**Feedback Systems – Identify the stimulus, receptor, control center, and effector in each example.**

1. Johnny eats a four course dinner. An hour later, chemoreceptors in his bloodstream detect high levels of glucose. The chemoreceptors send this message to the pancreas, which secretes insulin into the bloodstream lowering his blood sugar levels.

 Type of feedback system: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 How do you know? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Hypoventilation describes breathing that is too slow or shallow. This leads to less carbon dioxide being exhaled and a resultant buildup in the blood. There are chemoreceptors in blood vessels like the aorta and carotid arteries that are sensitive to both the carbon dioxide content and the pH of the blood. When the carbon dioxide concentration rises or when the pH lowers the respiratory center in the medulla oblongata of the brain is stimulated and the breathing rate increases.

 Type of feedback system: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 How do you know? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. A baby latches on to its mother’s breast. There is a nerve response into the spinal cord and up into the hypothalamus of the brain, which then stimulates the pituitary gland to produce more prolactin to produce more milk.

 Type of feedback system: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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4. The kidneys detect reduced oxygen levels present in blood. When less oxygen is delivered to the kidneys, they secrete erythropoietin into the blood. Erythropoietin then travels to the bone marrow where it stimulates more red blood cells to be created as a result of hematopoiesis. The newly created blood cells “leak” back into blood circulation.

 Type of feedback system: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 How do you know? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_