

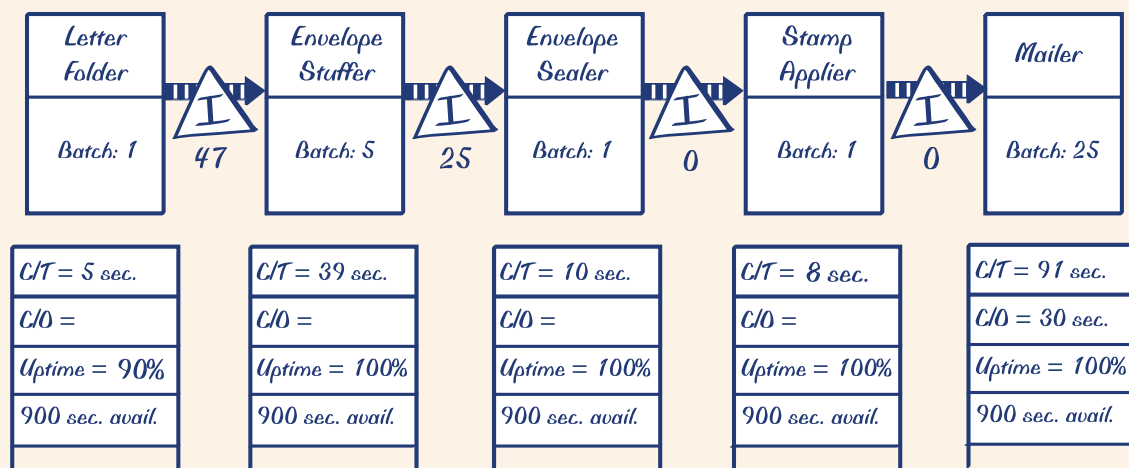
# Mapping the Value Stream

One of the key steps in implementing lean thinking principles in a business is the mapping of the value streams for its products. A product's value stream consists of all of the steps needed to get the product from concept to consumer. By looking at all of these steps, a company can more easily see where there is waste in the process. There are two major components to the value stream: the design flow, which involves all of the steps from concept through research and development and launch, and the production flow, which involves all of the steps from working with the raw materials through manufacturing and selling the product to the customer. In this activity, you will focus on production flow.

By mapping the production flow value stream and eliminating the waste that they find through the mapping process, companies can have a dramatic impact on the time it takes to make one of their products, on their ability to respond to customer demands, and on their bottom line. Penelope's Pizza could certainly benefit from some value stream mapping!

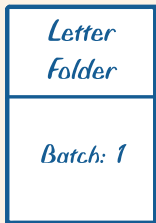
In the lean thinking system, there are actually several pieces to a value stream map of production flow. However, for the purpose of looking at Penelope's Pizza, you'll map just one part of the flow: the steps that actually take place on the production line. The map you create will include information about the cycle time, downtime, and changeover time for each step, as well as information about the amount of inventory kept between each step. With this information, you will be able to see the problem areas in the pizza production line and can then take steps to correct these problems.

## Value Stream Map for an Envelope-Stuffing Assembly Line



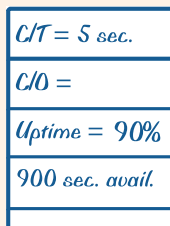
This value stream map conveys all of the information you need to know about the envelope-stuffing process—if you know how to read it. You can use the icons and the layout of the map as an example as you create your own value stream map for Penelope's Pizza.

Here is what the icons stand for:



### Process Box Icon

The manufacturing process box icon is the most basic icon you will use as you create your map. Write the name of the process in the top section of the box and write the number of pieces required for each batch in the bottom section of the box. If the process only requires one piece at a time, write "Batch: 1."



### Data Box Icon

The data box icon is used to record information about the manufacturing process. On the top line, write the cycle time (C/T), which is the amount of time it takes to process one pizza (or batch of pizzas, if the station uses batch processing), in seconds. On the second line, write the changeover time (C/O), which is the amount of time it takes to change over from processing one kind of piece to another. In the envelope examples, it takes two minutes to change over from stuffing one kind of envelope to another. On the third line, write the uptime, which is the percentage of time that a machine or person is actually working. For example, if a machine is unavailable, whether because of breakdown or maintenance, for 20 minutes out of every 100, it has an uptime of 80 percent. On the fourth line, write the number of seconds that are available for work each shift. For example, if a shift is eight hours long and workers are given a half-hour break during each shift, then seven and a half hours, or 27,000 seconds, are available.



### Inventory Triangle Icon

The inventory triangle icon indicates the amount of inventory kept between stations. Below the triangle, write the number of pieces of each kind of part that collected between two stations during the simulation. For example, pepperoni pizza and mushroom pizza are two different parts and should be tallied separately. In the case of Penelope's Pizza, any inventory that has collected outside the pizza freezer must be thrown away at the end of the shift. For your Penelope's Pizza map, consider the amount of inventory that had collected between stations by the end of the simulation to be the typical amount of inventory held between stations.

### Push Arrow Icon



The striped push arrow icon indicates that a product is being "pushed" to the next production station when it is completed, in contrast to a product that is "pulled" by a downstream operation when it is needed.