WAMC Lab Heart Rate

Math Concept(s): Data Calculations

Source / Text:

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Date: Summer Conference 2023

Attach the following documents:

- Lab Instructions charting and comparing heart rates
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

Be able to check, plot, and chart your heart rate at resting and exercising,

Lab Plan

Lab Title: Heart rate

Prerequisite skills: Students have basic knowledge of knowing how to check pulse (heart rate)

Lab objective: The objective of the lab is to help students gain a practice knowledge of knowing what resting heart rate is workout heart rate needs to be.

To get your pulse. The radial pulse is located on your wrist near the base of your thumb. The carotid pulse is on the side of your throat beside your jaw. Pick which spot is easiest for you to find your pulse. Teacher will time you in a 10-second period, you will count how many beats in that 10 second period of time. Multiply this number by 6 to get the *number of beats per minute* for your heart. Write the number of beats per minute as your "resting pulse rate." Teacher will time you one minute as you run in place. Immediately after the teacher will time again for a 10-second period and you count the beats. Multiply this number by 6 to get the beats per minute. Record the number of beats as your "exercising pulse rate." Rest for three minutes. Teacher will count for a 10-second period, Multiply this number by 6 to get the beats per minute. Record this number as your "recovery pulse rate." Teacher will do this again after two more minutes and then again three minutes later. Record all the data for each class member on the board in a table with headings for "resting pulse rate," exercising pulse rate," and "recovery pulse rate."

Standards: *(Note SPECIFIC relationship to Science, Technology, and/or Engineering)*

Mathematics K–12 Learning Standards

HSS-ID.A.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

Standards for Mathematical Practice:

1. Make sense of of problems and persevere in solving them
4. Model with mathematics
- 6. Attend to precision

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- SL.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners
- SL.1.B Work with peers and to set rules for collegial discussions and decision making
- SL.1.C Propel conversations by posing and responding to questions that relate to the current information

K-12 Science Standards

- HS-PS2 Motion and Stability
- HS-PS3 Energy

Technology

5. Computational Thinker. Students develop and employ strategies for understanding problems in ways that leverage the power of technology.

5.b Students collect data or identify relevant data sets, use digital tools to analyze them and represent data in various ways to facilitate problem solving and decision making.

Engineering

- HS-PS2 Motion and Stability
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Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

☐ Global Awareness ☐ Financial/Economic/Business/Entrepreneurial Literacy ☐ Civic Literacy
☐ Health/Safety Literacy ☐ Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION
Creativity and Innovation
☐ Think Creatively
☐ Work Creatively with Others
☐ Implement Innovations
Critical Thinking and Problem Solving
☐ Reason Effectively
☐ Use Systems Thinking
☐ Make Judgments and Decisions
☐ Solve Problems
Communication and Collaboration
☐ Communicate Clearly
☐ Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS
Information Literacy
☐ Access and Evaluate Information
☐ Use and manage Information
Media Literacy
☐ Analyze Media
☐ Create Media Products
Information, Communications and Technology (ICT Literacy)
☐ Apply Technology Effectively

LIFE & CAREER SKILLS
Flexibility and Adaptability
☐ Adapt to Change
☐ Be Flexible
Initiative and Self-Direction
☐ Manage Goals and Time
☐ Work Independently
☐ Be Self-Directed Learners
Social and Cross-Cultural
☐ Interact Effectively with Others
☐ Work Effectively in Diverse Teams

Productivity and Accountability
☐ Manage Projects
☐ Produce Results
Leadership and Responsibility
☐ Guide and Lead Others
☐ Be Responsible to Others

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Paper
- Pencil/Pen
- Phone or stop watch for timing

Set-Up Required:

- Room big enough so students can move
- Gym or weight room might be best
- Track or field outside would work also

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Each person taking ownership for writing down their information

Cooperative Learning:

- One person being a time as the other is checking pulse
- Having a workout partner to do exercise with

Expectations:

All students calculating resting and exercise heart rate and compare to the average of the class.

Timeline:

- 45-50 minute class period

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Having a heart rate that is healthy
- How health relates to job effectiveness
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Career Applications

- Medical field

Optional or Extension Activities

- Setting fitness related goals
- Making a workout plan
- Making an eating plan

WAMC Lesson Plan

Name(s):Brent Moon
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Lesson Title: Finding and comparing Heart rates
Date:6/26/23
Text: STEM Correlation: Math Lesson Length:45 minutes

Big Idea (Cluster): Comparing Heart rate	
Mathematics K–12 Learning Standards HSS-ID.A.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	
Mathematical Practice(s):1. Make sense of problems and persevere in solving them 4. Model with mathematics 6. Attend to precision	
Content Objectives: Student will compute and compare resting heart rate to exercising heart rate	Language Objectives (ELL):
Vocabulary: Pulse (heart rate) Resting rate vs Exercising Rate Target rate	Connections to Prior Learning Formula Function Calculation
Questions to Develop Mathematical Thinking: • How can this be used in the real world.	Common Misconceptions: Maintaining the target rate while working out

Assessment (Formative and Summative):

- Walk around and check for understanding, class discussion (formative)
- Doing a workout and maintaining the target rate (summative)

Materials:

- Paper for notes
- Pencil/Pen
- Worksheet

Instruction Plan:

Introduction: Show both places to take a pulse
Explore: Hand out worksheet Go through at least one example. Have students take down notes that may help them calculate averages.
When I observe students: Assign worksheet for students to complete in class so you can be available to assist them.
Questions to Develop Mathematical Thinking as you observe: How do you compare to the average of the class?
Answers: could be above or below the average Are you in a safe range for your pulse (heartbeat)

Summarize: After all students have done a 15-20 minute workout
Were you able to maintain your target rate? Why? Why not?

Career Application(s):

- Medical field

Leadership/21st Century Skills:

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☐ Be Self-Directed Learners
Social and Cross-Cultural
X Interact Effectively with Others
☐ Work Effectively in Diverse Teams

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☐ Manage Projects
X Produce Results
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X Guide and Lead Others
X Be Responsible to Others

Heart rate worksheet

Resting _____ X 6 = _____

Exercising _____ X 6 = _____

3 Minute recovery _____ X 6 =_____

5 Minute recovery _____ X 6 =_____

8 Minute recovery _____ X 6 =_____

Calculating your target rate (220-age=_____ X .70 =_____target rate for exercising

After exercising/working out for 15 minutes, were you able to maintain your target rate?