

Name \_\_\_\_\_ Date \_\_\_\_\_

## Chapter 8 Lab Investigation: Endocrine System

### Purpose

In this activity you will investigate the concept of the negative feedback loop and identify organs of the endocrine system.

### Background

A negative feedback loop starts with a set point. If the level of a particular hormone falls below the set point, an endocrine organ begins to make more of that hormone. The organ continues to manufacture the hormone until the hormone level reaches the set point. When the hormone level reaches the set point, the endocrine organ stops producing it.

### Materials

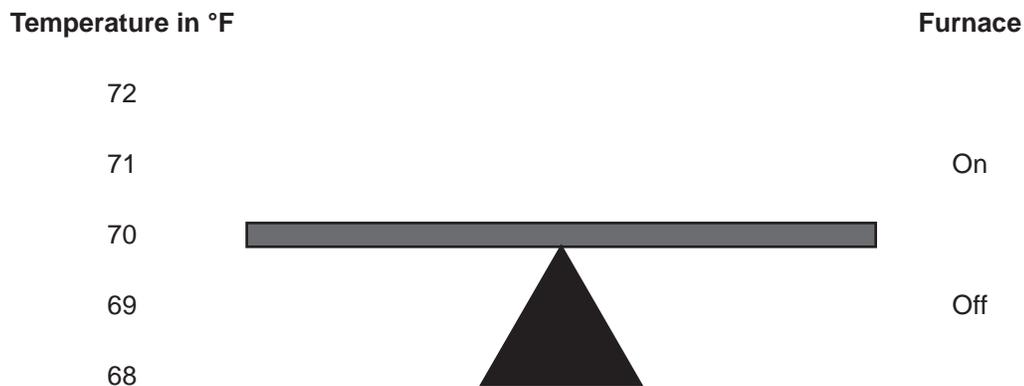
your textbook, your body

### Procedure

#### *Negative Feedback*

The thermostat in a home functions much like the negative feedback loop in the human body. The diagram below illustrates the negative feedback relationship between the thermostat (which detects room temperature) and the furnace. If the thermostat detects a temperature lower than the set point, the furnace turns on to produce heat, thus raising the room temperature.

The diagram shows a balance beam mounted on a point (fulcrum) that represents the set point. If the temperature drops, then the left side of the bar will drop, causing the right side of the bar to rise.



Review the diagram above. Then answer the following questions.

1. What temperature is the set point? \_\_\_\_\_
2. When the balance beam is level, is the furnace on or off? \_\_\_\_\_
3. At what temperature will the furnace turn on? \_\_\_\_\_
4. Now, on a separate piece of paper, draw a triangular base and balance beam as shown above, but make the set point "hormone level" instead of temperature, and rather than a furnace turning on or off, "hormone production" will be switched on or off. Draw the balance beam to reflect a condition of homeostasis—all the hormone levels are exactly where they need to be. Label the set point on the left. Add labels for on and off at the right as they are shown above for the furnace.
5. Draw the triangle and balance beam again, but this time draw the beam to show how it will tilt if the hormone level falls below the set point.

6. With hormone production on, what will happen to the hormone level? \_\_\_\_\_
7. How will the balance beam move while the hormone production stays on? \_\_\_\_\_
8. What will cause the hormone production to stop? Once the hormone level reaches the set point, hormone production will shut off. \_\_\_\_\_

## Conclusions

In the chart below, the six hormones secreted by the anterior pituitary gland are listed. For each hormone, write the name of the target organ or tissue and the action produced by the hormone on that organ or tissue. Finally, place an asterisk (\*) beside each tropic hormone.

Hormones of the Anterior Pituitary		
Hormone	Organ or Tissue Acted Upon	Hormonal Action
1. adrenocorticotropin (ACTH)		
2. follicle-stimulating hormone (FSH)		
3. growth hormone (GH)		
4. luteinizing hormone (LH)		
5. prolactin		
6. thyroid-stimulating hormone (TSH)		

In the chart that follows, the two hormones secreted by the posterior pituitary gland are listed. Beside each hormone name, write the name of the target organ or tissue and the action produced by the hormone on that organ or tissue.

Hormones of the Posterior Pituitary		
Hormone	Organ or Tissue Acted Upon	Hormonal Action
7. antidiuretic hormone (ADH)		
8. oxytocin		

In the chart below, the two hormones secreted by the adrenal medulla gland are listed. Beside each hormone name, write the name of the target organ or tissue and the action produced by the hormone on that organ or tissue.

Hormones of the Adrenal Medulla		
Hormone	Organ or Tissue Acted Upon	Hormonal Action
9. epinephrine (adrenaline)		
10. norepinephrine (noradrenaline)		