

Lab: Homeostasis - A Balancing Act

We have been investigating homeostasis. Remember, homeostasis is the body's ability to maintain its internal balance. A good example of how our body maintains homeostasis is through exercise. As we begin to exercise, our body needs more oxygen. In response to this demand, we begin to breathe more heavily. Today, you and a partner will examine other variables that change within our body as we exercise.

**Procedure:**

1. Get into a group of 2. Decide who is going to be the person who exercises and who is going to be the timer and data collector.
2. Have the person who is going to do the exercising sit in a chair quietly (no moving, no talking) for 1 minute.
3. After that minute, measure that partner's heart rate by counting the number of heart beats for 15 seconds. Multiple that number by 4 to get beats per minute and enter that number in Table 1.
4. Count the number of breaths taken in a minute. One full breath in inhalation (breath in) and one exhalation (breath out). Record that number in Table 1.
5. Record the exerciser's temperature by place the thermometer in their armpit. Put the thermometer as close to the skin as possible (for example, remove large sweatshirts). Record temperature in Table 1.
6. Now take note to the exerciser's perspiration level. Are the sweating a lot, a little, or not at all. Record information into Table 1.
7. Lastly, note the pigmentation of the skin. Does the exerciser have flushed skin (pink/red), patchy redness, or normal pigmentation? Record information into Table 1.
8. The exerciser will choose an exercise such as jumping jacks, step-ups, sit-ups, squats, or push-ups. The exerciser will be doing this exercise at 1 minute intervals. At each 1 minute interval, repeat steps 3-7. Record all data in Table 1.
9. After the 4 minutes of exercising, have the exerciser rest for a minute and then repeat steps 3-7. Record the data in Table 1.

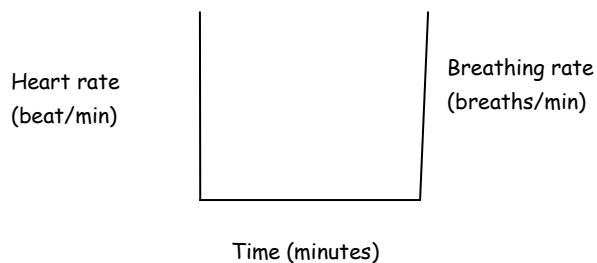


TABLE 1

Minutes	Heart Rate (beats/min)	Breathing Rate (breaths/min)	Body Temperature (°C)	Perspiration Level (Sweating a lot, a little, not at all)	Skin Pigmentation (Normal, patchy, flushed)
0					
1					
2					
3					
4					
5					

Graph

Create a graph comparing the heart rate and breathing rate over time. Use the diagram below as an example on how to set up the graph. Remember to include a descriptive title, a key for each line, and label each axis with the correct units.

**Discussion/Conclusion**

1. What changes did you observe in the exerciser?
2. How did each of the variables change with additional minutes of the exercise?
3. To the exerciser: How did you feel after the first two minutes? How did you feel after 4 minutes? How did you feel after the minute of rest?

4. What aspects of the "normal" body conditions were changed by this activity? In other words, what were the issues that made a homeostatic response necessary?
5. What responses did the body use to maintain homeostasis?
6. What body systems were involved in the criteria we measured today? Make sure to describe how.
7. Why does an increased breathing rate accompany exercise?
8. Why does an increased heart rate accompany exercise?
9. How does a regular exercise regiment affect our body's ability to maintain homeostasis?
10. What challenges would be similar if we had students run 5 miles? What would be new challenges if they ran for the long distance?

