

Preparing Your Students for Advanced Technological Education

Diagram a Closed-Loop System

Many automated manufacturing systems utilize closed-loop systems to ensure that desired outcomes are achieved. Choose one or both of the following descriptions to create a diagram similar to the one featured in the Closed Loop Systems interactive activity.

1. Imagine a facility that bakes bread. Computers control the entire process by using sensors to monitor various aspects, such as the quantity of ingredients, oven temperature, cooling time, and packaging. For example, sensors are used to weigh the ingredients, the dough, and the finished product; they also monitor the temperature of the ovens or cooling units. Other types of sensors visually inspect the product for color and texture. The data gathered by the sensors are passed to the computer, and the controller then regulates the system so that each loaf of bread comes out perfectly.
2. An oven is a simple example of a closed-loop system. This system is designed to maintain the temperature inside the oven at a specific, preset level. When you set your oven to a certain temperature, the oven will heat up until it reaches that temperature. The oven's thermostat serves as both the measurement device and the controller. If the thermostat detects that the temperature in the oven is too low, it will instruct a gas burner to fire, or an electric element to heat up, which causes the temperature in the oven to rise. When the correct temperature is reached, the thermostat then instructs the actuator to turn off and stop heating the oven.