The Heart
Sixth Grade Unit

Unit Summary:
The theme of this unit centers on the structure and function of the heart. It does not attempt to cover every concept related to the heart. Instead, it includes a series of structured and inquiry-based activities that build upon one another, with the early activities being highly structured, and the later activities being more open-ended.

DPS District Standards Addressed:
Science Standard 1: Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.
Science Standard 3.3: Students know and understand how the human body functions in health and disease, factors that influence its structure and function, and how these structures and functions compare with those of other organisms.
Science Standard 7: Students use appropriate technologies to facilitate understanding of scientific concepts, communicate scientific information, and conduct scientific inquiry.
Math Standard 2.3: Describe the connections among representations of patterns and functions, including words, tables, graphs, and symbols.
Math Standard 3.1: Define and analyze the distribution of raw data using mean, median, mode, range, intervals and quartiles.
Math Standard 5.1: Use customary and metric units where appropriate to solve problems that involve measuring length, weight, mass, time, temperature, money; and calculate area, volume and perimeter.
Math Standard 5.2: Demonstrate knowledge of U.S. customary and metric measurements.
Math Standard 6.5: Compute commonly used percentages as they relate to fractions and decimals.

Time: This unit is intended to take between 2-3 weeks to complete, depending on how much time is spent on each activity. Please see schedule tables below.

Activity 1: “Organ Donation”
Students watch the video “Flow”. This video tells the story of a young man who receives a heart transplant and then meets the brother of the donor. It is an emotional story. It may bring up questions or issues about organ donation. After watching the video, students will discuss their reactions to the video as a class. They will then complete the following activity that looks at their opinions about organ donation. Students will assemble data on opinions of all class members and create a histogram.
Time: One or two 45-minute periods or one 90-minute block.
Prerequisite math skills: data collection, constructing a bar graph

Activity 2: “The Heart – What Do You Know?”
Students are asked to complete simple questions that assess what they already know about the heart.
Time: One 45-minute period or less.
Activity 3: “A Measure of the Heart”
This is a structured activity in which students make measurements of sheep hearts. They will measure mass, volume, and length in metric units and practice making unit conversions.
**Time:** Two 45-minute periods or one 90-minute block.
**Prerequisite math skills:** measurement – use of measuring tapes, balance, and graduated cylinders to find length, mass, and volume, unit conversion

Activity 4: “Heart Parts”
This is a structured activity in which students dissect the heart or examine heart models or drawings to identify the parts and trace the route of blood through the heart. The nodes of electrical conductivity in the heart will also be discussed.
**Time:** Two 45-minute periods or one 90-minute block.

Activity 5: “The Rhythm of the Beat”
Students will learn about the pattern created by an electrocardiogram or EKG and take their own EKG. They will use the EKG to calculate heart rate.
**Time:** One or two 45-minute periods or one 90-minute block.

Activity 6: “Pump It Up”
This is a structured activity in which the teacher models how the scientific process would be used to test the hypothesis that exercise causes heart rate to increase.
**Time:** One or two 45-minute periods or 90 minute block
**Prerequisite math skills:** finding the mean or average, addition and subtraction

Activity 7: “Under Pressure”
This is a guided inquiry exercise in which students form a hypothesis about what will happen to their blood pressure after exercise and test their hypothesis.
**Time:** One or two 45-minute periods or 90 minute block
**Prerequisite math skills:** finding the mean or average, addition and subtraction

Activity 8: “Open Heart Inquiry”
This is an open inquiry exercise in which students form new hypotheses about what could affect heart rate (Activity Five). They might choose to investigate the effects of lying down versus standing, ingestion of caffeine or sugar, different intensities of exercise, meditation, etc. The students form hypotheses and design experiments to see if heart rate is affected.
**Time:** Two 45-minute periods or 90 minute block

Activity 9: “Community Connection”
Students either make a poster encouraging organ donation or a poster describing the structure and function of the heart.
**Time:** One or two 45-minute periods or one 90-minute block.

**Assessment**
This is a written assessment based directly on the format and content of the 8th grade CSAP exam in science. It focuses on inquiry skills in the context of a hypothetical experiment on the effect of exercise on how long students can hold your breath.
**Time:** One 45-minute period