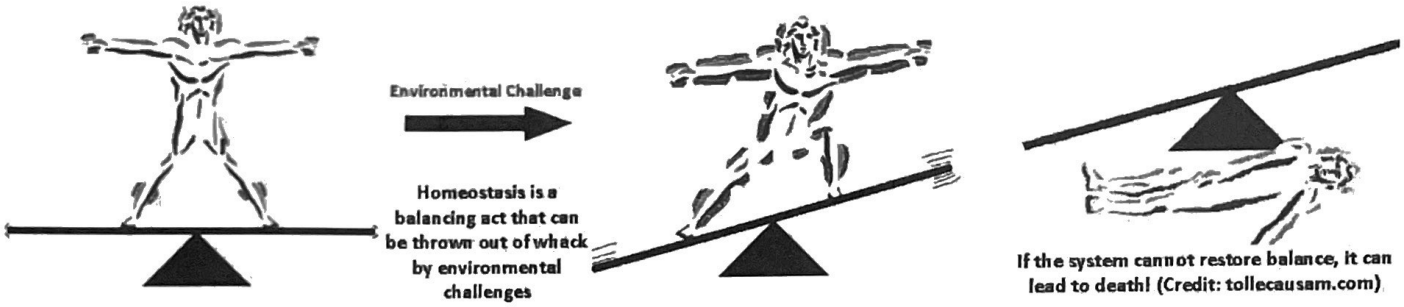
Biology
Ms. Ye

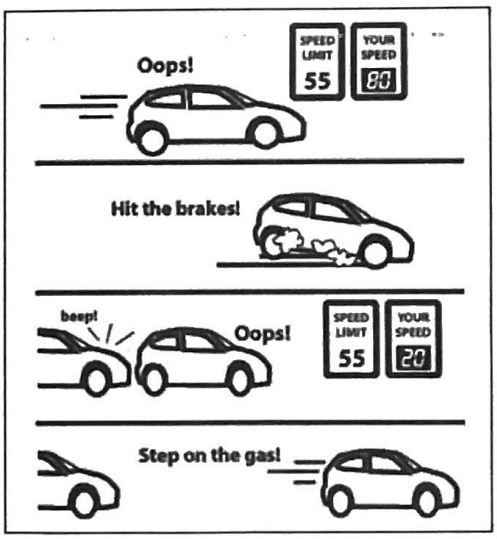
Name _____
Date _____ Block _____

Homeostasis Worksheet

Homeostasis is a dynamic process of **regulating and maintaining stable internal conditions**



MODEL 1: Maintaining a Car Speed. The process of homeostasis can be compared to driving a car at the speed limit.

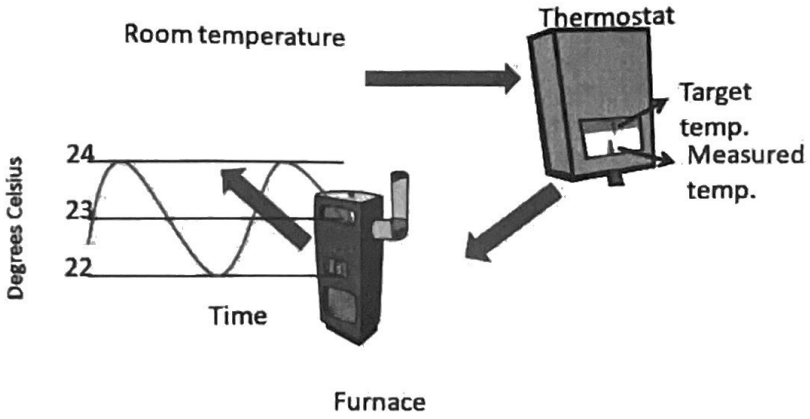


1. What is the "set point" for driving a car in this example?

2. If you detect that the speed of the car is above the set point, what response would you make to get the speed back to the "set point"?

3. If you detect the speed of the car is below the "set point", what response would you make to get the speed back to the "set point"?

MODEL 2: Maintaining the Temperature in a House. This model shows a heating system for maintaining home temperature in cold weather. Most people consider a value around 23 degrees Celsius to be comfortable.



QUESTIONS:

4. What is the temperature range within the house over the time period shown?

5. What two values are used by the thermostat in its functioning?

6. At what temperature does the furnace turn on? At what temperature does it turn off?

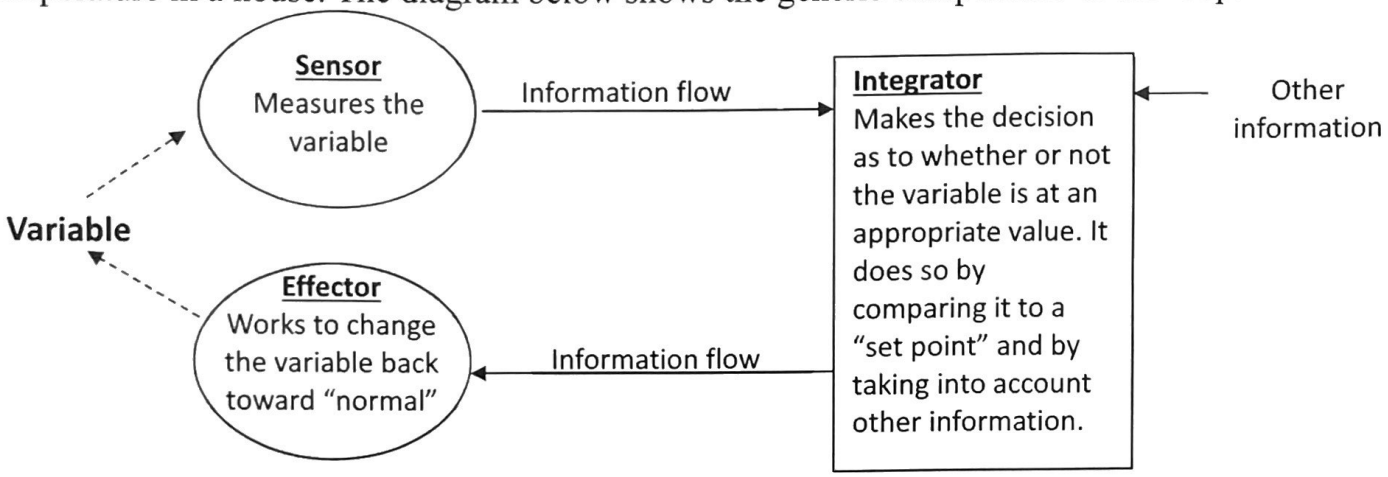
7. In this scenario, what is the most likely value of the target temperature? Explain your reasoning.

8. The homeowner has Northern Australian orchids growing in the house, which only grow in temperatures above 22 degrees Celsius. If the thermostat, or the wire from the thermostat to the furnace, breaks, what will happen to the temperature in the house? What will happen to the Orchids?

9. In the summer, how could this loop be modified (settings or components) to keep the house around the same target temperature?

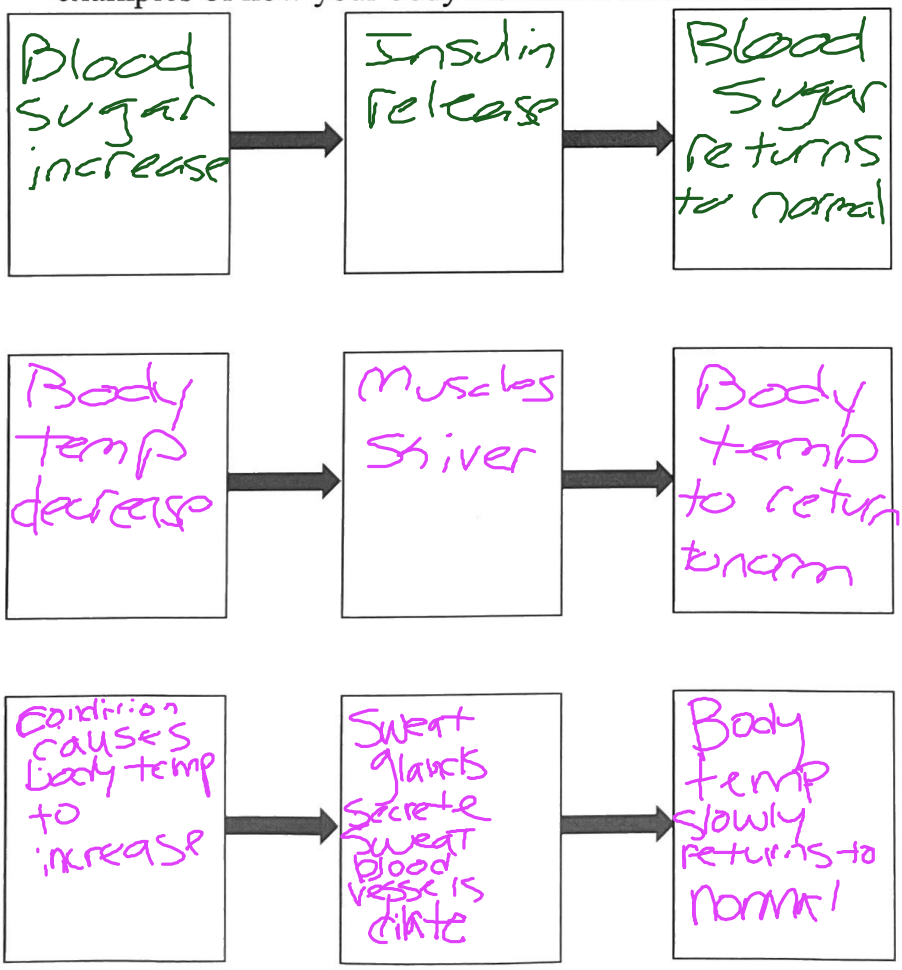
MODEL 3: General Feedback Loop

Homeostasis is an important ability associated with living organisms. It is typically carried out through a process using a negative feedback loop, similar to the loop that controls the temperature in a house. The diagram below shows the generic components of the loop.



Feedback Loops:

10. Fill in the missing components for the following feedback loops. These are all common examples of how your body maintains homeostasis.

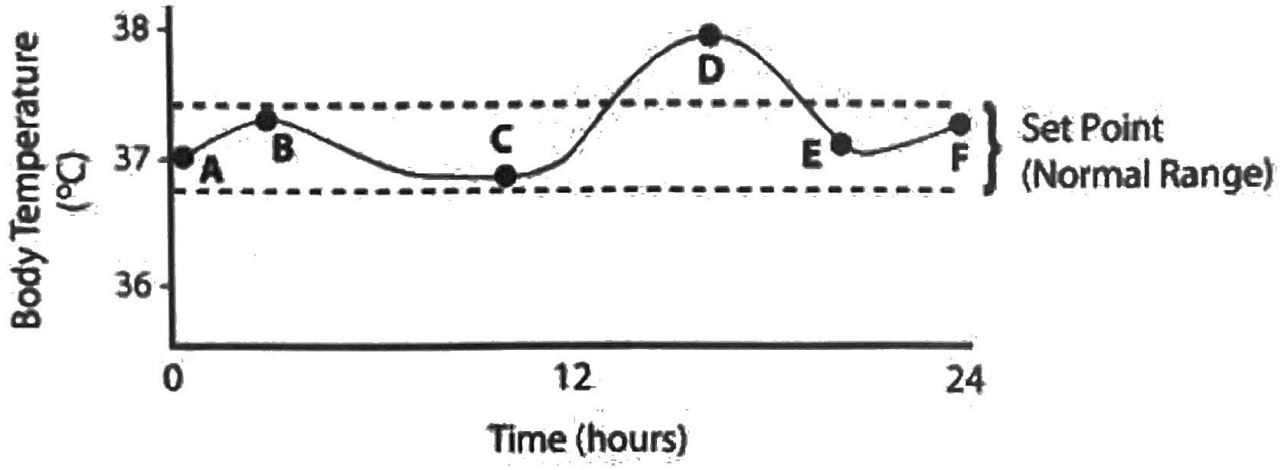


Word Bank:

- Body temperature slowly returns to "normal" (x2)
- Body sugar levels return to normal
- Conditions cause body temperature to decrease
- Conditions cause body temperature to increase
- Blood sugar levels rise after eating food
- Muscles Shiver; Blood vessels constrict
- Sweat glands secrete sweat; Blood vessels dilate
- Insulin is released to help remove glucose (sugar) from the blood and store it in your body

Application Questions:

The graph below shows evidence of disease in the human body. Base your answer to the following questions on the information in the graph.



11. A disruption in homeostasis is indicated by a temperature change that occurs between points
    a. A and B **Justify your answer!**
    b. B and C
    c. C and D
    d. E and F

12. The action of a homeostatic feedback mechanism is indicated by a temperature change that occurs between points
    a. A and B **Justify your answer!**
    b. B and C
    c. C and D
    d. D and E