**[[1]](#footnote-1)**

**Managing Inventory at Littlefield Labs**

# **Background**

Littlefield Labs (LL) opened a new, highly automated lab to test blood samples. LL receives samples from local hospitals and clinics and processes those samples with disposable test kits. After 210 days of operation the lab will cease operations and shut down. Neither capacity nor inventory will have salvage value after the lab shuts down.

Although daily arrivals vary, marketing is confident that long term demand will remain stable throughout the lifetime of this lab. Management’s main concern is managing inventory levels for the predicted demand pattern. Delays resulting from insufficient inventory could under­mine LL’s promised lead times and even force LL to turn away work.

# **Operations at Littlefield Labs**

LL uses a fresh test kit with each new blood sample. After matching samples with kits, orders travel through the reentrant four step process described in Getting Started. The purchase price of any machine is $30,000. The retirement price of any machine is $10,000. It takes time for new capacity to be ordered and installed. New machines become operational 10 days after they are paid for. Sold machines are retired as soon as they finish any work in process. Management has not performed stopwatch studies of the process times, but one quickly notices no variability in those times.

LL purchases inventory using an automated policy of periodic review. Inventory is replenished every 12 simulated days. All remaining inventory rolls over at the end of each period—it does not expire. LL has a physical inventory holding cost of $0.10 per kit per day. They are also concerned with the opportunity cost of any interest that could have been earned by cash spent on inventory. LL earns daily interest for cash held at an annual rate of 10% per year. They have been replenishing back up to 150 kits every 12 days but often run out several days before each period ends. You will be able to change this order up to level. Fresh test kits cost $200 each. There are no additional ordering costs. Reorder costs for each period are simply the unit cost times the number of kits required to replenish.

Littlefield promises results within a specific time frame. LL earns $400 for all test results delivered in less than 24 hours. Customer rebates begin to kick in when an order’s actual lead time exceeds 24 hours. Revenues decrease linearly from $400, when the actual lead time is less than 24 hours, down to $0, if it takes longer than 72 hours to deliver those same test results. A test kit is consumed with every accepted order, so LL begins to lose money on any tests requiring more than 48 hours total waiting and process time.

Production began with $1,000,000 in operating cash and 150 fresh test kits. Revenue earned from filled orders increase overall cash balance while capital investments and inventory purchases reduce cash balance. Additional machinery cannot be purchased if the resulting cash balance would prevent inventory replenishment. There are no taxes, payrolls, nor fixed overhead costs to consider.

# **Assignment**

You begin managing the laboratory on Day 30. Historic data is available for review. For the next 180 simulated days you must buy or sell machines to maximize the lab’s overall cash position. There is one preparer, one tester, and one centrifuge already in the laboratory. You may purchase more capacity if needed.

You may also change the way testing is scheduled. Jobs at the tester are currently scheduled First-In-First-Out (FIFO), but you can give priority status either to the short initial test or the longer final test.

After the simulation ends you may review Littlefield’s history and download data, but the laboratory will no longer be active. **The only winning condition is having the most cash at game’s end.**

1. Based on a document written by Sunil Kumar and Samuel C. Wood, Stanford University Graduate School of Business. Copyright 2009. No part of this document may be reproduced without permission from Responsive Learning Technologies, Inc. [info@responsive.net](mailto:info@responsive.net) [↑](#footnote-ref-1)