## Non-linguistic Strategies Learning Experience Plan

Subject: Biology Grade level: 8

Unit: The Endocrine System Theme: Fear

Topic: The “Flight-or-Fight” Response Lab Experiment

Content Standards:

**Standard 1:** Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

**Standard 4:** Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development in ideas in science.

**Standard 6:** Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.

Literacy Standards (Grade Level 6-8):

**R2.** Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

**R3.** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

**R4.** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6– 8 texts and topics*.

**R6.** Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.

**R7.** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

**R9.** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

**W2.** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

a)Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.

b) Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

c) Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

d) Use precise language and domain-specific vocabulary to inform about or explain the topic.

f) Establish and maintain a formal style and objective tone.

e) Provide a concluding statement or section that follows from and supports the information or explanation presented.

**W4.** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

**W7:** Conduct short as well as more sustained research projects based on focused questions,demonstrating understanding of the subject under investigation.

**W9.** Draw evidence from informational texts to support analysis, reflection, and research.

**Theme and Lesson Description/Relevance to 8th Graders:**

Everyone experiences fear. Fear of whatever or whoever it may be is expressed in many ways. This theme explores the different effects fear has on the body, both physically and psychologically. On a day-to-day basis we experience anxiety due to exposure to stressors.  Fear tends to lead to irrational thinking, or not being able to think or act at all as well as anxiety. At the end of this theme students will be expected to answer: How can we gain control over our fear(s)? This particular lesson is designed to allow students to connect math and science and become familiar with creating graphs and other mathematical data to experimental results. Because we have already discussed the symptoms of the “flight-or-fight” response, students will know what to expect but will also verify the information given to them by mimicking the response. They will do this by running and recording their heartbeat rate. Heartbeat rate can be measured by counting the beats per minute (simply putting pressure below the jaw line or wrist and counting each pump felt in one minute). They will do several trials, one at resting heartbeat (the control) in which will be compared to the independent and dependent variables. The dependent variable is the heartbeat rate during running, jogging, and while the student views “scary” content. I do not want to truly scare my students, so I will use PG-13 content! (NOTE: At this point, students have already completed several experiments and know what the scientific method is and should be able to define terms such as control, dependent variable, and independent variable. By discussing fear and its expression in the brain and body, students will have a better understanding on why they feel scared at certain times or from certain things, people, or places. This will hopefully give them confidence and knowledge to tackle their fears and develop into stronger minded people and become fear*less* (yet cautious and inquisitive) of the world around them.

**This Lesson’s Connection with *Some* of the 21st Century Skills Middle Schoolers are Learning:**

* *Collaborate with others; use teamwork*:
  + Students can bounce ideas off of each other during a possible class discussion. Disrespect towards others during class will not be tolerated. Students will work together in pairs recording data off of each other as well as taking turns performing each experiment. They will learn to work effectively because they will be timing each trial.
* *Think critically:*
  + Students will be developing critical thinking skills by converting their data into graphs, which they then have to interpret and summarize in their lab reports.
* *Be autonomous:*
  + Students will work independently on their lab reports. This assignment will be due a week later.
* *Ask questions (be inquisitive)*:
  + Students will be encouraged to ask questions relevant to the material by participating in or initiating class discussions before, during, and after the direct instruction part of the lesson. They are also eliciting the “purpose” for the experiment. In addition, they are going through the scientific process as they complete the experiment.
* *Become aware and informed of current events:*
  + Students will personally become aware the physical effects stress and fear has on the body. They will connect this experiment’s results with personal experiences and/or other ideas.
* *Collect research and information from credible sources to use in expository writing*:
  + Students will cite evidence from their own findings (their results) to base their lab report on. They will mention this and all of the other aspects of the scientific method in their lab reports.

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| **Learning Experience Outcomes**  Students will:   * Follow the scientific method in a lab experiment * Follow directions in a procedure * Determine heart rate of their partner * Convert technical information into a bar graph * Compare heart rate when running to heart rate when jogging. * Connect that comparison to intensity of response. * Create examples of when a person could be doing either during a possible flight-or-fight response. * Investigate heart rate during a mimicked “flight-or-fight” response. * Summarize their findings in their lab reports * Connect their results to any personal experiences or observations outside the classroom * Relate the experiment’s importance by identifying the purpose * Record all results and observations in the experiment. | | | **Learning Experience Assessments**   * Lab Report * Ability to work together – assessed through observation and accuracy of results * At least one graph and its interpretation per group will be collected at the end of class. This allows the teacher to know what to expect on their lab reports. | |
| **Differentiation –** for lab report, working in pairs | | | | |
| **Approaching**  Students with the poorest math skills will work with stronger students; Each team of two will be assigned based on strengths and weaknesses known by the teacher. In addition, these students will find the lab report guide especially helpful in writing their report. | | **On-level**  Students already on the level will be supplement their learning by reading past notes to include background information on the lab report which will not be due until a week after. | | **Beyond**  Students beyond the standards may be expected to start their lab reports during class time. |
| **Curriculum Integration**  Math, Psychology | | | | |
| **Materials/Resources/Timing** | **Procedures/Strategies** | | | |
| - Chalk/White board  - Timers/Stopwatches  - The gym  - Lab report rubric  - Graph paper  - Lab Report Guide handout  - Scary pictures (choose one)  5-7 minutes  1 minute  2 minutes  5 minutes  5 minutes  5 minutes  10-20 minutes  5 minutes  Homework | **Sponge Activity** (activity that will be done as students enter the room to get them into the mindset of the concept to be learned)   |  |  | | --- | --- | | Definition: *An automatic response to an experience that is perceived to be a threat to survival. The part of the brain that regulates metabolic and autonomic function and prepares muscles to act -- to either flee or fight. This survival mechanism works well when the situation allows for an active response.* | Physical Effects:  *Sweating, raised blood pressure, released hormones (adrenaline)* | | Examples:  *Running from an attacker, natural disaster, stress* | Specific Body Parts Affected:  *Heart, skin, body temperature, throat (lump-feeling in throat) blood vessels* |   As students are walking into class, a blank definition frame with “flight-or-fight” response in the middle will be up on the board with directions to complete it in their notebooks. This should take about 5-7 minutes.  Completed Definition Frame (Frayer Model) is displayed here:  **Flight-or-Fight Response**  **Anticipatory Set** (focus question/s that will be used to get students thinking about the day’s lesson)  Student elicited possible aims:  *How can we discover more about the effects of the “flight-or-fight” response to the body?*  *How does the “flight-or-fight” response show in a person?*  *How can we mimic the “flight-or-fight” response to investigate its effects on the body?*  **Activating Prior Knowledge** (what information will be shared with/among students to connect to prior knowledge/experience)  *Do-Now: Which body system is associated with this response?*  A: Nervous and Endocrine are the main systems, but through them the response affects almost the entire body including blood vessels (circulatory system).  **Direct Instruction** (input, modeling, check for understanding)  Today we will be performing an experiment that tests our heartrate while we mimic the flight-or fight response.  Q: How can we mimic this response? How can we do this without literally stressing or scaring ourselves based the effects we already know?  A: We can run, or jog (flight response)  Q: How can we mimic the “fight” response?  A: We can watch a scary movie.  There is no time to watch a scary movie, but students will investigate one of the known effects on the body from the flight-or-fight response (heart rate in beats per minute) from the following trials:   1. Resting heart rate – The control. 2. Heart rate while running – Dependent variable 1. 3. Heart rate while jogging – Dependent variable 2. 4. Heart rate while looking at scary picture – Dependent variable 3.   Students are shown how to take the pulse of their partner (Gently press index and middle finger together on wrist of partner and count each pump which is considered the heartbeat.)  They will also be shown how to use the stopwatch properly.  Q: Why are we measuring heart rate here?  A: Because there is an artery there and arteries carry blood from the heart.  At this point, students will connect with their partner, gather necessary materials (stopwatch, notebooks and lab report guide and a pencil) and head to the gym where they spread out with their partner and begin their trials. While at the gym, students will be told the rules when they are to begin their running and jogging trials.  **Guided Practice** (how students will demonstrate their grasp of new learning)  Students are given a maximum of 15 minutes to complete the procedure. As they do each step, they also complete answers in their lab report guide.  As the students are doing their lab experiment, they will record results and observations in their notebooks as well as the lab report guide worksheet. The worksheet functions as a guide for when they actually write the report.  The teacher keeps as close an eye as possible on the students and walks around to help and observe.  **Closure** (action/statement by teacher designed to bring lesson presentation to an appropriate close)  *“On a separate graph paper with you and your partner’s name on it, draw at least the graph displaying your results. In one-three sentences, explain the graph. Do you see a pattern?”*  Here, students will be asked for a preview of their lab reports by showing part of their results. They will be collected at the end of class. They will be allowed to work with their partner here, but lab reports will be graded individually.  Q: Why is the resting heart rate considered the control in this experiment?  A: Because it will be compared to the dependent variables. This is the normal heart rate of the person when they are not in the flight-or-fight response.  Q: Why are trials 2 and 3 considered the dependent variable? What is the variable and what does it depend on?  A: The variables are the heart rates and they depend on the intensity of the person running or jogging.  **Independent Practice** (what students will do to reinforce learning of the lesson)  The “Thought Questions” on the lab report guide. The lab report is an assignment to be independently worked on outside of class. Students will know that a lab report will be expected throughout the entire class time. (Please see rubric.)  **NOTE:** *We probably will not have enough time to trek back to the classroom, so class will end in the gym and all students will be told to take all their belongings with them before they have left the classroom. Gym “procedures” (rules) will be announced before leaving to go to the gym.* | | | |