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| Title: | Getting to the Heart of Things |
| Grade(s): | 5 |
| Subject(s): | Science |
| Author: | King, Ward, Calhoun, McDaniel |
| Overview: | The teacher will ask students what they know about the heart and how it affects the body. After reviewing this information the students will be asked to participate in a heart rate activity and diagram presentation. |
| Content Standards: | <p>SC(5) 8. Identify major body systems and their functions, including the circulatory system, respiratory system, excretory system, and reproductive system.</p> <p>ELA(5) 7.2 Demonstrating clarity and organization in a composition</p> <p>TC(3-5) 9. Use technology tools to organize, interpret, and display data.</p> <p>TC(3-5) 12. Create a product using digital tools.</p> |
| Local/National Standards: | |
| Primary Learning Objectives: | <p>The student will describe the characteristics of the heart and how it pumps blood throughout the body.</p> <p>The student will:</p> <ul style="list-style-type: none"> • Identify the four chambers of the heart. • Trace the path of blood through the heart and lungs. • Explain where oxygen enters the bloodstream. • Describe how blood is carried through the body. • Compare the functions of arteries, capillaries, and veins. |
| Additional Learning Objectives: | Students will use Microsoft Excel to make graphs of their heart rates. |
| Approximate Duration of Lesson: | 1 Week |
| Materials and Equipment: | Books, magazines, and/or Google search |
| Technology Resources Needed: | Laptop or desktop computer with Microsoft Office, Internet Access, LCD Projector |
| Background/Preparation: | Collect pictures of the heart from different organisms, books and magazines that reinforce healthy heart function. Produce a handout of how to create a graph in Microsoft Excel. |
| Procedures/Activities: | <p>Step 1</p> <ul style="list-style-type: none"> - Ask students what they know about the heart. Create a KWL chart for their answers. - Use pictures to differentiate between a human heart and the hearts of other types of organisms. • Fish, frog, reptile, bird, mammal |

Source for animal heart descriptions and diagrams:
<http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/A/AnimalHearts.html>

- Show internet videos to review the path of blood through the heart and body

3D Animation of the Heart:

<http://www.youtube.com/watch?v=NF68qhyfc0M>

- Step 2** - Show the students a stethoscope. Ask them to give examples of how it might be used. Demonstrate how it is used to listen to the heart and to find heart rates.
 - Demonstrate to students how to determine their heart rate by taking their pulse in their wrist or neck. Count the number of beats in 30 seconds, then double to get beats per minute.
- Step 3** - Have students collect data on their heart rate at rest and after various lengths of activity.
 1. Instruct students to measure their pulse rate while sitting at their desk. Record this measurement in beats per minute at Time 0.
 2. Have students run in place while their partner times them for 15 seconds, 30 seconds, and 60 seconds of activity. After each time period they will take their pulse and record their heart rates for Time 15, 30, and 60 seconds.
 - Have students use the data they collected to create a graph in Excel. Review procedures for creating a line plot (scatter plot) with Length of Exercise on the X axis and Heart Rate on the Y axis.
 - Place a class data table on the board or overhead and tally the resting heart rates in each category for boys and girls.
 - Have students use Excel to create a vertical bar graph comparing the resting heart rates of boys and girls.
 - Discuss the class results. How much did the heart rate increase after each period of exercise? Was the amount of increase the same for boys and girls? What could account for differences? (*Fit individuals usually show less increase in heart rates than individuals who get less exercise. Smaller individuals tend to have faster heart rates than larger individuals in the same condition.*)

Step 4 Have students use the RAFT strategy (attached) to create a Glogster presentation, brochure, or a song to demonstrate what they have learned about the heart.

Attachments: Heart Activity Guide, RAFT Chart, Rubrics

Assessment

SEE RUBRICS Attached

Strategies:

Extension:

- Identify the components of blood.
- Explain where various substances (carbon dioxide, urea, glucose) are added or removed from the bloodstream.
- Identify heart healthy foods.

Remediation:

Provide differential instructions for special needs students; provide pictures/model for the visual learner; provide audio lessons by way of Glogster, Wallwisher, or Prezi

Activity Guide: The Heart

Work with your partner to time your heart rate at rest and after each of the periods of exercise in the table below. Write your heart rate for each period in the table.

Part A: Individual Data

| Length of Exercise (seconds) | Heart Rate (Beats/Minute) |
|------------------------------|---------------------------|
| Resting Heart rate (Time 0) | |
| After 15 seconds of activity | |
| After 30 seconds of activity | |
| After 60 seconds of activity | |

1. For your individual data, when was your heart rate the highest? _____
2. When was your heart rate the lowest? _____
3. What trends have you observed? _____

4. How can you explain the trends? _____

5. Use the data that you collected in Part A to create a line plot graph (scatter plot) in Microsoft Excel showing the effect of exercise on heart rate.
6. Record your resting heart rate (Time 0) on the Class Data Chart on the board.
7. Using the class data, complete the chart for resting heart rates.

Part B: Class Data

| Resting Heart Rates (Beats/min) | Number of students | |
|---------------------------------|--------------------|-------|
| | Boys | Girls |
| 50-59 | | |
| 60-69 | | |
| 70-79 | | |
| 80-89 | | |

8. Use Excel to create a double bar graph (Clustered Column graph in Excel) comparing the resting heart rates of boys and girls.



RAFT Assignments for the Heart

| Role | Audience | Format | Topic |
|---------------|-----------------|---------------|------------------|
| Dr. Oz | TV Audience | Glogster | Heart Matters |
| Writer | Patients | Brochure | Know Your Heart |
| Slim Goodbody | Schools | Song/Rap | Pumping for Life |

Assessment Rubric for Presentation

| CATEGORY | 4 | 3 | 2 | 1 |
|---------------------|--|---|--|---|
| Presentation | Well-rehearsed with smooth delivery that holds audience attention. | Rehearsed with fairly smooth delivery that holds audience attention most of the time. | Delivery not smooth, but able to maintain interest of the audience most of the time. | Delivery not smooth and audience attention often lost. |
| Content | Covers topic in-depth with details and examples. Subject knowledge is excellent. | Includes essential knowledge about the topic. Subject knowledge appears to be good. | Includes essential information about the topic but there are 1-2 factual errors. | Content is minimal OR there are several factual errors. |
| Organization | Content is well organized using headings or bulleted lists to group related material. | Uses headings or bulleted lists to organize, but the overall organization of topics appears flawed. | Content is logically organized for the most part. | There was no clear or logical organizational structure, just lots of facts. |
| Requirements | All requirements are met and exceeded. | All requirements are met. | One requirement was not completely met. | More than one requirement was not completely met. |
| Sources | Source information collected for all graphics, facts and quotes. All documented in desired format. | Source information collected for all graphics, facts and quotes. Most documented in desired format. | Source information collected for graphics, facts and quotes, but not documented in desired format. | Very little or no source information was collected. |

Rubric for Know Your Heart Brochure

| CATEGORY | 4 | 3 | 2 | 1 |
|--|---|---|---|---|
| Writing - Organization | Each section in the brochure has a clear beginning, middle, and end. | Almost all sections of the brochure have a clear beginning, middle and end. | Most sections of the brochure have a clear beginning, middle and end. | Less than half of the sections of the brochure have a clear beginning, middle and end. |
| Writing - Vocabulary | The authors correctly use several new words and define words unfamiliar to the reader. | The authors correctly use a few new words and define words unfamiliar to the reader. | The authors try to use some new vocabulary, but may use 1-2 words incorrectly. | The authors do not incorporate new vocabulary. |
| Content - Accuracy | All facts in the brochure are accurate. | 99-90% of the facts in the brochure are accurate. | 89-80% of the facts in the brochure are accurate. | Fewer than 80% of the facts in the brochure are accurate. |
| Diagram | Clearly shows the circulatory system with all parts color coded and labeled. | Clearly shows the circulatory system with most parts color coded and labeled. | Clearly shows the circulatory system with a few parts color coded and labeled. | vaguely shows the circulatory system with no parts color coded and labeled. |
| Attractiveness & Organization | The brochure has exceptionally attractive formatting and well-organized information. | The brochure has attractive formatting and well-organized information. | The brochure has well-organized information. | The brochure's formatting and organization of material are confusing to the reader. |
| Writing - Mechanics | Capitalization and punctuation are correct throughout the brochure. | Capitalization and punctuation are correct throughout the brochure after feedback from an adult. | There are 1-2 capitalization and/or punctuation errors in the brochure even after feedback from an adult. | There are several capitalization or punctuation errors in the brochure even after feedback from an adult. |
| Spelling & Proofreading | No spelling errors remain after one person other than the typist reads and corrects the brochure. | No more than 1 spelling error remains after one person other than the typist reads and corrects the brochure. | No more than 3 spelling errors remain after one person other than the typist reads and corrects the brochure. | Several spelling errors in the brochure. |

RAFT Rubric (Role, Audience, Format, Topic)

| | 1 | 2 | 3 | 4 |
|--------------------------|--|---|---|--|
| Presentation | Writing is unclear and has gaps or confusions. Essay is marred by numerous errors, which disrupt reader's understanding. | Writing wanders or is somewhat repetitious. Essay contains several sentence errors and mechanical mistakes that may interfere with clarity of ideas. Audience is irritated by errors. | Writing is clear and direct. Essay contains some fragments, run-ons or other errors; occasional mechanical mistakes. Audience is informed. | Writing is fluent and interesting. Essay contains few or no fragments or run-on sentences; rare errors or mechanical mistakes result from risk-taking. It engages and informs audience. |
| Accuracy | The information provided in RAFT is very incomplete and/or has major anachronisms. | The information provided in RAFT has some small inaccuracies, omissions or anachronisms. | The information provided in RAFT is accurate but could use more support or specific details related to subject or time period. | Information & details in RAFT are always accurate and properly reflect information, ideas and themes related to the subject and time period. |
| Perspective | Viewpoint or ideas are sketchy and not drawn from time period. RAFT does not show insight into how characters feel or act during the event(s). | Viewpoint or ideas reflect current concerns rather than time period. RAFT does not show insight into how characters feel during the event(s). | RAFT maintains a reasonably consistent point of view and includes ideas relevant to role and time period played. Character's feelings about the event(s) are evident. | RAFT maintains clear, consistent point of view, tone and ideas relevant to role and time period played. Ideas and information always tied to role and audience of time. Characters are insightfully shown. |
| Focus | RAFT wanders from topic; focus cannot be seen or has many side comments. | Central topic and purpose of RAFTS can be seen, but focus is inconsistent. | RAFT stays largely on topic; its ideas are mostly supported. | RAFT stays on topic, consistently maintains form or type; details and information are included and directly support the purpose. |
| Use of Class Time | Class time used to disrupt others. Class resources are not or inappropriately used. | Class time and resources used to do work for other classes and/or chat with friends. | Class time used mostly effectively to research the era and create coherent stories. | Class time used efficiently and appropriately to research the era and create interesting, well written, stories; extra effort or involvement beyond class. |