5E Lesson Plan (NGSS)

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| **Teacher:** |
| **Date:** |
| **Subject / grade level:** Science, Grade 7, Lesson # |
| **Topic:** How does Physical Activity affect the Pulse Rate |
| **Materials:**  Computer, COSMOS Technology Toolkit, Handouts |
| **Essential Question(s):**  How do environmental conditions affect the survival of living organisms? Why are cells considered the smallest units of life? |
| **New York State P-12 Science Learning Standards (NGSS):**  **MS-LS1-3**. Construct an explanation supported by evidence for how the body is composed of interacting systems consisting of cells, tissues, and organs working together to maintain homeostasis.   |  |  |  | | --- | --- | --- | | **Science & Engineering Practices (SEPs)** | **Disciplinary Core Ideas (DCIs)** | **Crosscutting Concepts (CCs)** | | **Developing and Using Models**  Modeling in 6–8 builds on K–5 and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.  **Obtaining, Evaluating, and Communicating Information**  Obtaining, evaluating, and communicating information in 6-8 builds on K-5 and progresses to evaluating the merit and validity of ideas and methods.  **Constructing Explanations and Designing Solutions**  Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students’ own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (MS-LS1-3) | **LS1.A: Structure and Function**  In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3) | **Cause and Effect**  Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8)  **Scale, Proportion, and Quantity**  Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1)  **Systems and System Models**  Systems may interact with other systems; they may have subsystems and be a part of larger complex  systems. (MS-LS1-3)  **Structure and Function**  Complex and microscopic structures and systems can be visualized, modeled, and used to describe how  their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function.  (MS-LS1-2) |   **Common Core State Standards (CCSS):**  **SL.8.5** Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.  **RST.6-8.9** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text or prepared information on the same topic. |
| **Lesson Topic:** How does physical activity affect the pulse rate  **Learning Target:** I will:   * Perform an activity to show how physical activity affects the pulse rate |
| **Differentiation strategies to meet diverse learner needs:**   * **Bodily kinesthetic learners** - Local and Express demonstration hands-on activity * **Audio and Visual learners** – Slide show, Visual representation of activity using computer, transmitter and receiver, The observations/data collected throughout the activity * **ELL/Low reader** - Guided notes printed for those who require them * **Technology**- Utilizing COSMOS Technology Tool Kit, heart rate sensor, timer * **Extended time** for those who require it * **Small groups** according to levels, behavioral needs, and activity requirements |
| **ENGAGEMENT**   1. Discussion Question(s)  * Are your heart rate and your pulse rate the same thing? * Where on your body can you feel your pulse rate?  1. Teacher will use a short slide-show to explain how the heartbeat causes your pulse |
| **EXPLORATION**   1. Students will view a short slide show to introduce the lesson. Materials & equipment are set up on student’s desks. Students are in small groups & will assign roles to each other for the activity, e.g. note taker, reader etc. One student will read out loud from the handout and the group will perform the activity. 2. Activity: 3. Teacher will supervise students as they perform the activity using the COSMOS Technology Toolkit and heart rate monitor 4. Students will work in groups of 2. First student will sit and attach the heart rate monitor. Once the sensor is properly attached it will detect your pulse rate. Have your partner start the timer and monitor for 1 minute. The reading will be recorded on the COSMOS Technology Toolkit. Record the readings in the table entitled “Pulse Rate” 5. Stand and jog in place for 1 minute (with the heart rate monitor attached). The partner will again time for 1 minute. The readings will be displayed on the COSMOS Technology Toolkit and then be recorded in the able entitled “Pulse Rate” 6. The partners will now exchange roles and follow procedures 1 – 3 above again and record the results in the table. 7. Students will then answer the questions that follow their activity on their handouts. |
| **EXPLANATION**  After students complete their experiment there will be a discussion/share-out with their observations and comments about their activities - facilitated by the teacher. Analyzing information collected on their handout and identifying any errors that may have been made and correct them. Explanation and clarification of what causes the pulse rate and the different factors that can affect the pulse rate. Vocabulary words: *atrium, ventricle, heart beat* |
| **ELABORATION**  Students will extend their knowledge of the human heartbeat and pulse rate by discussing the following question(s):  What should you do if a person complains that they are having heart palpitations (racing heart) before getting them to the hospital? |
| **EVALUATION**   1. Teacher Observation 2. Correctly following procedures 3. Students complete the questions on their handouts |
| **HOMEWORK**  Write 1 paragraph to explain how long can a person survive after his heart stops beating? |