Simple moving average Average of demands occuring in several of the most recent periods; most recent periods are added and oldes ones dropped to keep calculations current.

Simple Moving Average A *simple moving average* (MA) combines the demand data from several of the most recent periods, their average being the forecast for the next period. Once the number of past periods to be used in the calculations has been selected, it is held constant. We may use a 3-period moving average or a 20-period moving average, but once we decide, we must continue to use the same number of periods. The demands for all periods are equally weighted. The average "moves" over time, in that, after each period elapses, the demand for the oldest period is discarded and the demand for the newest period is added for the next calculation, overcoming the major shortcoming of the simple averaging model.

A simple moving average is calculated as follows:

$$MA = \frac{\text{sum of demands for periods}}{\text{chosen number of periods}} \tag{3.4}$$

$$MA = \frac{\sum_{t=1}^{n} D_t}{n} = \frac{1}{n} D_1 + \frac{1}{n} D_2 + \ \ldots \frac{1}{n} D_n$$

where

n = the chosen number of periods
$t = 1$ is the oldest period in the n-period average
$t = n$ is the most recent period
D_i = the demand in the ith period

EXAMPLE Frigerware has experienced the following demand for ice coolers during the past six months:

Month	Ice Coolers Demanded
January	200
February	300
March	200
April	400
May	500
June	600

The plant manager has requested that you prepare a forecast using a six-period moving average to forecast July sales. It is now July 2, and we are to begin our production of ice coolers on July 6.

$$MA = \frac{\sum_{i=1}^{6} D_i}{6} = \frac{200 + 300 + 200 + 400 + 500 + 600}{6}$$
$$= 367$$

Using a six-month moving average, the July forecast is 367. Now examine the data. A three-month moving average might be a more accurate forecast. If we use three months, the forecast for July is:

$$MA = \frac{\sum_{i=1}^{3} D_i}{3} = \frac{400 + 500 + 600}{3}$$
$$= 500$$

If we use a one-month moving average, the forecasted demand for July is the actual demand for June, so the July forecast is 600.

We must make some recommendation to the plant manager for Frigerware. For now, let's recommend using a three-month moving average of 500 ice coolers for July, since that number looks more representative of the time-series pattern than does the six-month moving average, and it is based on more data than is the one-month moving average.

Weighted moving average An averaging method that allows for varying weighting of old demands.

Weighted Moving Average Sometimes the forecaster wants to use a moving average but does not want all n periods equally weighted. A *weighted moving average (WMA)* allows for varying, not equal, weighting of old demands:

WMA = Each period's demand times a weight, summed over all periods in the moving average (3.5)

$$n = \sum_{i=1}^{n} C_i D_i$$

where

$$0 \leq C_i \leq 1$$
$$\sum_{i=1}^{n} C_i = 1$$

This model allows uneven weighting of demand. If n is three, for example, we could weight the most recent period twice as heavily as the other periods by setting $C_1 = .25$, $C_2 = .25$, and $C_3 = .50$.

AMPLE

For Frigerware, a forecast of demand for July using a three-period model with the most recent period's demand weighted twice as heavily as each of the previous two periods' demand is:

$$\text{WMA} = \sum_{i=1}^{3} C_i D_i = .25(400) + .25(500) + .50(600)$$

$$\text{WMA} = 525$$