

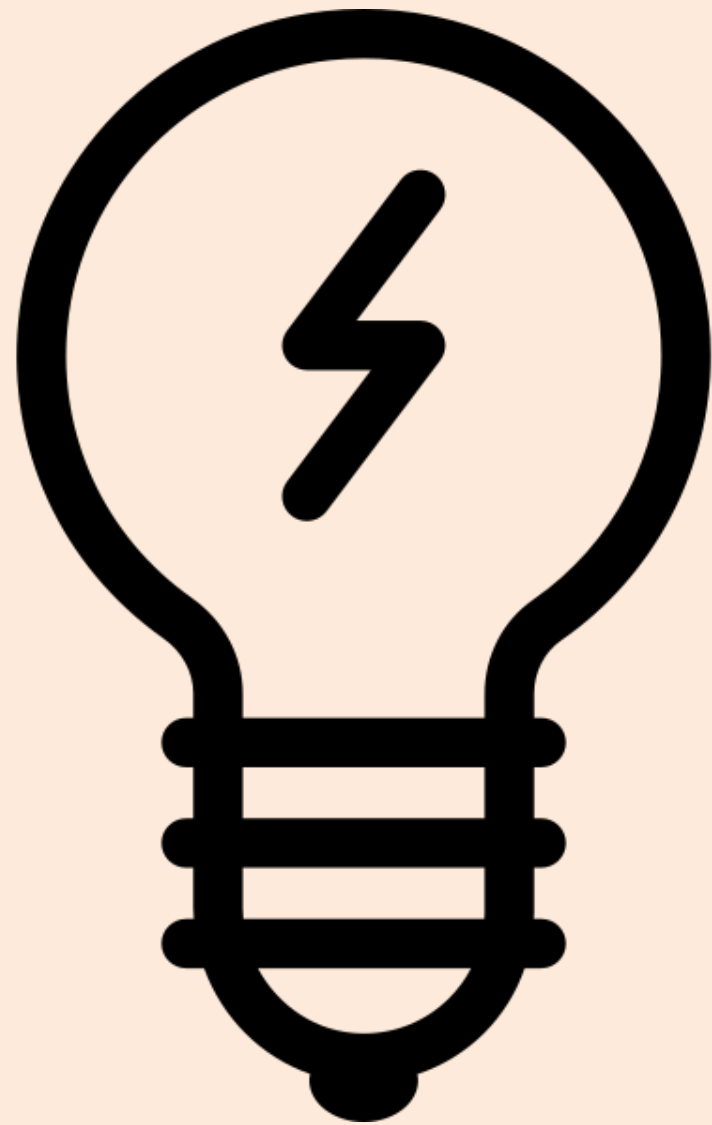


OPTIMAL PRODUCT MIX

Michaels Chocolates

Using Scenario & Answer Report generated in EXCEL Solver

AGENDA



- Executive Summary
- The Problem
- The Solution
- Solution Analysis
- Change in optimal mix
- Change in space utilization
- Change in profit per unit
- Insights
- Recommendation

Executive Summary

Michaels Chocolates sells chocolates in single bars, 6-packs, and 12-packs to convenience and grocery stores. They are expanding to a national chain big box store where they have purchased 45 square feet of shelf space. They want to optimize the use of that shelf space to ensure that they showcase all three configurations of their product while maximizing profit as best they can.

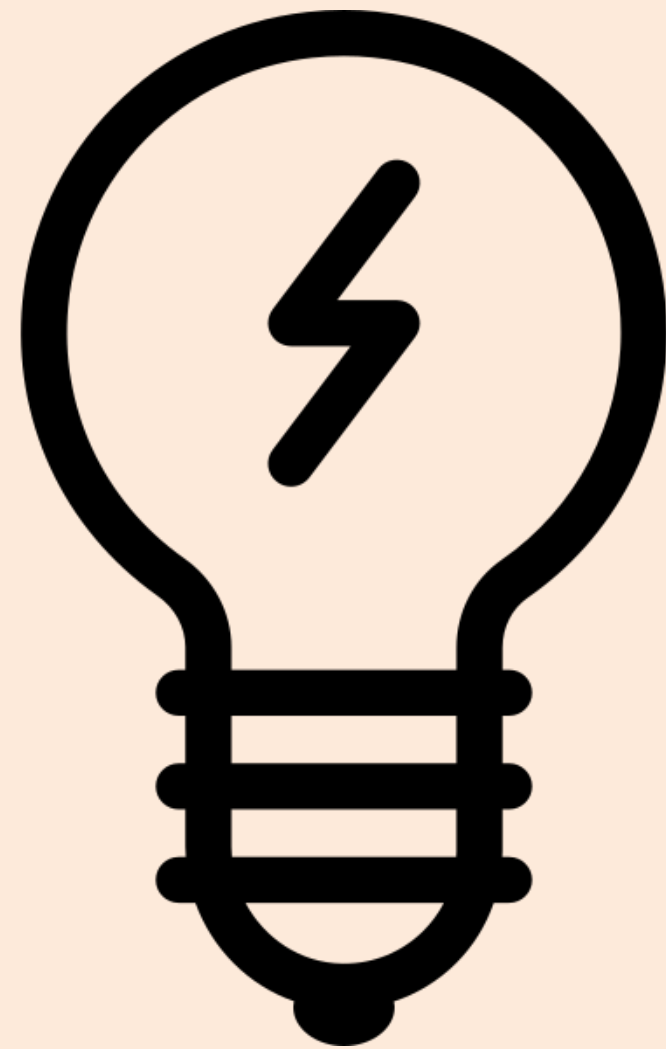
Keeping in mind the space constraint (max. 45 sq feet) and changing display constraints (single bars: 50 max, 6-pack: min 30 and 12-pack: min 30 in the first case & max. 30 of 12-packs in the second case), we came up with two scenarios to find the optimal mix from the perspective of maximizing profit. They are listed below:

Scenario 1: Min 30, 12- packs	Singles	6-pack	12-pack	Max. Profit	Scenario 2: Max 30, 12- packs	Singles	6-pack	12-pack	Max. Profit
Optimal Mix	50	30	40	\$52.55	Optimal Mix	50	48	30	\$52.20

We recommend scenario-2 for Michaels Chocolates as they can display total of 128 items on the shelf as compared to 120 in scenario-1 satisfying all the requirements of Michaels about the item's display and maximum profit. The profit difference in the 2 scenarios is very miniscule around \$0.35.

The critical point Michaels should keep in mind while choosing scenario-2 is that the profit difference between 6-pack and 12-pack is less in this case (\$4.60) as compared to scenario-1 where it is more than double. Assuming that customers are health conscious & would buy small pack of chocolate than bigger one, choosing scenario-2 would allow them to display more of 6-packs which can sell like hot-cakes as per our assumption.

THE PROBLEM



Michaels Chocolates sells chocolates in single bars, 6-packs and 12-packs to convenience and grocery stores. Their main goal is Profit Maximization. The two problems faced are:

1. **Space Constraint:** Michaels want to optimize the usage of 45 square feet display shelf so that they can showcase their three product categories to yield maximum profit.

2. **Display Constraint:** Michaels has the following two scenarios of display constraints:

DKS 120 49 DKS 120 50

Display Scenario 1

Single bars: 50 maximum
6-Packs: 30 minimum
12-packs: 30 minimum

▶ 7 ▶ 8 ▶

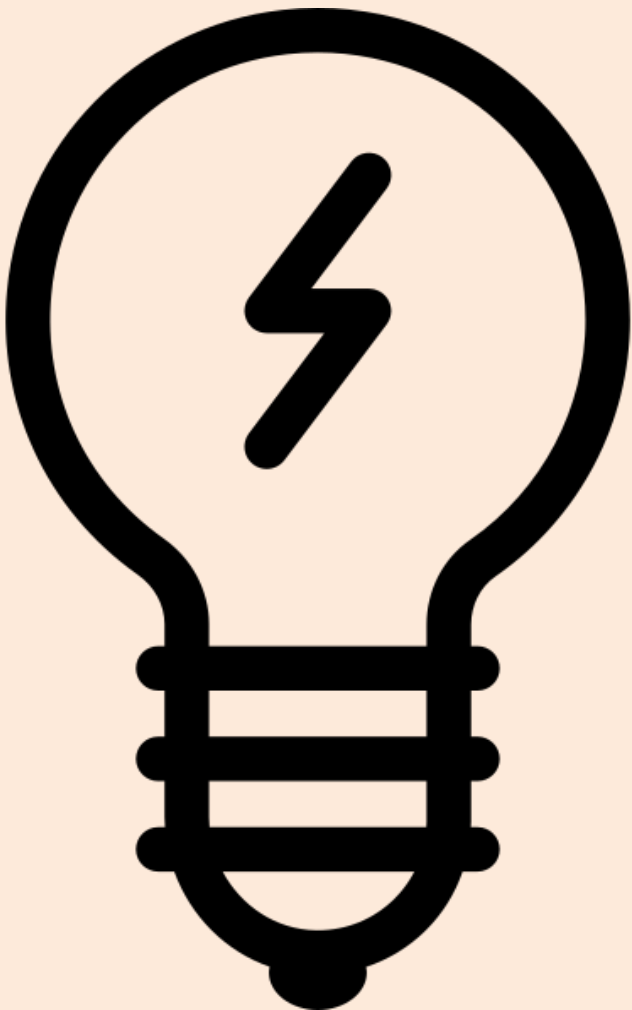
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Display Scenario 2

Single bars: 50 maximum
6-Packs: 30 minimum
12-packs: 30 maximum

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SOLUTION

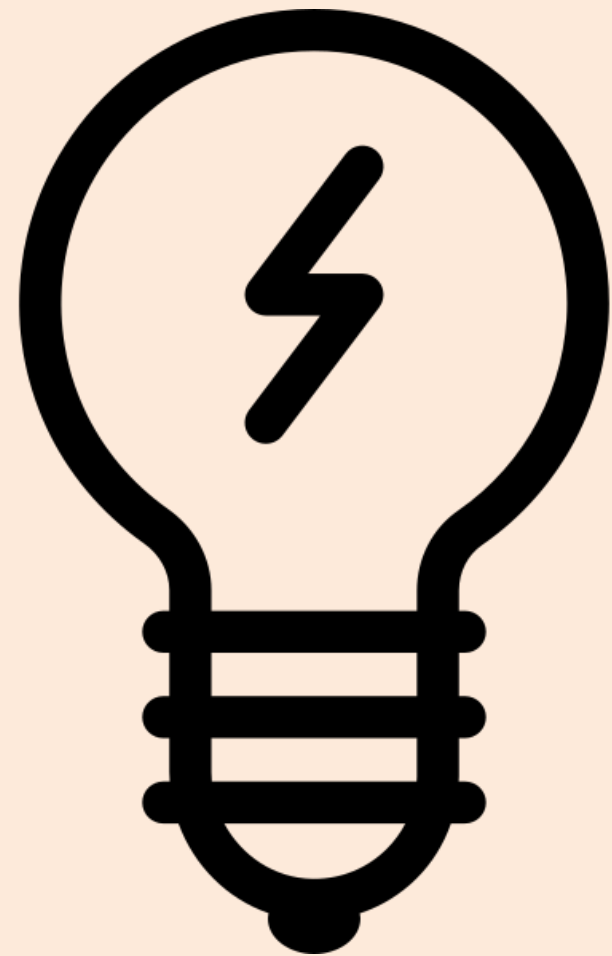


The two solution scenarios have been provided below with respect to the above mentioned constraints.

Solution for Scenario 1			
Max Profit:			
\$52.55	Number of Items	Space per item (sq feet)	Profit per item(\$)
Single Bars	50	3	\$4.00
6- Packs	30	12	\$13.50
12- Packs	40	30	\$35.05

Solution for Scenario 2			
Max Profit:			
\$52.20	Number of Items	Space per item (sq feet)	Profit per item (\$)
Single Bars	50	3	\$4.00
6- Packs	48	19	\$21.80
12- Packs	30	23	\$26.40

SOLUTION ANALYSIS



The solutions attained in the two scenarios will be analyzed and compared from the following perspective:

- Differences in the optimal mix
- Differences in the space utilization by different items
- Differences in profit per item

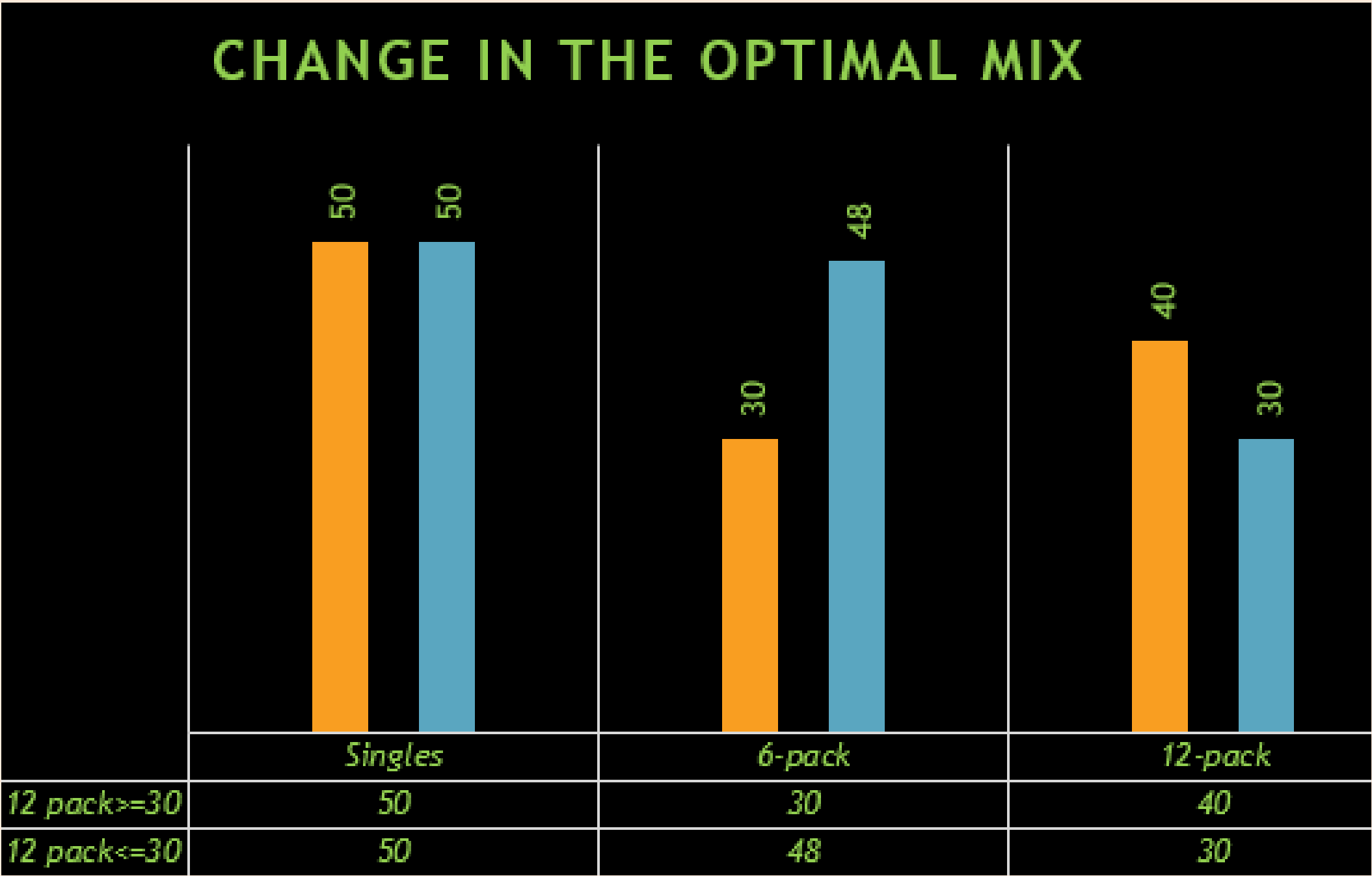
Analysis:

Scenario-1 (Min 30 units of 12-Packs)
Scenario-2(Max 30 units of 12-Packs)

Single Bars: There seems no differences between 2 scenarios in case of single bars as Michaels can sell 50 units of it.

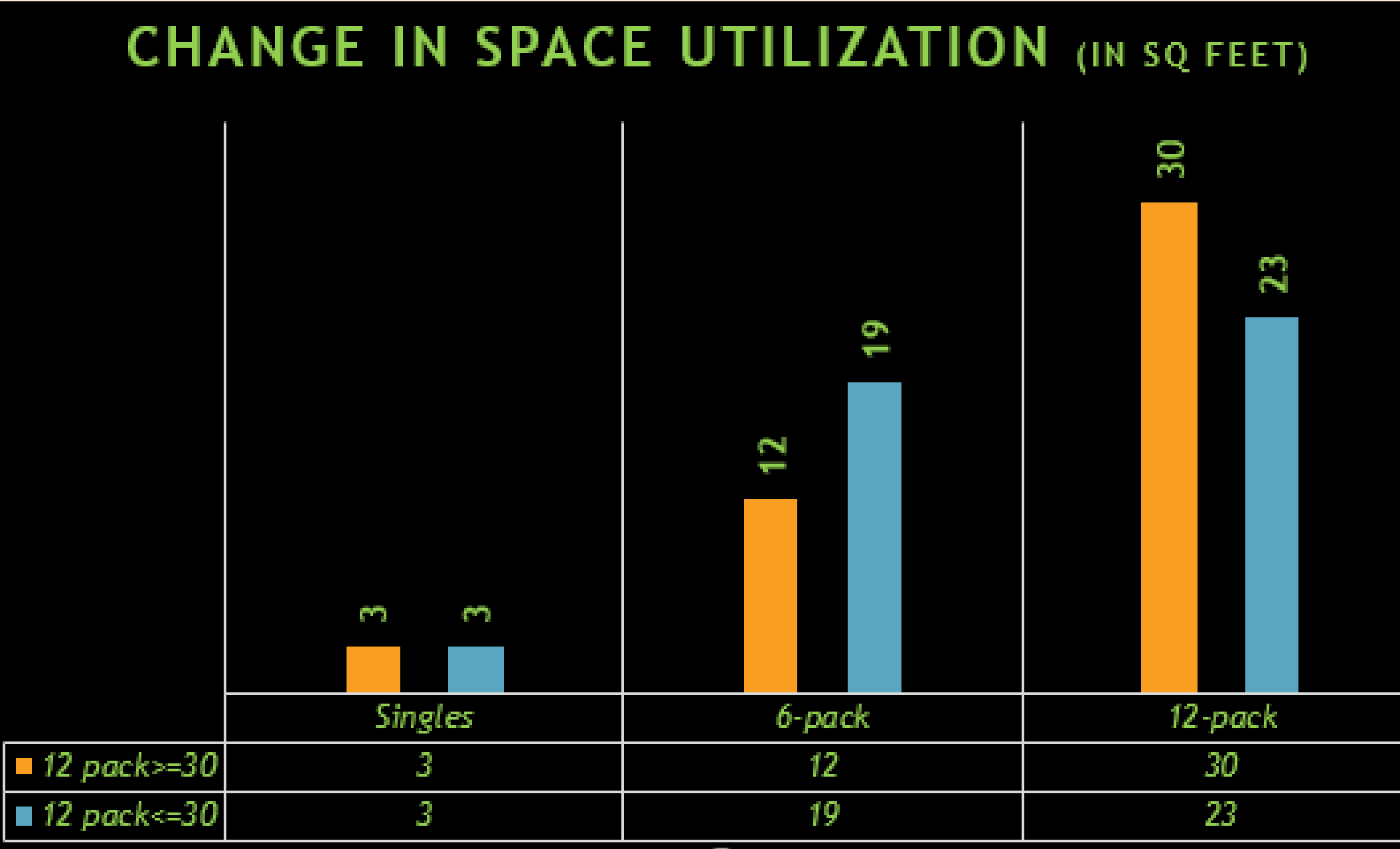
6-Packs: When there a constraint of maximum 30 units of 12-Packs then it seems to have an impact on the number of 6-Packs. Now, 48 units of 6-Packs can be displayed instead of 30. It is 1.6 times more than the number of 6-pack on the shelf when there was no minimum restriction on 12-Packs.

12-Packs: Scenario-1 has 10 more units of 12-Packs (i.e. 40) than scenario-2 (i.e. 30) on the display shelf.



Analysis:

Scenario-1 (Min 30 units of 12-Packs)
Scenario-2(Max 30 units of 12-Packs)



Single Bars: The space required for single bars are the same i.e. 3 sq feet in both scenarios.

6-Packs: Since 48 units of 6-packs can be displayed in 2nd scenario so the space required for it also increases from 12 sq feet to 19 sq feet.

12-Packs: Under scenario-1, the space utilization is more at 30 sq feet because 40 units of 12-Packs were displayed whereas only 23 sq feet of display space is used when a maximum of 30 units of 12-Packs are displayed in Scenario-2

Analysis:

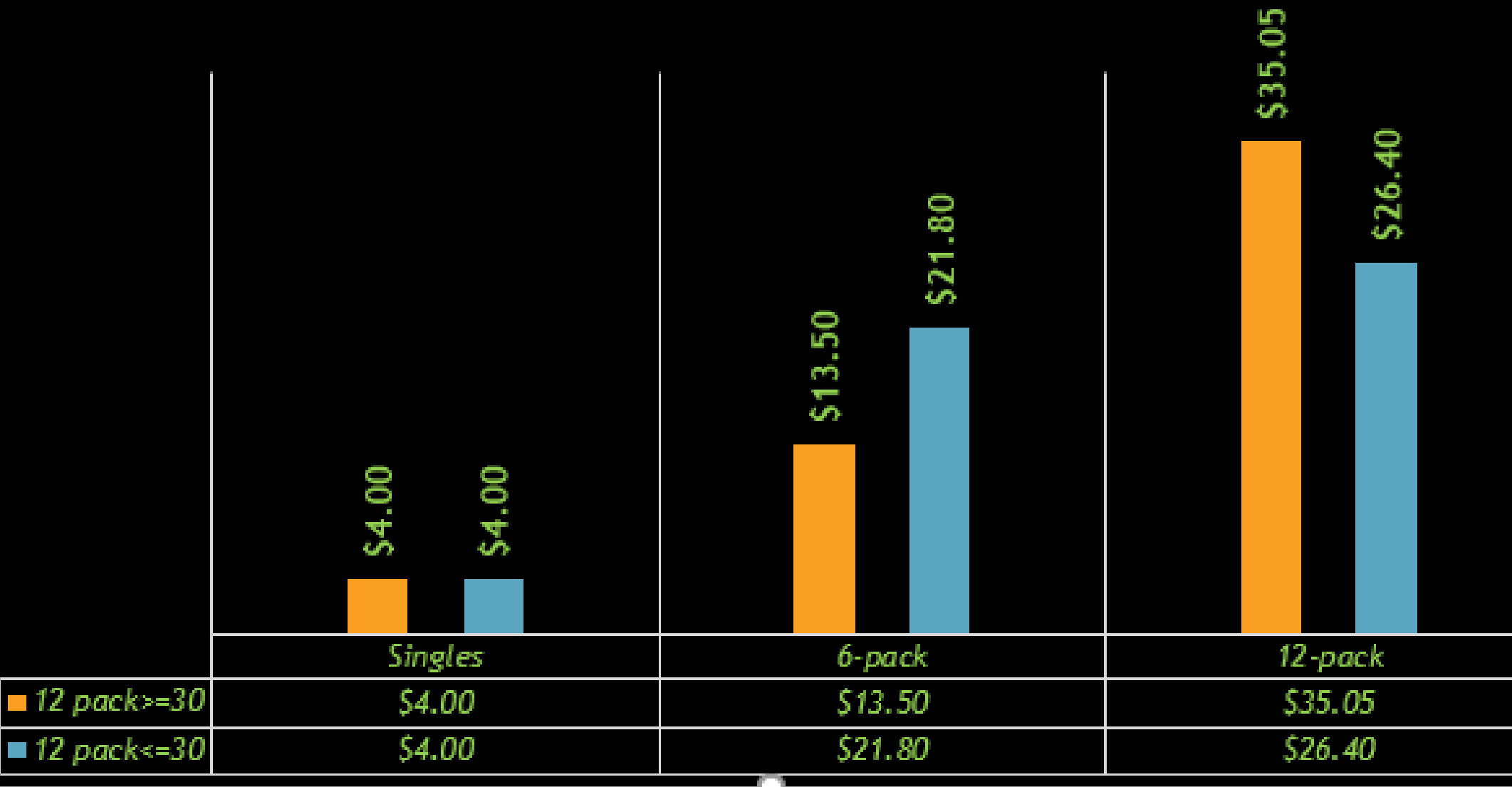
Scenario-1 (Min 30 units of 12-Packs)
Scenario-2(Max 30 units of 12-Packs)

Single Bars: The profit for single bars is same at \$4.00 in both scenarios.

6-Packs: Scenario-2 yields more profit of \$21.80 as compared to \$13.50 in case of scenario-1. There is an increase of \$8.30 in the profit in scenario-2 as more units of 6-Packs can be displayed.

12-Packs: There is a higher profit of \$35.05 on 12-packs when there is no minimum display restriction on it. The profit declines by an amount of \$8.65 to \$26.40 when maximum of 30 units of 12-Packs can be displayed

CHANGE IN PROFIT PER ITEM (IN DOLLARS)



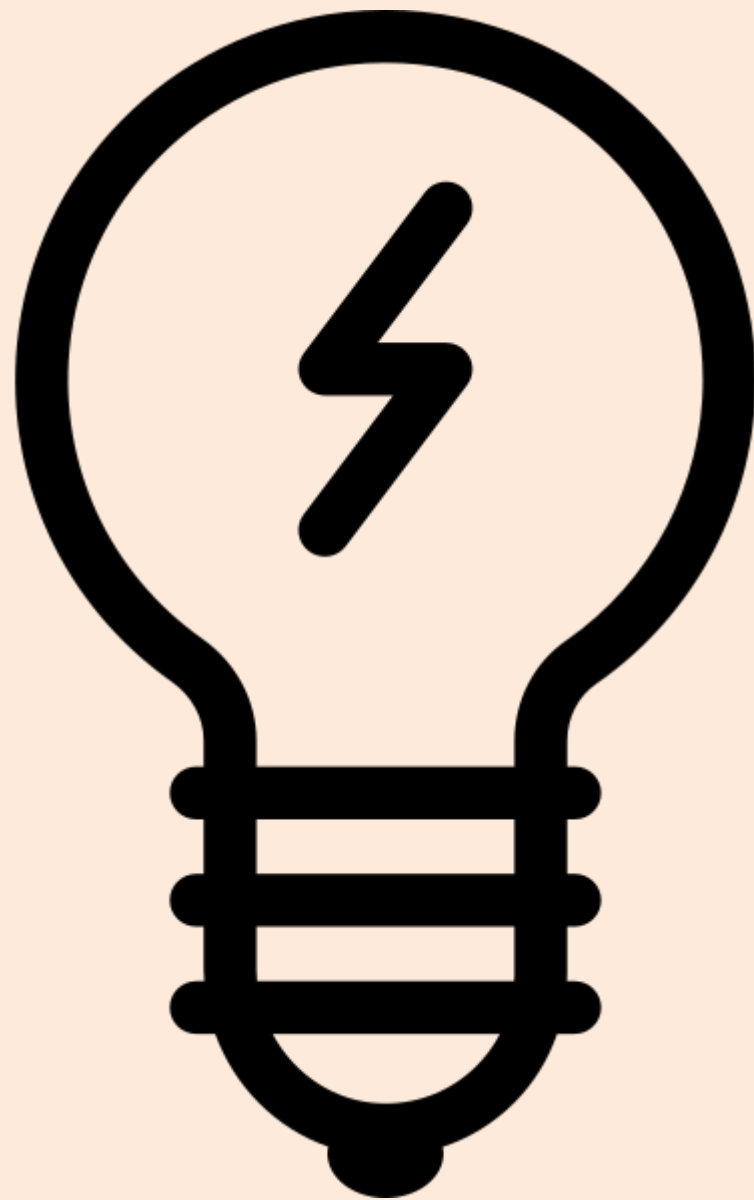
INSIGHTS

Scenario-1 (Min 30 units of 12-Packs)

Scenario-2 (Max 30 units of 12-Packs)

- Scenario-1 has more overall profit of \$52.55 as compared to \$52.20 under scenario-2.
- The profit difference between 6-Pack and 12-Pack in scenario-1 is more than double whereas there is only a slight difference of \$4.60 in scenario-2.
- Since scenario-1 has more units of 12-Packs to be displayed in comparison to scenario-2 which means there is less display space for Single Bars and 6-Packs. This also means that total profit will be heavily dependent on the sale of 12-Packs in scenario-1.
- In scenario-2 there is a little difference between the profit of 6-pack and 12-pack (\$4.60). Also, the number of items Michaels can put on the shelf are more i.e. 128 when compared to scenario-1 i.e. 120. This is mainly because now more units of 6-Pack can be displayed on the shelf.

RECOMMENDATION



We recommend that Michaels should opt for scenario-2 where there is a restriction on the display of 12-Packs. The reasons are:

- Ability to display more items and also from different categories on the shelf.
- Difference in the maximum total profit between 2 scenarios is very small (\$0.35).
- All the requirements of Michaels about the item display and maximize profit are satisfied.

The critical point we think Michaels should keep in mind while opting for scenario-2 is that the profit does not depend on any categories. In fact, it can sell more as it is able to satisfy different requirements of the customers. Customers might want to buy a smaller pack of chocolate than the bigger ones assuming that they are more health conscious.

THANK YOU
