**Design Document**

**Goals and Objectives of Instruction:**

**Learning Objective:**  Students will learn that structure relates to function. Organs and organ systems function together to provide homeostasis in organisms. The functioning of organs depends upon multiple organ systems.

**Standard 3: Students will understand the relationship between structure and function of organs and organ systems.**

Objective 1: Describe the structure and function of organs.

1. Relate the structure of organs to the function of organs.
2. Compare the structure and function of organs in one organism to the structure and function of  organs in another organism.
3. Research and report on technological developments related to organs.

Objective 2: Describe the relationship between structure and function of organ systems in Humans and other animals.

1. Relate the function of an organ to the function of an organ system.
2. Describe the structure and function of various organ systems (i.e., digestion, respiration,  circulation, protection and support, nervous) and how these systems contribute to homeostasis of  the organism.

**Prerequisites and Learner characteristics:**

Students in my Biology classes are taking Biology to earn a Core science credit toward graduation. According to the student survey that I administered to my Biology classes (see analysis document), students have a desire to do well in school. Their parents expect them to do well in school and most say that they do well in their classes. Most of my students (between 75% - 82%) have GPA’s of above 2.0, 60% are above 3.0. Most have taken the CRT, of those who took the CRT last year 86% were 3 or 4, which is considered proficient in Science. Most students intend to take Chemistry next year, and intend on going to College after graduation.

**Testing and Evaluation:**

Some testing and evaluation strategies that I will use during these lessons are:

* Pre-test to assess prior knowledge
* Compare and contrast body systems having similar functions in humans and other organism
* Quizzes: frequent quizzes to assess understanding of new material and to guide instruction
* Formative evaluation: daily check points and review with discussion to guide instruction.
* Project : Rubric
* End of unit test: to assess learning

**Feedback mechanisms and practice activities**

* Guided learning: re-teaching when needed.
* Practice test and review sheets on line
* Internet links to tutorials on my class Weebly site, which teach about body systems.
* Daily assignments and worksheets to assess learning, and inform instruction.
* Class discussion: formative assessment to identify gaps in learning.
* Body mapping for all of the body systems studied.
* Explain models of body systems,
* Compare and contrast body systems in different organisms
* Diagram and label body systems studied

**Introductory presentation of instruction**

* Demonstration of distortion glasses
* Invitation to learning: What is happening with our vision when we put on the glasses, what is happening to the brain, what will happen to our vision if it is altered for an extended time period.
* Talk about the nervous system; eyes are sensory organs, and how the brain processes information from the nervous system
* Have several students try the glasses and then see how it affects them.

**Motivational Strategies**

* Class simulates the way neurons work at a neuromuscular junction, by role-playing different chemicals and receptors.
* Students will work with partners to test their cranial nerve function.
* Students will work with partners to test reaction time and measure speed of an impulse.
* Students will test different parts of the skin to determine the distance that neurons are located from each other.
* Students will work with a partner(s) to produce a brochure, PowerPoint presentation, poster, newsletter, that explains one of the components of the nervous system, or diseases of the nervous system (sensory organs, brain, spinal cord, etc.), how injuries to the nervous system will affect them. They will share their project with the class.  **Language Arts**

**Basic plans for instructor materials**

* Book the computer lab or mobile lab for students to create product
* Assemble materials and practice Demonstration
* Assemble materials for cranial nerve testing
* Assemble materials for reaction time testing
* Assemble materials for skin receptor testing
* Assemble materials for modeling neuromuscular junctions
* Print neuron map worksheet
* Print brain map worksheet
* Check out video: *Secrets of the Teenage Brain*
* Make worksheet for the teenage brain worksheet
* Preview PowerPoint lectures and edit if needed
* Bring in brain model, eye model from lab room
* Develop rubric to grade project
* Print worksheets and other materials needed.

**Curriculum Map – Scope and Sequence**

**Lesson 1 –**

* Pretest: Nervous System; 15 – 20 questions
* KWL about nervous system
* Demonstrate “distortion glasses”
* Notes: Neurons
* Book assignment: neurons and their function

**Lesson 2 –**

* Go over book assignments to assess understanding
* Class role play: neuron function and neuromuscular junctions
* Clicker quiz: neurons their structures and how they function
* Lab: Cranial Nerve Testing
* Class discussion of what they learned during the lab;
* Turn in lab report

**Lesson 3-**

* Quick quiz : sequence nerve impulse transmission
* Read article about how injuries to the brain have helped scientists develop a map of the brain
* Brain mapping activity
* Homework: 31.2; due next class

**Lesson 4 –**

* Hand in homework
* Think pair share about events that make their heart race
* Notes: sympathetic and parasympathetic nervous system
* Fight or Flight need quick responses
* Lab: Measuring Reaction Time; convert distance to time in milliseconds
* Go over lab and turn in a lab report

**Lesson 5 –**

* Clicker quiz: sympathetic and parasympathetic nervous system
* Describe color to a blind person, describe the taste of salt to someone who has never tasted it before.
* Blind folded taste testing to demonstrate how multiple sense organs are involved in detecting nervous stimuli.
* Skin receptor testing; determine locations on the body that are more sensitive to touch; where touch receptors are closer together.