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**Topic:** Design a Homeostasis Lab

**Summary:** This is a structured inquiry lesson on how to design an experiment. The focus is on experimental design.

**NGSS Standards:** *HS-LS1-3*: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

**Time Length:** 90 minutes; should be broken into multiple days, one day for procedures / conducting the experiment, the other day for the rest of the lab report.

**Prerequisite Knowledge:** Introduction to the scientific method

**Materials:**

- Timer (phone with stopwatch)
- Enough room, probably outdoors, for students to conduct their experiment
- Handouts and pencils

**Procedures:**

Day 1

1. Help students write their hypothesis.
2. Help students design their experiment by writing procedures for their experiment. Remind students to create a control group in their procedures.
3. Help students to create their data table to record data from the experiment.
4. Have students conduct the experiment.

Day 2

5. Have students finish the rest of the lab report, including helping them determine their variables, conclusion, errors, and practical application.

**Editable DOCX File and Answer Key:**

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# Design a Homeostasis Lab

## Driving Question:

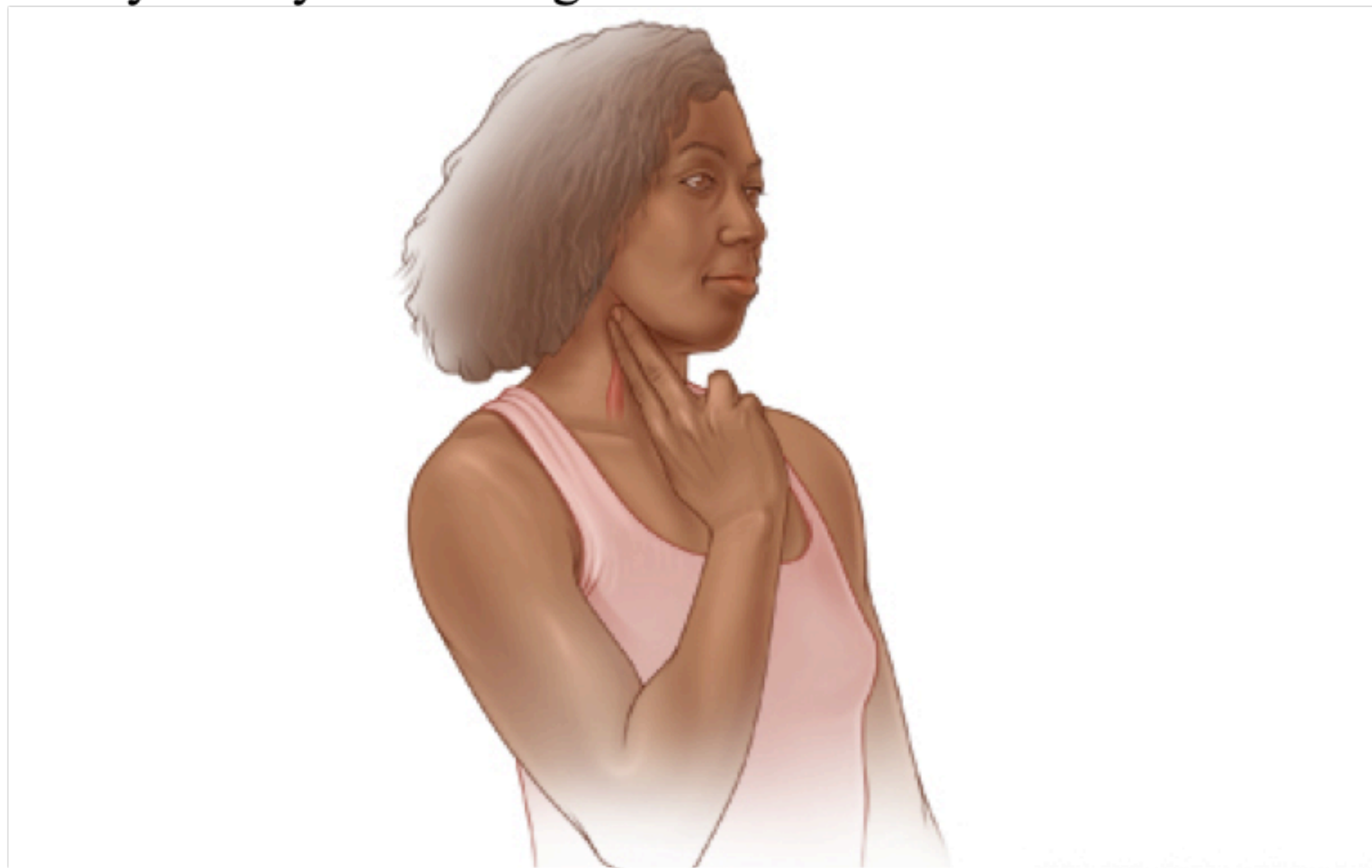
In this lab, you will be discovering how exercise affects your heart rate.

## Materials:

- Timer (phone with stopwatch)
- Exercise activity
- Partner with pulse
- Textbook for understanding heart rate

## Procedures:

- First discover how to feel your pulse. You can use your carotid artery. This is located in your neck, on either side of your windpipe. Be careful when checking your pulse in this location as you may become lightheaded and fall.



- Take out your stopwatch. Start your stopwatch when you find your pulse and hold your finger there for 20 seconds. Count the number of bumps (pumps of blood). Take the total number of bumps and multiply by three to get the heart rate.
- Make a plan on how you are going to investigate how exercise affects your pulse. What will be your independent variable, dependent variable, constants, and control group? Write sentences explaining the procedures of your experiment.
- What data will you collect? How are you going to organize this data?
- A conclusion either confirms the hypothesis (meaning the hypothesis is correct) or rejects the hypothesis (meaning the hypothesis was wrong). When stating evidence for your conclusion, make sure to include body parts involved with heart rate, why would your heart change, what is the purpose of pumping blood, and why would one rate be lower than the other rate?
- Identify and write down all experimental errors that you do during the experiment. You need to write your lab errors or how you would make the experiment better.

# Design a Homeostasis Lab

Name: \_\_\_\_\_ Row: \_\_\_\_\_

Date: \_\_\_\_\_ Period: \_\_\_\_\_

## Hypothesis:

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## Procedures:

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**Data Table:** Include both experimental and control group data. Include labels, units, and % difference in pulse  $-((\text{resting/exercise}) * 100) - 100$ .

## Variables:

Independent: \_\_\_\_\_ Dependent: \_\_\_\_\_

Constants: \_\_\_\_\_

Control Group: \_\_\_\_\_

## Conclusion:

Do you confirm or reject your hypothesis? \_\_\_\_\_

What *evidence* supports why you confirmed or rejected your hypothesis?

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## Experimental Errors:

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**Practical Application:** How is changing your heart rate an example of homeostasis?

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