Name (1) Name (2)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name (3) Name (4)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period

# Biology Lab: Homeostasis and Exercise

**Background**: Your body's temperature, heart rate, and blood pressure need to remain within certain set ranges. In this lab, you will work in groups to examine the effects of exercise on the circulatory and respiratory systems, and on perspiration level. You will then observe how the body reacts when exercise is stopped.

**Introduction:** Use the following questions to drive your introduction. This introduction must be 3 paragraphs (5-7 sentences each).

1. What is homeostasis and why is it an essential function of life (regulation)?
2. What are feedback loops and how are they utilized to maintain homeostasis?
3. How could temperature, heart rate, and blood pressure be changed during bouts of moderate to extreme exercise, and if so what do these changes have to do with maintaining homeostasis?

Name (1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Question:** This question is TESTABLE and includes an INDEPENDENT and DEPENDENT VARIABLE.

**Hypothesis:** Write a hypothesis about the effect of exercise on the dependent variables that you are measuring, giving a possible explanation to the question listed above, using an “If, then because” statement.

**Experimental Design:** Be sure to explain each of the following parts of your groups design.

Independent Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Dependent Variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Constants: List at least 4 Control(Standard of Comparison):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(1)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (2)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (4) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Materials:

# Procedure: This should be a numbered list that includes details of procedure. Be sure to include safety considerations.

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☐ Teacher must review and okay procedure before beginning lab

Name (2)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- | --- |
| **Time (minutes):** | **Heart Rate: (Beats/min)** | **Breathing Rate: (Breaths/min)** | **Perspiration level** | **Other** |
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**Graph:** Include title

Name (3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Explain the relationship between stimuli and response. What is an example from this lab?

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1. Does this lab demonstrate the functioning of positive or negative feedback loops? Explain.

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1. What are the effects of exercise over time on the circulatory and respiratory systems? On perspiration level? Explain how these systems interact to reduce body temperature during exercise?

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1. What other processes could you have measured to determine the external and internal effects of exercise on the body?

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1. How is perspiration level related to body temperature? How is perspiration related to homeostasis?

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Name (4)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Conclusion: Each person in the group should answer one of these questions. Person(1) should answer #1. Person (2) should answer #2. Person (3) should answer #3, and person (4) should answer question #4.

1. Was your hypothesis accepted or rejected by the experiments of the lab? Why/why not?

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1. What were the findings of this lab? Were there any unexpected results that occurred during your observations? What were some areas of scientific error?

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3. Explain how four of the body’s systems (28.3) work together to allow the body to function properly respond to exercise.

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4.Cite evidence from this investigation that demonstrates that feedback mechanisms maintain homeostasis. Be sure to incorporate the components of a negative feedback loop into your answer.

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**Evaluation Sheet**

|  |  |  |  |  |  |  |  |  |  |
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| Introduction | /5 | Design | /5 | Conclusion | /5 | Data  | /5 | Analysis | /5 |

**INTRODUCTION/ANALYSIS RUBRIC (1 & 4)**

|  |  |
| --- | --- |
| 5 | All the questions are thoroughly answered in complete sentences. All answers show an in depth understanding of the concepts. |
| 4 | All the questions are thoroughly answered in complete sentences. All the questions are answered correctly but **do not show an in depth understanding** of the concepts. |
| 3 | All the questions are thoroughly answered in complete sentences. All the questions are answered **but fewer than 2 are incorrectly answered.** |
| i | Student has not answered all of the questions, or has incorrectly answered more than 2 questions. |

**EXPERIMENTAL DESIGN (2)**

|  |  |
| --- | --- |
| 5 | Al l of the design elements are filled in and accurate. They reflect thoughtful understanding of the definition of the terms and the intention of the lab. The procedure is written so that anyone would be able to complete the lab |
| 4 | One of the pieces of the design is flawed. |
| 3 | Two of the pieces of the design is flawed. |
| i | Entire sections of the data are missing, or of poor quality. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DATA RUBRIC(3)** |  |  |  |  |

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| --- | --- |
| 5 | Data table is completely filled in with accurate numbers that reflect actual observation, and not expected outcomes. The graph is titled, axis labeled and to the correct scale, a key, and data from the experiment is accurately plotted on the graph. Colors are used to help differentiate the different sets of data. |
| 4 | One of the pieces of the data/graph is missing or inaccurate. |
| 3 | Two of the pieces of the data/graph are missing or inaccurate |
| i | Entire sections of the data are missing, or of poor quality. |

**CONCLUSION RUBRIC ALL**

|  |  |
| --- | --- |
| 5 | The hypothesis has been restated and addressed as either accepted or rejected. The conclusion **thoroughly** addresses what has been learned or taught regarding the target of the lab and student demonstrates an **in-depth understanding** of the concepts. The conclusion properly uses and includes rich academic language and critical vocabulary is highlighted. |
| 4 | The hypothesis has been restated and addressed as either accepted or rejected. The conclusion addresses what has been learned or taught regarding the target of the lab and student demonstrates an **understanding** of the concepts. The conclusion properly uses and includes rich academic language and critical vocabulary is highlighted. |
| 3 | The hypothesis has been restated and addressed as either accepted or rejected. The conclusion addresses what has been learned or taught regarding the target of the lab and student demonstrates an **understanding** of the concepts with **only a few minor errors**. The conclusion properly uses and includes rich academic language and critical vocabulary is highlighted. |
| i | The conclusion does not demonstrate understanding of the target of the lab. |