HUMAN BODY
SECTION 5-CIRCULATION

STANDARDS:
Students know how blood circulates through the heart chambers, lungs and body, and how carbon dioxide (CO₂) and oxygen (O₂) are exchanged in the lungs and tissues.

Students will record data using appropriate graphic representation (including charts, graphs, and labeled diagrams), and make inferences based on those data.

KEY WORDS:
HEART: The heart pumps blood through the body, delivering food and oxygen to each cell and collecting waste through a system of arteries, veins, and capillaries. The kidneys clean waste from the blood.
BLOOD: In a drop of blood there are 5,000,000 red blood cells to transport oxygen and carbon dioxide and 5000 white blood cells to defend against germs.

MATERIALS:
For the Class
1 Stethoscope

EXPLORE:
HOW OFTEN DOES YOUR HEART BEAT?
HOW DOES EXERCISE AFFECT YOUR HEART?
1. STETHOSCOPE:
Have each student listen to his or her heart with the stethoscope. Listen for 2 distinct sounds (lub-dub) as the blood flows through the atria and ventricles.

2. COMPARING PULSE RATES-RESTING PULSE:
What is the average pulse rate of students while sitting?
The easiest place to feel the pulse is on the side of your neck below your chin.
Watch the clock and count the beats for one minute.
Discuss results. Does everyone have the same heart rate? (no)

3. GRAPH: Have students:
Make a graph showing their ‘resting’ pulse rate.
Use the graph paper at the end of this section.
Graph pulse rates of at least 5 other students, sharing data.

4. PULSE AFTER RUNNING: Have students:
Run around the playground 1 lap.
Stop and find their pulse immediately when you blow a whistle.
Start counting beats on the next whistle. (15 seconds later)
Count the beats for 1 minute. (Blow the whistle after 1 minute.)
Record this ‘active’ pulse rate.

5. Continue to count the pulse every 2 minutes after running until it returns to normal. How long did it take to return to normal?

6. **GRAPH: EXERCISE PULSE RATE**
   *Have students:* Graph their active pulse rate by adding a different color at the end of their resting pulse rate, extending it. Compare their resting and active pulse rates. Discuss.

7. **WHY DOES YOUR HEART BEAT FASTER?**
The heart squirts blood rapidly with each pump, creating the pulse. Running uses energy, creating a greater need for oxygen and food to be delivered to the cells. The heart must work faster to circulate more blood to meet the cells’ needs.

**MATH:**

**HOW MANY TIMES DOES YOUR HEART BEAT A DAY?**

Have students calculate their total number of heart beats a day.
Multiply: 24 hours times 60 minutes = total minutes in a day.
Multiply: Total minutes times their number of heart beats per minute at rest = Total beats per day.

**FINDING THE AVERAGE:** *Have students:*
Find the average pulse rate for 5 students.
(add the 5 pulse rates, then divide the sum by 5)
Compare results with other classmates. Discuss

**NOTE:**
The resting heart rate for adults averages 70 beats per minute (bpm).
Children have smaller hearts that beat faster. A baby’s resting rate is 100 bpm.
Name this body system _________________________________

Label the following parts on the diagram: aorta, arteries, veins, left atrium, valve, left ventricle, septum, vein, right ventricle, valves, right atrium, vein.
(Right and left is relative to the person who ‘owns’ the heart and the opposite of your left and right.)

Write a paragraph explaining how this system helps the body and how it works.

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