

Inventory Management & Demand Planning — Workbook

This workbook turns the course into a working inventory system for your own products. Move through it in order: measure your inventory health and run an ABC analysis, set reorder points and safety stock, build and score a demand forecast, then rationalize your catalog and lock in a recurring review. Use the templates to calculate reorder points, classify SKUs, model order quantities, and track forecast accuracy so every stocking decision rests on numbers you can defend.

Inventory Fundamentals and the Cost of Getting It Wrong

Quantify what your inventory costs to hold and focus your effort with ABC analysis.

Worksheet: Your Carrying Cost and Health Metrics

Fill in your real numbers to put a dollar figure on what holding inventory costs you, then compute the core health metrics. Use cost (not retail) for inventory values.

Average inventory value at cost (\$)

Carrying cost rate (capital + storage + service + risk, typically 20-30%)

Annual cost of holding inventory (\$) = avg inventory x carrying rate

Annual cost of goods sold (COGS, \$)

Inventory turnover = COGS / average inventory

Days of inventory on hand = 365 / turnover

Typical turnover for my industry (benchmark)

Current fill rate (% of demand fulfilled from stock without stockout)

Exercise: Run an ABC Analysis on Your Catalog

Use the SKU classification template to sort your products by annual value and assign each to a tier. Classify by dollar throughput, not unit volume.

- For each SKU, what is the annual consumption value (annual units sold x unit cost)?

- After sorting high to low, where do the cut lines fall: which SKUs reach ~80% cumulative value (A), the next chunk to ~95% (B), and the rest (C)?

- What share of your SKUs are A items, and what share of revenue do they drive? Does it roughly follow the 80/20 pattern?
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- What management policy will you assign to each tier (tight control for A, moderate for B, simple bulk rules for C)?
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Checklist: Inventory Baseline Established

- Average inventory value at cost calculated
- Annual carrying cost estimated in dollars (using a 20-30% rate)
- Inventory turnover and days of supply computed and benchmarked
- Fill rate measured for recent stockout history
- Every SKU assigned an A, B, or C class by annual value
- Management intensity set per class (A = tightest, C = loosest)
- Calendar reminder set to refresh ABC each quarter

Reorder Points and Safety Stock

Set the trigger level, buffer, and order size that keep each SKU in stock without freezing cash.

Worksheet: Reorder Point Build Sheet (per SKU)

Work the reorder point for one A item, then repeat for the rest using the template. Use honest, historical lead times that include receiving and putaway, not the supplier's best case.

SKU / product name

Average daily demand (units/day)

Lead time in days (order to sellable stock, including receiving)

Lead-time demand = avg daily demand x lead time

Safety stock (units) — sized in the next exercise

Reorder point = lead-time demand + safety stock

Maximum observed lead time (days)

Notes on supplier reliability / variability

Exercise: Size Safety Stock by Service Level

Decide how much buffer each SKU needs based on its importance and variability, rather than a single round number. Give A items more protection than C items.

- What target service level fits this SKU (e.g., 97-99% for A items, 85-90% for C items), and why?
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- Which sizing method will you use: simple days-of-demand, lead-time variation (avg daily demand x [max lead time - avg lead time]), or the statistical Z-score x demand standard deviation method?
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- Using your chosen method, what safety stock (in units) does this SKU need?
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- How variable are demand and lead time for this item, and does the buffer reflect that (more for erratic

demand or unreliable suppliers)?

Exercise: Find Your Order Quantity with EOQ

Use the order quantity template to balance ordering cost against holding cost, then adjust for real constraints.

- What are your three EOQ inputs: annual demand (D), cost per order (S), and annual holding cost per unit (H = carrying rate x unit cost)?

- What is the EOQ = square root of $(2 \times D \times S / H)$, and how many orders per year does that imply?

- What real constraints change the order size (supplier MOQ, volume discounts, shelf life, storage limits, available cash)?

- What is your final order quantity per cycle after adjusting EOQ for those constraints?

Checklist: Replenishment Rules Set

- Average daily demand calculated from recent sales for each A item
- True lead time measured (including receiving and putaway)
- Safety stock sized by service level and variability, not a round number
- Reorder point = lead-time demand + safety stock recorded per SKU
- EOQ-informed order quantity set per SKU, adjusted for MOQ and discounts
- Higher service levels assigned to A items, lower to C items
- Each SKU now has a known trigger level and a known order size

Demand Forecasting You Can Actually Run

Build a forecast in a spreadsheet, adjust for seasonality and trend, and score its accuracy.

Exercise: Build a Baseline Forecast

Using the forecast tracker template, forecast next period for a key SKU with both a moving average and exponential smoothing, then compare.

- Using the last 3 months of sales, what is your 3-month moving average forecast for next month?

- Using exponential smoothing (new forecast = $\alpha \times \text{last actual} + (1 - \alpha) \times \text{previous forecast}$), what does it predict, and what alpha did you choose (0.2 smooth vs 0.5 responsive)?

- Is demand for this SKU stable (moving average is fine) or shifting (exponential smoothing reacts faster)?

- Which method will you adopt for this SKU, and why?

Worksheet: Seasonality and Trend Adjustment

Layer real-world shape onto your baseline forecast so you stock up for peaks and down for troughs. Build seasonal indices from a year or two of history.

Overall average monthly sales (units)

Seasonal index per month (month avg / overall avg; e.g., Dec 1.5, Jan 0.7)

Underlying trend (annual growth or decline %)

Baseline forecast for next year (this year's average + trend)

Seasonally adjusted monthly forecast = baseline x month index

Known promotions/events and their expected lift (forecast separately)

Outliers removed from history so one promo does not distort the average

New-product items with no history (use comparable SKU / conservative order)

Exercise: Score Your Forecast Accuracy

Compare forecast to actual over the last several periods and compute error so you can improve the method. Watch bias most closely.

- For each recent period, what was the absolute error ($|\text{forecast} - \text{actual}|$)?
 - What is your MAD (average absolute error in units) and your MAPE (average of $|\text{error}|/\text{actual}$ as a percent)?
 - Is there bias — do your errors lean consistently over (overstocking) or under (stockouts)?
 - Did exponential smoothing or seasonal indices lower the error versus your old method? If so, adopt the better one.
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SKU Rationalization, Systems, and Cash

Prune the catalog, choose tools that fit your stage, and keep inventory aligned with cash.

Exercise: Rationalize Your SKU List

Use your ABC results to find rationalization candidates, then decide what to cut, consolidate, or keep, judging by profit and role, not volume alone.

- Which SKUs have had no sales in 6-12 months or turnover far below your average (dead/slow stock)?
 - Ranked by profit contribution (units x margin) minus carrying cost, which SKUs actually lose money?
 - For each cut candidate, does it still earn its place strategically (supports a bestseller, completes a range, anchors a key account) or is it true dead weight?
 - What is the action for each — discontinue, consolidate near-duplicates, or keep as special-order only — and how will you clear the remaining dead stock?
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Checklist: Inventory System and Data Accuracy

- Chosen the right tool for my stage (spreadsheet / platform inventory / dedicated software / ERP)
 - Stock decrements automatically on every sale, return, and transfer
 - Cycle counting scheduled — A items most often, B and C less frequently
 - Receiving controlled: quantities and quality verified against the PO before stock is added
 - Barcodes/scanning adopted at receiving and picking as volume grows
 - Reorder points and forecasts kept updated as demand and lead times shift
 - Identified the trigger to upgrade tools (hours/week lost, missed reorders, overselling, new channel)
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Worksheet: Inventory Cash-Flow Plan

Map the gap between paying suppliers and getting paid, and plan to keep cash flowing while inventory grows. Average days from paying a supplier to selling that stock

Average days from sale to receiving customer payment

Cash conversion gap (days money is tied up in inventory)

Supplier payment terms negotiated (e.g., net 30, deposit + balance)

Large reorders to stagger into smaller timed buys

Dead stock to clear (markdown/bundle) and cash it will release

Cash buffer held to cover the gap and upcoming reorders (\$)

Checklist: Recurring Inventory Review Rhythm

- Monthly: update forecast with latest sales and recompute A-item reorder points
- Monthly: review turnover, days of supply, and fill rate; order anything at its reorder point
- Quarterly: re-run ABC and refresh safety stock / service levels by class
- Quarterly: review forecast accuracy (MAD, MAPE, bias) and tune methods
- Quarterly: rationalize the catalog and clear newly identified dead stock
- Ongoing: cycle count to keep records accurate
- Ongoing: keep the supplier-payment-to-customer-payment cash gap in clear view

Your Action Plan

1. Calculate your carrying cost in dollars and your turnover, days of supply, and fill rate so you have a baseline.
2. Run an ABC analysis and assign a management intensity to each tier, focusing effort on the A items.
3. Measure true lead times and average daily demand for your A items as inputs to replenishment.
4. Size safety stock by service level and variability, then set a reorder point for each SKU.
5. Use EOQ to find an efficient order quantity per SKU, adjusting for MOQs, discounts, and cash.
6. Build a baseline demand forecast with a moving average or exponential smoothing for each key SKU.
7. Layer in seasonal indices and trend, and forecast promotions separately so peaks and troughs are planned.
8. Track forecast accuracy with MAD, MAPE, and bias, and switch to whichever method lowers your error.
9. Rationalize the catalog by profit and role, cut or consolidate dead weight, and clear the freed dead stock.
10. Lock in a monthly and quarterly review rhythm, with cycle counting and a cash buffer that covers the payment gap.

