

Heart Rate and the Scientific Method

Honoree: Vince Ford

Grade Level: 9-12

Subject: All Sciences - Lesson to be used as a reinforcement of the Scientific Method)

Standard/Indicator: Biology Standard B-1: The student will demonstrate an understanding of how scientific inquiry and technological design, including mathematical analysis, can be used appropriately to pose questions, seek answers, and develop solutions.

Goal/Objective(s):

- Students will discuss the accomplishments of Vince Ford and determine how his efforts help to meet the unmet health needs of the community's uninsured and medically underserved populations in Columbia.
- Students will generate hypotheses based on credible, accurate, and relevant sources of information.
- Students will organize and interpret the data from a controlled scientific investigation by using mathematics, graphs, and/or technology.

Items/Materials Needed:

1. Timers
2. Open Space
3. Heart Rate Lab Handout
4. 2013 AT&T African American Calendar
5. United Streaming Video: "How to Improve Your Cardiovascular Endurance" (segment 4)

Steps/Strategies:

The teacher will introduce the honoree (Vince Ford) to the students through a short lecture, explaining his contributions to the health care industry here in South Carolina. (Teacher may use the AT&T SC African American History Calendar).

The teacher will then lead a discussion on the scientific method and how it is used daily in the health care industry.

The teacher will show United Streaming Video: "How to improve your Cardiovascular Endurance."

The teacher will instruct the students to create group of 3 and have them complete the Heart Rate Lab. (attached)

Printable Worksheet: Heart Rate and the Scientific Method (Attached)

Heart Rate and the Scientific Method

What effect does activity have on heart rate?

Goals of Activity

- Generate hypotheses based on relevant sources of information
- Accurately measure the human heart rate
- Determine the effects of activities on heart rate
- Collect and summarize data in tables and graphs

Introduction

The Scientific Method can be applied to various aspects of our lives. Today we will use the Scientific Method to determine the effect an activity can have on our **heart rate**. Your heart rate is the number of times your heart beats per unit of time. This is normally calculated in beat per minute (bpm). In today's experiment you will calculate your **resting heart rate** then compare it to your heart rate after you have completed an activity (run, jogging in place, etc.).

Materials

- Timers or Stopwatch
- Open Space

Methods

1. Choose one member from group to be the subject, one person to be the time keeper, and one member to be the data recorder. Each of you will work together to complete the lab.
2. Have the subject to take his/her resting heart rate. Record the heart rate in the data table and then repeat two more times. After all 3 trials you will take the average (which will be used in your graph).

To measure heart rate, count the number of pulses in 20 seconds. Multiply that number by 3, and you will have the number of heart beats per minute.



Resting Heart Rate	Trial 1	Trial 2	Trial 3	Average

- Choose an activity that the group will test to determine its effect on heart rate (running, jogging up stairs, etc.). Write the activity in the data table below.
- As a group, generate a hypothesis on the effect of your activity on your heart rate. Write your hypothesis below:

Hypothesis:

If we _____ for 30 seconds, then our heart rate will _____ by _____ beats per minute.

- Have the subject complete the activity chosen by your group for 30 seconds and then take his/her heart rate immediately afterwards. Record in data table.
- Repeat activity 2 more times and record in data table. After all 3 trials are completed; take the average of the trials.

Activity (From step 3)	Trial 1	Trial 2	Trial 3	Average

Data Analysis:

Compare the data from your **resting heart rate** to your **heart rate after the activity** and graph the averages below.

Conclusion:

1. What were the **average** resting and activity heart rates from your subject?
2. What was the independent variable in your experiment? Dependent variable?
3. Did you encounter any issues/problems during your experimentation that may have affected the accuracy of your data?
4. Does your data/results support your hypothesis? Explain your reasoning?