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Name:

Date: _____

Chapter 2 Assessment

ITEM 1

1a. A student monitored her temperature every morning for 10 days. She woke up on day 4 with a fever accompanied by a stomachache and diarrhea. The doctor diagnosed her with gastroenteritis, which is sometimes called the stomach flu.



A student develops a fever.

The fever lasted for 3 days. Describe what likely happened inside her body to cause the fever.

- **1b.** Which graph best represents the likely temperature of the student over the 10-day period? Circle the letter for the graph you choose.
 - You may choose to use the I² Strategy if it helps. Reminder: the I² Strategy involves writing "what I see/what it means" statements.



1c. Describe why the graph you selected best represents the temperature of the student over the 10-day period.

1d. The student continues to monitor her temperature the following week. This time she records her temperature every 2 hours. One day, she sees that her temperature is consistently getting higher from 6:00 in the morning until 1:00 in the afternoon. She feels fine but is worried that she is getting a fever again.

Is she correct in thinking that an increase in body temperature means a person is getting a fever?

Claim (answers the question with a *how* or *why* explanation) (Select one)

- A. Yes, an increase in body temperature always means that the person has a fever because they are fighting an infection.
- B. No, an increase in body temperature is always caused by the person moving around more than usual.



A graph of the student's body temperature from 6:00 a.m. to 1:00 p.m.

- C. No, a person's body temperature fluctuates within a certain range, so it is normal to have periods of time where the temperature is increasing.
- **1e. Support** (relevant evidence and describe how the evidence links to science ideas):

Check:

- \checkmark The claim answers the question
- ✓ The support includes evidence from labs, readings, videos, or other sources
- \checkmark The support includes science ideas that we agree on
- \checkmark Each piece of evidence is linked to a science idea

ITEM 2

2a. A group of friends challenges each other to a race. They all run as fast as they can to the finish line.

At the end of the race, they notice that they are breathing faster than they were before the race started. They also notice that their heart is beating faster than before the race. The friends know that

they need to take in oxygen by breathing. The oxygen they breathe in is transported throughout their bodies through the bloodstream. Their cells use the oxygen to carry out functions like movement.

Using what you know about body systems and feedback mechanisms, develop a model that explains why their heart rates and breathing rates increased when they ran the race. First, consider what components you will include. List the **components** below.



A group of people running.

2b. What interactions between components will you include in the model? List the **interactions** below.

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2c. Based on your list of components and interactions, draw a model that explains why the runners' heart rates and breathing rates increased when they ran.

Use this space to draw your model.

Self-check: In my model I ...

- \checkmark Identified all the components my model needs.
- If-check: In my model I ... Identified all the components my model needs. Showed the interactions between the components in my model and included any initial conditions, inputs, outputs, and boundaries of the system(s) \checkmark inputs, outputs, and boundaries of the system(s).
- Used my model to provide a description of how and why the phenomenon works. \checkmark

ITEM 3

3a. The pancreas is a part of the endocrine system and is located in the abdomen. It plays a role in regulating the amount of glucose (a type of sugar) in the blood. The part of the pancreas that regulates the blood glucose level is called the islets of Langerhans. They are large spherical clusters of cells as shown in the diagram below. Cells called beta cells in the islets of Langerhans release insulin, which is a molecule that signals the body to decrease the amount of glucose in the bloodstream.



The pancreas (left) and inside the pancreas, the islets of langerhans and branches of the pancreatic duct (right).

After you eat a meal, the level of glucose in your blood increases. This increase in blood glucose causes the beta cells to release insulin into the bloodstream. The insulin then helps move the glucose out of the blood into other body cells. Once the blood glucose level decreases, the beta cells are signaled to stop releasing insulin.

CHAPTER 2 ASSESSMENT

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Using what you know about feedback mechanisms in the body, develop a model that illustrates what happens to the amount of glucose and insulin in the bloodstream after eating a meal. Your model should be in the form of a graph with words and annotations to explain the change in the amount of glucose and insulin in the bloodstream over time. Axes for the graph are provided below.



Self-check: In my model I ...

- \checkmark Identified all the components my model needs.
- ✓ Showed the interactions between the components in my model and included any initial conditions, inputs, outputs, and boundaries of the system(s).
- \checkmark Used my model to provide a description of how and why the phenomenon works.
- **3b.** People with diabetes have fewer beta cells in their islets of Lanngehans. Redraw the graphs in your model to represent the change in the amount of glucose and insulin in a person with diabetes. Axes for the graph are provided below.



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3c. Based on what you showed in your model, explain how having fewer beta cells affects the shape of the curves that represent the change in amount of glucose and insulin in the bloodstream after eating a meal.

Claim (answers the question with a how or why explanation)

3d. Support (relevant evidence and how the evidence links to science ideas):

Check:

- \checkmark The claim answers the question
- \checkmark The support includes evidence from labs, readings, videos, or other sources
- \checkmark The support includes science ideas that we agree on
- \checkmark Each piece of evidence is linked to a science idea