Description:

- MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

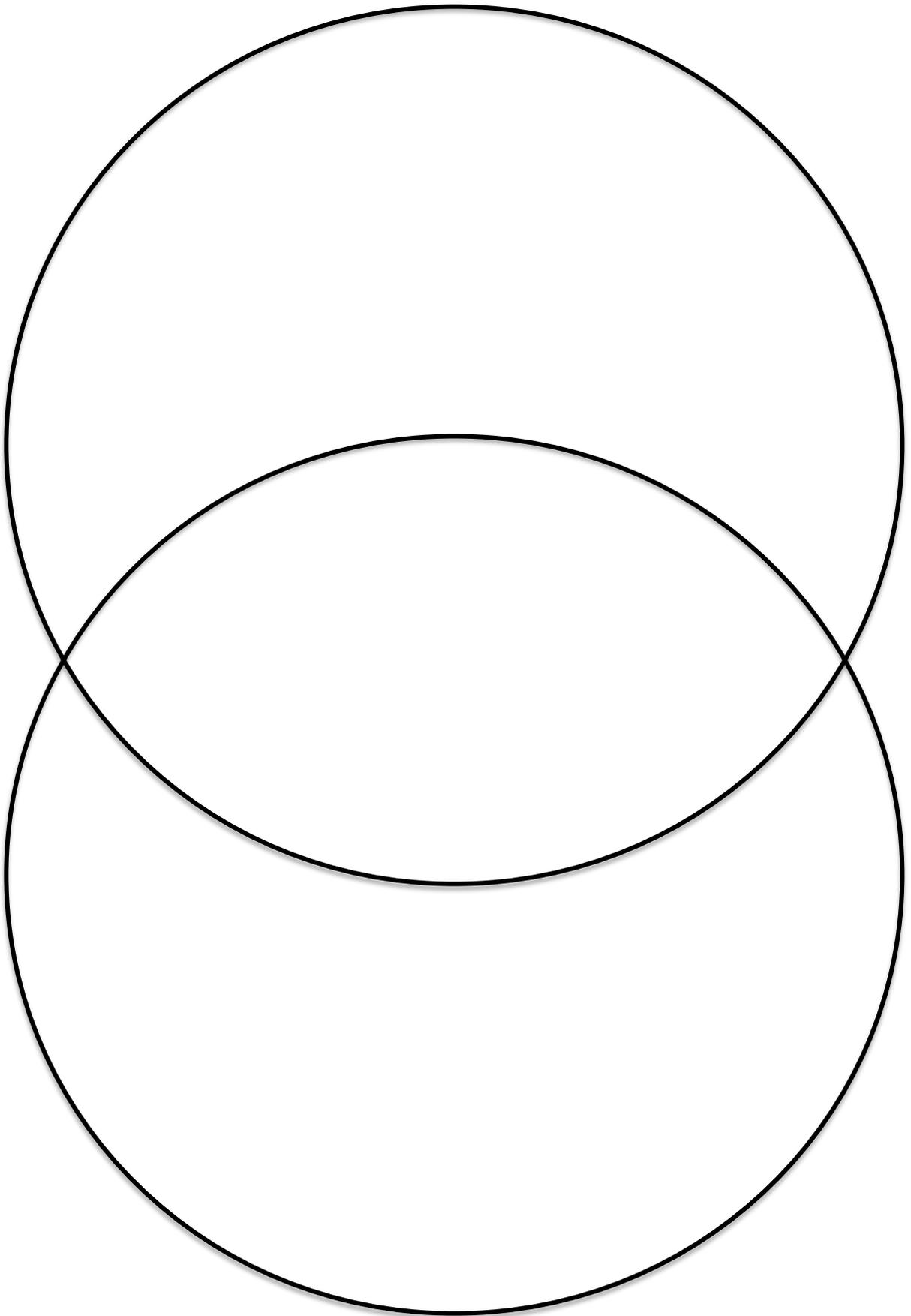
Students will demonstrate MS-ETS1-2 when they discuss universal design and compare different ways that our society makes buildings accessible to people with disabilities.

- HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

Students will demonstrate HS-ETS1-1 when they learn about disability in different cultures by comparing the cultures to their own.

Case Study:

Louise is an 86-year-old woman living independently in her lifelong home. Every morning she steps out of bed, opens her closet doors, reaches for a dress to wear and then brushes her teeth. Next, Louise walks downstairs, reaches down to pick up the food bowl off the floor to feed her cat, and goes for a brisk walk. When she returns home she prepares breakfast in her small kitchen and sets the table to eat. Louise uses her strength to open a can of fruit she retrieved from the fridge. After eating she cleans the kitchen and then drives to her local library where she volunteers. One day Louise experienced an unexpected stroke that left her brain severely damaged. The left region of the brain that contributes to motor control (movement) was damaged and caused paralysis of her right arm and leg. Louise's life has taken a sudden change and she will need the help of an occupational and physical therapist to adapt.



Adaptive Equipment Examples

