Qlik

LEAD WITH DATA™

Qlik Sense Project – 2020 – 2022 v6
TC Ice Cream
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Project Introduction

1. What is Qlik Sense?

Qlik Sense is Business Intelligence application that enables you analyze data, create visualizations/dashboards and share application among organizations.

The purpose of the assignment is for you to learn how a business analytics tool can be used to build an application (dashboard) and provide users the ability to analyze business data quickly.

Qlik Sense Introduction video
https://www.qlik.com/us/products/qlik-sense

2. A quick tour of Qlik Sense

If you do not have any experience with Qlik Sense, is recommended you familiarize yourself with how to navigate through a Qlik Sense application AND understanding some basic Qlik Sense terminology.

https://learning.qlik.com/mod/page/view.php?id=24700
"Getting Started Videos"

Note: you only have to view the interactive videos only and you need a Qlik Sense Continuous Class account (see appendix).

3. Help Videos

Videos related specifically to this application can be found on You Tube:

https://www.youtube.com/playlist?list=PLl4F1FsqnyHD6Wz9Q63qxqp9EnIpkqfNt
(Note : see the Appendix for more details)

Videos related to Qlik Sense – specific features and functionality can be found on the Qlik Sense learning web site:

https://learning.qlik.com/

https://help.qlik.com/

See the appendix for details on obtaining access to the Qlik Sense learning web site and resources.

4. Creating a Qlik Sense Account and Apply to the Academic Program

To receive Qlik Sense and access training and other resources, you will need to apply to the Qlik Academic Program.

To apply visit https://www.qlik.com/us/company/academic-program and scroll down to the student application. This application will prompt you to create a Qlik account and apply to the program in one continuous step. If you already have a Qlik account, skip the account creation, and login to complete the application. Watch this video for reference, Video (qt-lss.s3.amazonaws.com)

Once you are approved in the program you will be sent emails about how to create your Qlik Sense tenant and where to access the training and other resources on behalf of the Qlik Academic Program.

All of the resources provided by the program can be found in the Qlik Learning Portal- Academic Program Page (make sure you are logged in).

I would recommend the Business Analyst videos found in the Self-Paced Learning section, here is the direct link

Business Analyst https://learning.qlik.com/mod/page/view.php?id=24700 (Note: you only have to view the interactive videos only and you need a Qlik Sense Continuous Class account (see appendix).

5. Project Background

- TC Ice Cream - located in the northern region of Michigan – specializes in premium brand ice cream flavors and products.
- An example product would be a gallon of TC Cookie Dough Ice Cream. Sales are conducted via the web site and over the phone.
- The products are sold and sent to distributors throughout the United States. In turn, the distributors sell to local restaurants, vacation resort/destinations, etc... (Industry – Leisure and Hospitality)
- The sales team has obtained sales data from 2016-2019 from the IT department and management would like to analyze the data to determine trends to create future marketing strategies.
- The analysis to be conducted is to review different trends such as flavors sold, products sold, location of sales and month/year of sales.
- Primary analysis is focused on the ice cream flavors – what is selling the most, what is selling the least (by product type, state/city, etc…)

Fast Facts
- TC Ice Cream started off as a family-owned and operated business offering its products to local restaurants, and vacation resorts/destinations in northern Michigan.
- TC Ice Cream has gained in popularity over the past two years due to recent publicity such as winning awards on television network food shows and social media.
- In 2018, TC Ice Cream invested in new production processes as well as added space to their production facility.
- Products are sold by case; each case contains 20 single items of the specific product.
    - Example: If a distributor purchases a case of Cookie Dough Ice Cream Gallon, the case would be equal to 20 one-gallon containers of Cookie Dough Ice Cream
- Out of scope for this analysis includes:
    - Customer specific data
    - Shipping Logistics
    - Specific Revenue and Expenditures Accounts
    - Manufacturing Capacity

6. Assignments

1. Based upon the specifications in this document, your first assignment is to create a Qlik Sense application which can be used to analyze the 2016-2019 data. You will be creating the application using the Qlik Sense cloud environment. The result is to create an application that can be used easily to analyze 2016-2019 sales data of Ice Cream products and flavors.
2. A quiz has been created which covers a variety of questions about Qlik Sense and the application you create. You will use your application you have created to take the quiz and answers the questions.

Due dates for both assignments (the application and quiz) will be communicated by your professor accordingly.

TC-Ice-Cream-2022.qvf Template – upload process

In order to complete the Qlik Sense project, you will need to create an account on the Qlik Sense cloud environment. Please see the **appendix** of this document for more details. The IT department has provided you with a Qlik Sense application with the data already pre-loaded and only one sheet to test the data.

To upload the Qlik Sense Application:

Step 1 – download the **TC-Ice-Cream-2022.qvf** file provide by your professor (this usually can be found in the course LMS application).

Step 2 – access your Qlik Sense Cloud account
- Go to account site (usually yourusername.us.qlikcloud.com)
- Click on Login
- Use your Qlik Sense account username and password

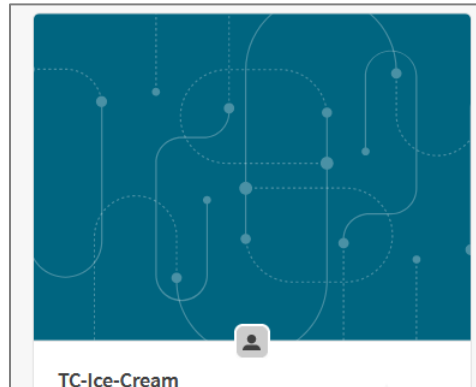Step 3 – upload the **TC-Ice-Cream-2022.qvf** file.
- From your Qlik Cloud Hub click on the New App icon
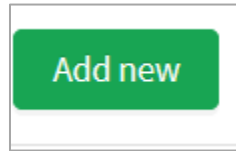
Step 4 – From the pop-up window click on "Upload an app". Drop the **TC-Ice-Cream-2022.qvf** file OR Choose the file **TC-Ice-Cream-2022.qvf**
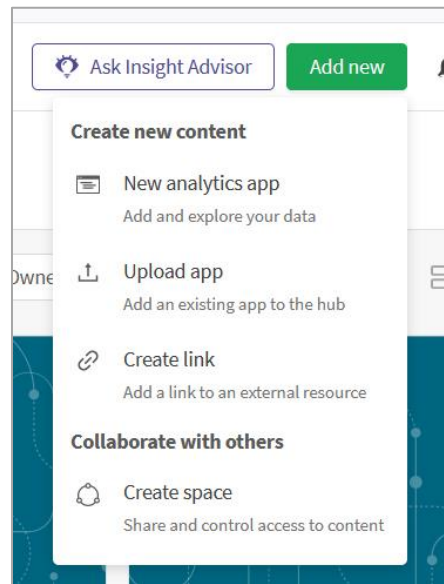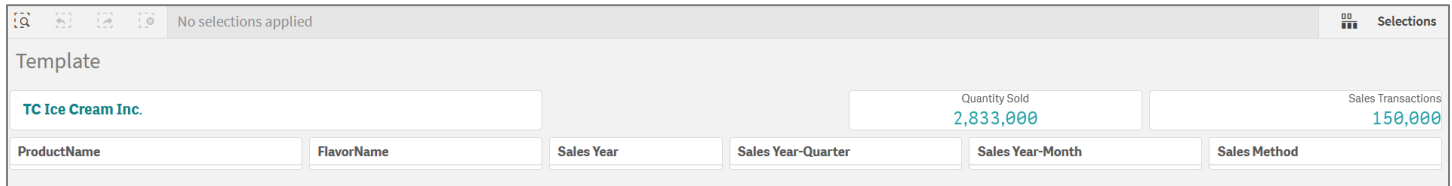
Step 5 – If you see a large icon with the TC-Ice-Cream in the My Work area, your application was successfully loaded (see screen grab below).

Step 6 – Click on the icon to open the application.
You will see the following:
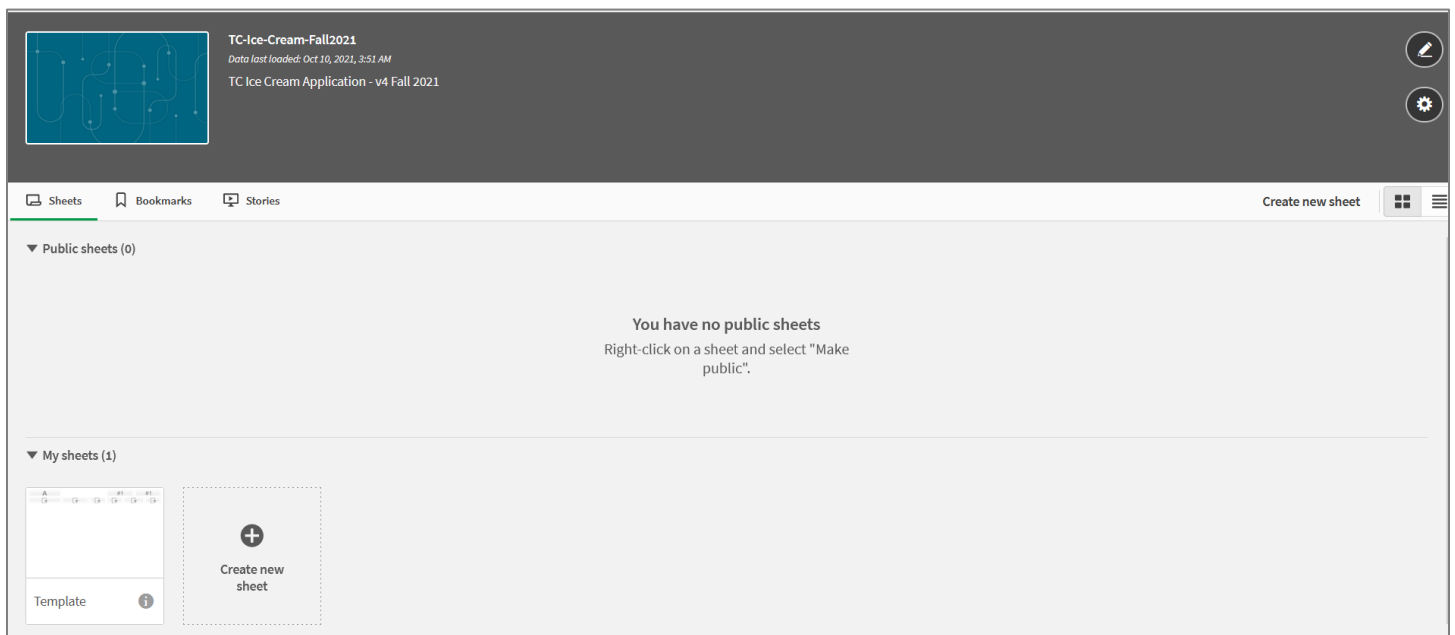
Step 7 – click on the "Template" sheet to open the test data. If your sheet looks like the below and the numbers match, your application has been successfully loaded into your Qlik Sense Cloud Environment.


Access your Qlik Sense Application

Once the set-up steps are completed, you no longer need to repeat the set-up steps to access your application.

To access your Qlik Sense application:

Step 1 – access your Qlik Sense Cloud account
- Go to Qlik Sense Account (yourusername.us.qlikcloud.com)
- Click on Login
- Use your Qlik Sense account username and password

Step 2 – You will see large icon with the TC-Ice-Cream in the My Work area. Click on the large icon to access the application.

TC-Ice-Cream
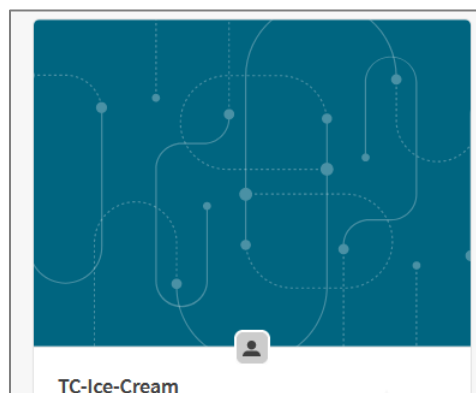
Part 1 – Quantity Sold Analysis

Create Master Items

When you create and build your application, you can save assets which can be used the sheets throughout your application. You can save visualizations, dimensions and measures, as master items. Any modifications you make to the master item are applied everywhere the master item is in use.

Create Master Items – Master Dimension- FlavorDescription:
You need to create a Master Dimension.
Type: Single
Name: FlavorDescription
Field : FlavorName

Value colors:

Flavor Name	Hex Value
Butter Pecan	D9AF62
Chocolate	BF7154
Coffee	A66E4E
Cookie Dough	5E412F
Cookies and Cream	261C1C
Mint Chocolate Chip	07F2C7
Rocky Road	595020
Strawberry	F28DA8
Vanilla	F2F2F2

Create Master Items – Master Dimension- Flavor-Product:
You need to create a Master Dimension.
Type: Drill Down
Name: Flavor-Product
Fields: Flavor Name, Product Name

Business Requirements

Your assignment is to build the TC Ice Cream application. The following below is a list of sheets you will build.

Sheet Name	Visualizations
Product Analysis	• Percent of Quantity Sold by Flavor Pie Chart • Quantity Sold by Flavor Bar Chart • Quantity Sold by Year/Month Line Chart
State Analysis	• Quantity Sold by City/State Map • Top Ten Cities Bar Chart
Raw Data	• Date – Flavor/Product Quantity Sold Pivot Table

You will be using the following chart types:

- Filter
- KPI
- Pie Chart
- Bar Chart
- Line Chart
- Map
- Pivot Table

Template Sheet

To build the sheets as defined by the Business Requirements (page 5), you can use the template sheet as a starting point.

To make a copy of the template sheet:

1. Go to the App overview screen (the application home)
2. Right-click on the Template sheet
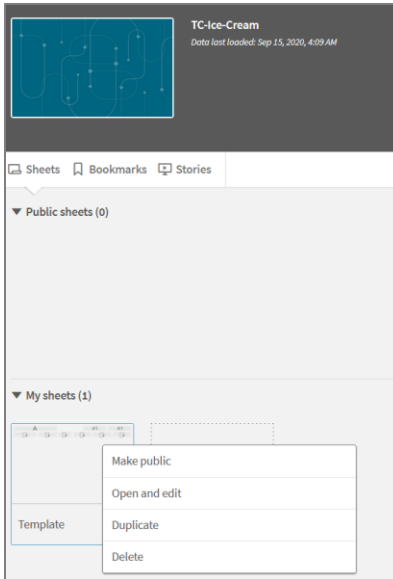
3. Click on 'Duplicate'
4. A new sheet will appear and Qlik Sense will prompt you to provide a name for the sheet. Enter the name of your new sheet (example : Product Analysis)
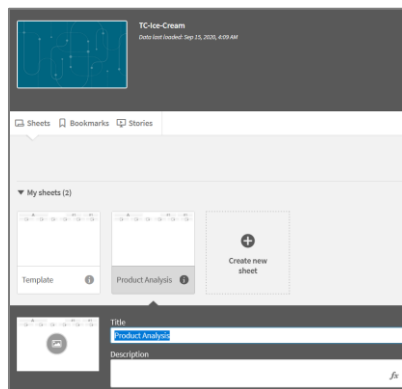
Note: You can duplicate any sheet in your Qlik Sense application. The Template sheet was set-up for you as a starting point.

Product Analysis Sheet

Purpose:
Contains visualizations as related to flavors/products.
Note: use the template sheet as a starting point.

Sheet Name: Last Name – Product Analysis

Sheet Visualizations:
Percent Quantity Sold by Flavor / Product Pie Chart
- Dimension – Flavor-Product (Master Item)
- Measure – sum(QuantitySold)
- Appearance – Colors
  - Set to "Custom" and "By Dimension". The Dimension should be FlavorDescription
  - To validate:
    - The pie slices (flavors) should coordinate with the colors set in the FlavorDescription Master Item Dimension
    - When you click on a single pie slice (flavor), the products for that specific flavor should appear with the appropriate percentages

Quantity Sold by Flavor/Product Bar Chart
- Dimension – Flavor-Product (Master Item)
- Measure – sum(QuantitySold)
    Under the Measure:
  - Show values as numbers
  - Add an 'average' trend line
- Sorting – change sort order to (1) QuantitySold, (2) Flavor-Product
- Appearance – Colors:
  - Set to "Custom" and "By Dimension". The Dimension should be FlavorDescription
  - To validate:
    - The bars (flavors) should coordinate with the colors set in the FlavorDescription Master Item Dimension
    - When you click on a single bar (flavor), the products for that specific flavor should appear with the appropriate percentages
- Appearance – Presentation:
  - Set the "value labels" to on

Quantity Sold by Year/Month Line Chart
- Dimension – SalesDate.YearMonth
- Measure – sum(QuantitySold)
    Under the Measure:
  - Show values as numbers
  - Add an 'average' trend line
- Appearance – Presentation:
  - Set the "value labels" to on

Potential Sheet Solution:

Product Analysis

TC Ice Cream Inc.

	Quantity Sold	Sales Transactions
	2,833,000	150,000

ProductName	FlavorName	Sales Year	Sales Year-Quarter	Sales Year-Month	Sales Method

Percent of Quantity Sold by Flavor

FlavorName

- Vanilla 18.1%
- Cookies and Cream
- Strawberry
- Butter Pecan
- Chocolate
- Mint Chocolate Chip
- Rocky Road

Quantity Sold by Flavor

FlavorName	Quantity Sold
Butter Pecan	307,890
Chocolate	312,139
Coffee	163,148
Cookie Dough	314,535
Cookies and Cream	284,962

Quantity Sold by Year/Month

2016: 11,131 36,538 25,923 101,673 35,443 37,335
2017: 7,435 29,549 20,608 134,822 74,740 63,174 37,377 50,218
2018: 74,893 120,508 65,341 42,655 70,431 71,783
2019: 65,718 69,492 70,959 228,696 235,494 231,604 70,720 74,028 71,700

State Analysis Sheet

Purpose:
Contains visualizations as related to states in which products were sold.
Note: use your template sheet as a starting point.

Sheet Name: Last Name – State Analysis

Sheet Visualizations:

Suggestion – add a Filter for the dimension "City-State" and "State"
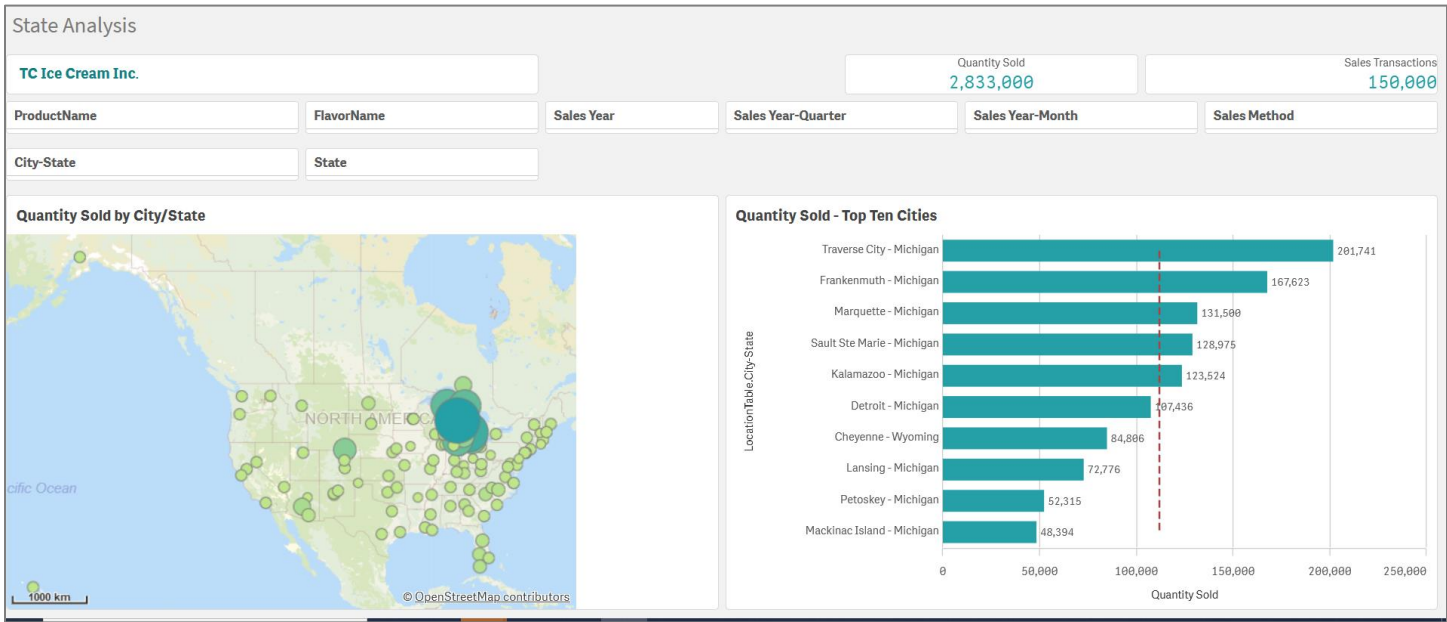
Quantity Sold by City/State
- Layers – Point Layer
- Click on Point Layer for the following settings:
    - Dimension – CIty
    - Location – check the "Longitude and Latitude fields" checkbox. Use the Longitude for the Longitude field and Latitude for the Latitude field
    - Size and Shape
        - Size by: sum(QuantitySold)
        - Bubble Size Range: adjust accordingly
        - Range: Auto
    - Set the colors to "by measure" and the measure QuantitySold (Library Colors should be set to "on")

Top Ten Cities Bar Chart
- Dimension – City
    - In the City Dimension – set the Limitation to "Fixed Number" and show the top 10
- Measure – sum(QuantitySold)
        Under the Measure:
    - Show values as numbers
    - Add an 'average' trend line
- Show values as number
Sort by QuantitySold then by City

Potential Sheet Solution:

State Analysis

TC Ice Cream Inc.			Quantity Sold	Sales Transactions
			2,833,000	150,000

ProductName	FlavorName	Sales Year	Sales Year-Quarter	Sales Year-Month	Sales Method

City-State	State

Quantity Sold by City/State

Quantity Sold - Top Ten Cities

City-State	Quantity Sold
Traverse City - Michigan	201,741
Frankenmuth - Michigan	167,623
Marquette - Michigan	131,500
Sault Ste Marie - Michigan	128,975
Kalamazoo - Michigan	123,524
Detroit - Michigan	107,436
Cheyenne - Wyoming	84,806
Lansing - Michigan	72,776
Petoskey - Michigan	52,315
Mackinac Island - Michigan	48,394

Raw Data Sheet

Purpose:
Contains visualizations as related to the data of the application.
Note: use your template sheet as a starting point.

Sheet Name: Raw Data

Sheet Visualizations:

Date/Transaction ID – Flavor/Product Quantity Sold PivotTable
- Rows – SalesDate.Date, SalesID
- Columns – FlavorName, ProductName
- Measures – sum(QuantitySold)
- Show values as numbers

Potential Sheet Solution:

Raw Data									
TC Ice Cream Inc.					Quantity Sold 2,833,000			Sales Transactions 150,000	
ProductName		FlavorName		Sales Year		Sales Year-Quarter	Sales Year-Month		Sales Method

Date/Transaction ID – Flavor/Product Quantity Sold

SalesDate.Date 🔍 FlavorName 🔍 ProductName 🔍
SalesID 🔍

	Butter Pecan	Chocolate	Coffee	Cookie Dough	Cookies and Cream	Mint Chocolate Chip	Rocky Road	Strawberry	Vanilla
⊕ 1/1/2016	6	12	16	35	104	62	28	58	37
⊕ 1/2/2016	98	12	70	31	6	24	18	14	10
⊕ 1/3/2016	79	57	60	16	4	22	12	30	51
⊖ 1/4/2016	26	28	100	32	37	43	16	35	7
20000098	-	-	5	-	-	-	-	-	-
20000099	-	-	-	-	-	10	-	-	-
20000100	-	-	12	-	-	-	-	-	-
20000101	-	-	15	-	-	-	-	-	-
20000102	-	-	-	-	-	6	-	-	-

Part 2 – Profit Analysis

Profit Analysis Background

This section of the application creates measurements to determine the profit based upon quantity sold. As stated in the background, products are sold by case; each case contains 20 single items of the specific product.

- *Example: If a distributor purchases a case of Cookie Dough Ice Cream Gallon, the case would be equal to 20 one gallon containers of Cookie Dough Ice Cream*

The financial department provided the following information regarding each product:

ProductID	ProductName	ProductProfitID	Profit Per Case
2001	Ice Cream Gallon	1	$45.00
2002	Ice Cream Pint	1	$45.00
2003	Ice Cream Mini-Cups (12 per pack)	2	$25.00
2004	Ice Cream Sandwiches (12 per pack)	2	$25.00
2005	Ice Cream Bars (12 per pack)	3	$35.00
2006	Ice Cream Taco (12 per pack)	3	$35.00
2007	Ice Cream Bites (36 per bag)	3	$35.00
2008	Ice Cream Mini-Cakes	4	$80.00

- ***Note: Profit Per Case*** *is calculated as total revenue less total expenses. Specific revenue and expense calculations are out of scope of the project.*

Formulas will need to be created to calculate the profit per Sales Transaction based upon the quantity sold.

Create Variables and Master Measures

For the profit calculation, you will need to create a variable to store the different "Profit per Case" information as provided in the table from the Finance Department.

Create Variable:

- While in edit mode, click the 'variables' icon in the lower left corner [x=]
- Click the 'Create New' button in the upper right area of the variable screen
- Enter in the name **vProfitPerCase**
- Formula:
  NUM#(PICK(ProductProfitID,45,25,35,80),'#0.00')

- *Note: to verify your formula click the* fx *in lower right corner. This will open up the 'edit expression' window. You will see the word "OK" if the variable was entered correctly.*
- Click the 'Create New' button to save and close the dialog box.

vProfitPerCase

Definition:

NUM#(PICK(ProductProfitID,45,25,35,80),'#0.00')

fx

Description:

Tags:

The pick function returns the n:th expression in the list. In the vProfitPerCase variable, it will analyze each value and assign the numbers accordingly (45,25,35,80).
https://help.qlik.com/en-US/sense/November2020/Subsystems/Hub/Content/Sense_Hub/Scripting/ConditionalFunctions/pick.htm

Create Master Measures

When you create and build your application, you can save assets which can be used the sheets throughout your application. You can save visualizations, dimensions and measures, as master items. Any modifications you make to the master item are applied everywhere the master item is in use.

Create Master Measure – Sales Profit:
You need to create a Master Measure.
Name: Sales Profit
Measure color: Any color green you wish
Expression:

Sum(QuantitySold*$(vProfitPerCase))

Label Expression: 'Sales Profit'
Number formatting: Custom
Format Pattern: $#,##0

Profit Analysis Sheet

Purpose:
Contains visualizations as related to product profit.
Note: use your template sheet as a starting point.

Sheet Name: Last Name – Profit Analysis

Sheet Visualizations:

KPI
- Add KPI to display the Sales Profit

Table Product – Quantity Sold/Profit
- Dimension – Product Name
- Measure – sum(QuantitySold)
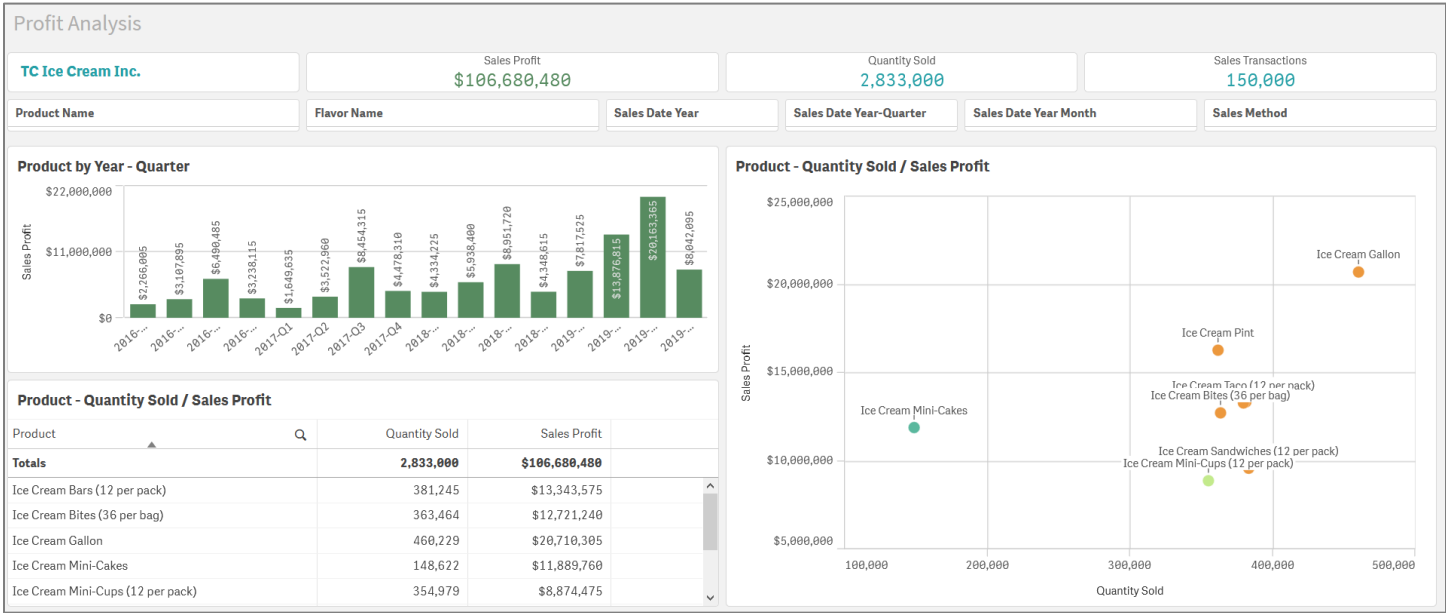- Measure – Sales Profit

Profit by Year/Quarter Bar Chart
- Dimension – SalesDate.YearQuarter
    - Add an 'alternative dimension' SalesDate.YearMonth
- Measure – Sales Profit

Profit by Quantity Sold/Sales Profit Scatter Plot Chart
- Dimension – Product Name
- Measure (x-axis): sum(Quantity Sold)
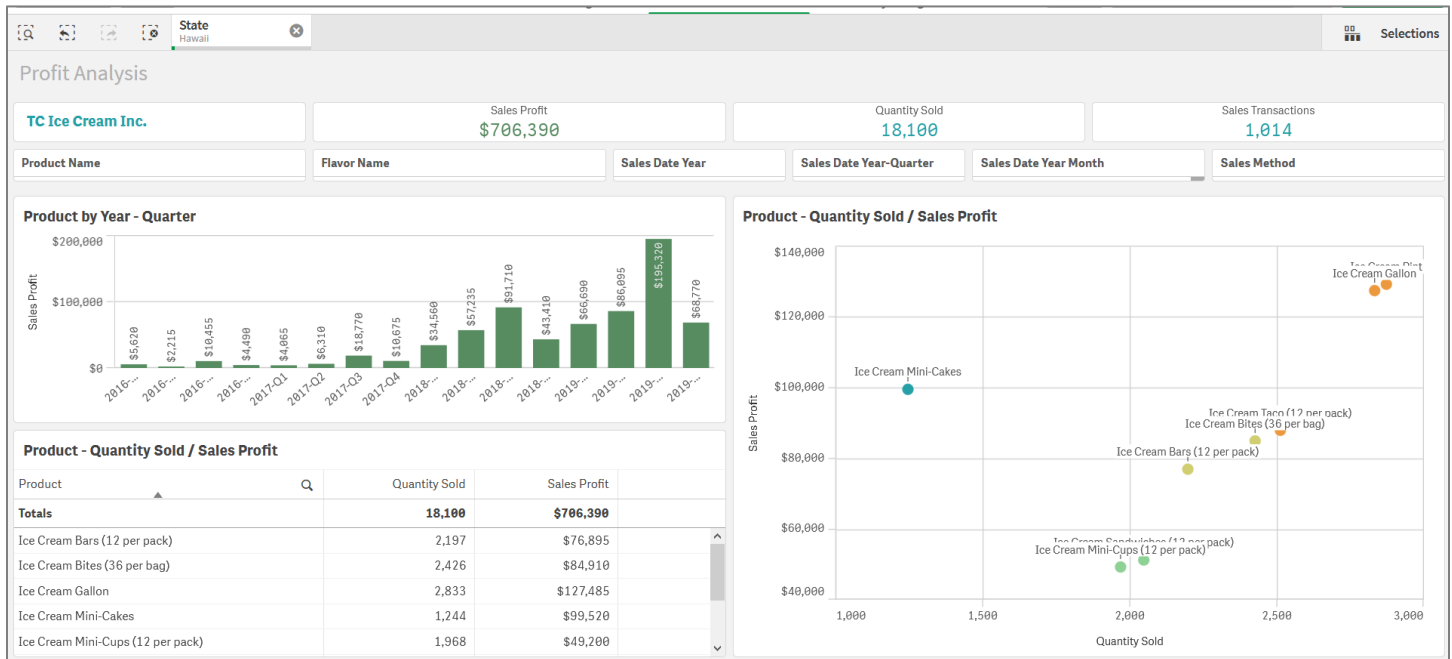- Measure (y-axis): Sales Profit

Potential Sheet Solution:

Validate formulas:

- On the State Analysis sheet, select the state "Hawaii"
- Switch to the Profit Analysis sheet
- The KPIs should display the following values:

Sales Profit: $706,390
Quantity Sold: 18,100
Sales Transactions: 1,014

Part 3 – Forecast Analysis

Forecast Analysis Background

This section of the application creates measurements to determine the forecast for the quantity sold of each product to achieve the next year's profit goal.

Create Variables and Master Measures

For the forecast calculations, you will need to create two variables to be used for the variable expression calculations.

Create Variables:

- While in edit mode, click the 'variables' icon in the lower left corner
- Click the 'Create New' button in the upper right area of the variable screen
- Enter in the name **vProfitGoal**
- Formula:
  50000000

- *Note: to verify your formula click the fx in lower right corner. This will open up the 'edit expression' window. You will see the word "OK" if the variable was entered correctly.*
- Click the 'Create New' button to save and close the dialog box.

- While in edit mode, click the 'variables' icon in the lower left corner
- Click the 'Create New' button in the upper right area of the variable screen
- Enter in the name **vQuantitySoldForecastIncrease**
- Formula:
  0

- *Note: to verify your formula click the ƒx in lower right corner. This will open up the 'edit expression' window. You will see the word "OK" if the variable was entered correctly.*
- Click the 'Create New' button to save and close the dialog box.

---

vQuantitySoldForecastIncrease

Definition:

0

ƒx

Description:

Tags:

Create Master Measures

When you create and build your application, you can save assets which can be used the sheets throughout your application. You can save visualizations, dimensions and measures, as master items. Any modifications you make to the master item are applied everywhere the master item is in use.

Create Master Measure – Past Year Sales Profit:
You need to create a Master Measure.
Name: Past Year Sales Profit
Measure color: Any color you wish (recommend green)
Expression:

```
Sum({$<[SalesYear] = {$(=max([SalesYear]))}>}[QuantitySold]*$(vProfitPerCase))
```

Label Expression: `$(=max([SalesYear]))&' Sales Profit'`
Number formatting: Custom
Format Pattern: $#,##0

The Expression performs the following function:
- Calculates the profit for the maximum year of the data (in this case – the quantity sold for the year 2019)
- Multiples the Quantity Sold * Profit Per Case

Create Master Measure – Past Year Quantity Sold:
You need to create a Master Measure.
Name: Past Year Quantity Sold
Measure color: Any color you wish (recommend blue)
Expression:

```
Sum({$<[SalesYear] = {$(=max([SalesYear]))}>}[QuantitySold])
```

Label Expression: **$(=max([SalesYear]))&' Quantity Sold'**
Number formatting: Number
Format Pattern: 1,000

The Expression performs the following function:
- Calculates the quantity sold for the maximum year of the data (in this case – the quantity sold for the year 2019)

Create Master Measure – Forecast Profit:

You need to create a Master Measure.
Name: Forecast Profit
Measure color: Any color you wish (recommend green)
Expression:

`Sum({$<[SalesYear] = {$(=max([SalesYear]))}>}([QuantitySold]*$(vProfitPerCase))*(1+($(vQuantitySoldForecastIncrease)/100)))`

Note: remove any line breaks and verify your express is "OK" (bottom left corner)

Label Expression: **'Forecast Profit'**
Number formatting: Custom
Format Pattern: $#,##0

The Expression performs the following function:
- Selects records only in which the year is the maximum year of the entire data (2019)
- Multiples the Quantity Sold * Profit Per Case
- Divide the variable vQuantitySoldForcastIncrease by 100 (converts to percentage) and add 1
  - *Example : If vQuantitySoldForecastIncrease is 60, then 1.6*

Name		Expression	
Forecast Profit		Sum({$<[SalesYear] = {$(=max([Sa	*fx*
Description		**Label expression**	
	fx	'Forecast Profit'	*fx*
Measure color		**Number formatting**	
■ ▼		Custom ▼	
Tags		**Decimal separator**	
	⊕	.	
		Thousands separator	
		,	
		Format pattern	
		$#,##0	
		Example	
			$1,000
		Reset pattern	

Create Master Measure – Forecast Quantity Sold:

You need to create a Master Measure.
Name: Forecast Profit
Measure color: Any color you wish (recommend red)
Expression:

`Sum({$<[SalesYear] = {$(=max([SalesYear]))}>}[QuantitySold])*(1 + ($(vQuantitySoldForecastIncrease)/100))`

Note: remove any line breaks and verify your express is "OK" (bottom left corner)

Label Expression: **'Forecast Quantity Sold'**
Number formatting: Custom
Format Pattern: 1,000

The Expression performs the following function:
- Selects records only in which the year is the maximum year of the entire data (2019)
- Multiples the Quantity Sold * vQuantitySoldForecastIncrease
- Divide the variable vQuantitySoldForcastIncrease by 100 (converts to percentage) and add 1
  - *Example : If vQuantitySoldForecastIncrease is 60, then 1.6*

Name		Expression	
Forecast Quantity Sold		Sum({$<[SalesYear] = {$(=max([Sa	fx
Description		**Label expression**	
	fx	'Forecast Quantity Sold'	fx
Measure color		**Number formatting**	
		Number	▼
Tags		**Formatting**	⬤
		Simple	
	➕	1,000	▼

Create Master Measure – Variance Quantity Sold:
You need to create a Master Measure.
Name: Forecast Profit
Measure color: Any color you wish (recommend yellow)
Expression:

`FABS(Sum({$<[SalesYear] = {$(=max([SalesYear]))}>}[QuantitySold])*(($(vQuantitySoldForecastIncrease)/100)))`

Note: remove any line breaks and verify your express is "OK" (bottom left corner)

Label Expression: **'Variance Quantity Sold'**
Number formatting: Custom
Format Pattern: 1,000

The Expression performs the following function:
-    Selects records only in which the year is the maximum year of the entire data (2019)
-    Multiples the Quantity Sold * vQuantitySoldForecastIncrease
-    Divide the variable vQuantitySoldForcastIncrease by 100 (converts to percentage)
     o   *Example : If vQuantitySoldForecastIncrease is 60, then .6*

Name	Expression
Variance Quantity Sold	FABS(Sum({$<[SalesYear] = {$(=ma *fx*
Description	**Label expression**
	'Variance Quantity Sold' *fx*
fx	**Number formatting**
	Number
Measure color	
▣ ▼	**Formatting**
	Simple ⬤
Tags	
➕	1,000 ▼

Forecasting Analysis Sheet

Purpose:
Contains visualizations as related to forecasting.
Note: use your template sheet as a starting point.

Sheet Name: Last Name – Forecast Analysis

Sheet Visualizations:
Start:
- Remove all filters except for Product Name and Flavor Name
- Under the sheet properties the extend sheet to should be set to on

KPIs
- Add KPIs to display the following:
    - Past Year Quantity Sold (Master Measure)
    - Forecast Quantity Sold (Master Measure)
    - Variance Quantity Sold (Master Measure)

Example:

Variable Input – Next Years Profit Goal
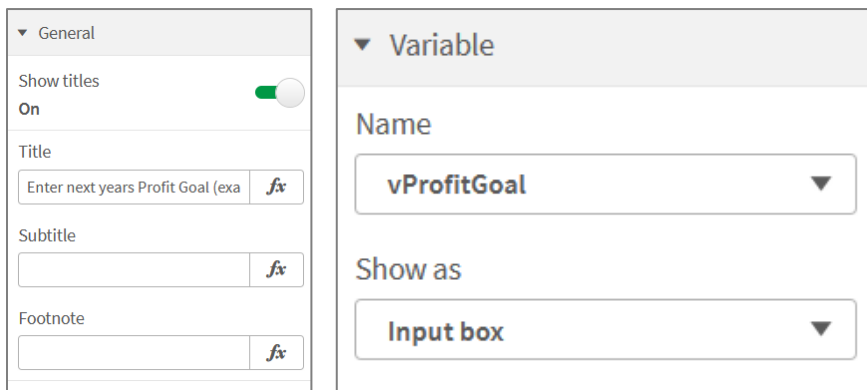
To add variable input to the Forecast Analysis Sheet:

- Click on 'Custom Objects'
- Search for 'variable'
- Drag-and-Drop 'variable input' onto the Forecast Analysis sheet
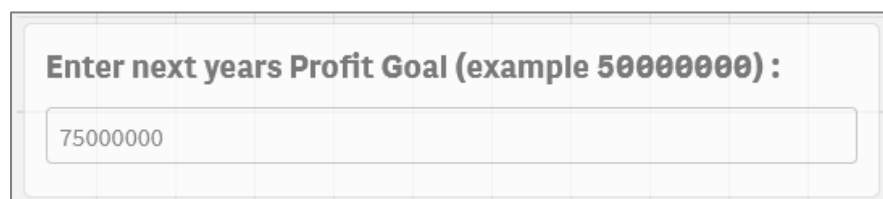
Settings:
- Under 'General' change the title to the following:
  Enter next years Profit Goal (example 50000000)
- Under 'Variable' change the variable name to **vProfitGoal**
- Under 'Variable' change the show as to **Input box**

Example:

Variable Input – Forecast Quantity Sold Percent Increase

To add variable input to the Forecast Analysis Sheet:

- Click on 'Custom Objects'
- Search for 'variable'
- Drag-and-Drop 'variable input' onto the Forecast Analysis sheet
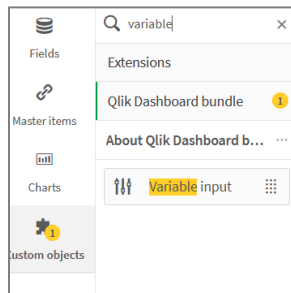
Settings:
- Under 'General' change the title to the following:
- `='Slide left-to-right for Next Years Forecast Quantity Sold Percent Increase :'`
- Under 'Variable' change the variable name to **`vQuantitySoldPercentIncrease`**
- Under 'Variable' change the show as to **`Slider`**
- Under 'Variable' check the **`'Update on drag'`** check box
- Under 'Values' change the Min to **`0`**
- Under 'Values' change the Max to **`100`**
- Under 'Values' change the Step to **`1`**
- Under 'Values' check the **`'Slider Label'`** check box

Example:

Forecast Quantity Sold Bar Chart
- Dimension – Product Name
- Measure:
    - Past Year Quantity Sold
    - Variance Quantity Sold
- Under 'Appearance' – 'Presentation' – set Styling to 'Stacked' and turn on the value labels

Example:
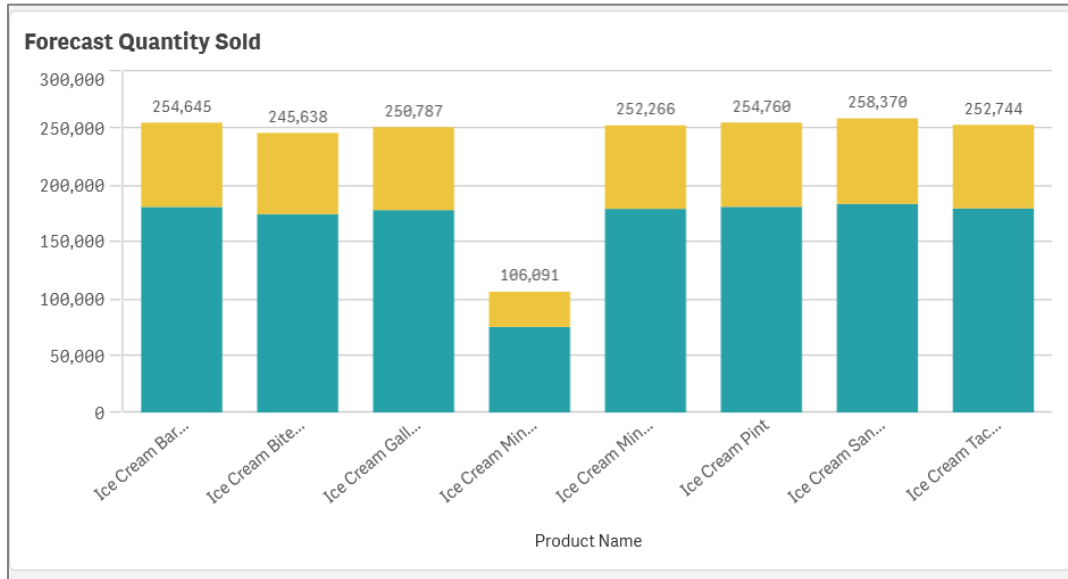
Forecast to Goal Gauge Chart
- Measure: Forecast Profit (Master Measure)
- Under 'Appearance' – 'Range Limit' – set the following:
  - Min:
    `=Sum({$<[SalesYear] = {$(=max([SalesYear]))}>}[QuantitySold]*$(vProfitPerCase))`
  - Max:
    `=$(vProfitGoal)`

Example:
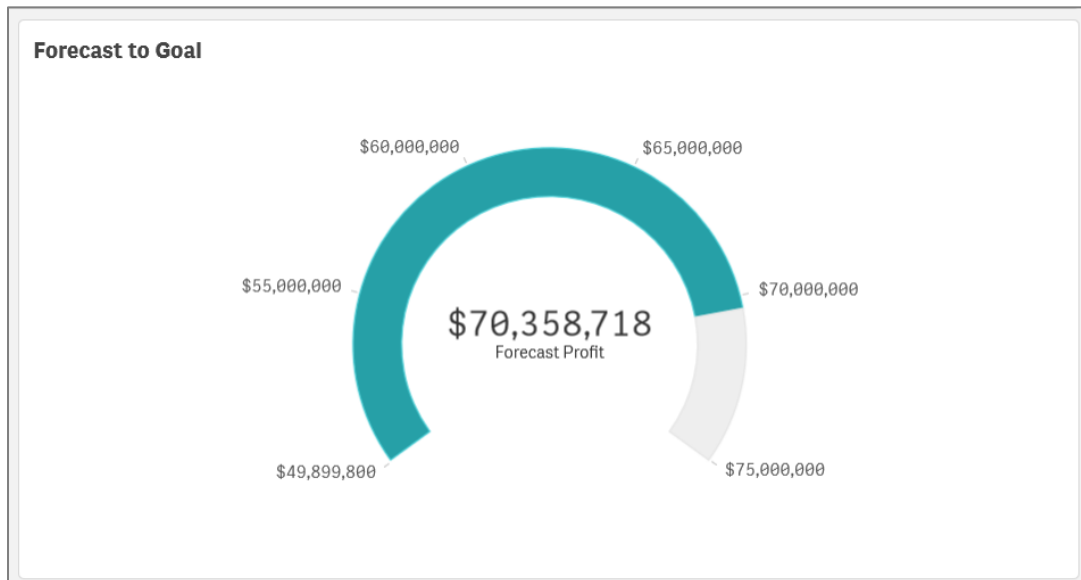
Table Forecast Analysis per Product
- Dimension – Product Name
- Past Year Sales Profit (Master Measure)
- Forecast Profit (Master Measure)
- Past Year Quantity Sold (Master Measure)
- Forecast Quantity Sold (Master Measure)
- Variance Quantity Sold (Master Measure)

Example:

Forecast Analysis per Product

ProductName	2019 Sales Profit	Forecast Profit	2019 Quantity Sold	Forecast Quantity Sold	Variance Quantity Sold
Totals	**$ 49,899,800**	**$70,358,718**	**1,330,000**	**1,875,300**	**545,300**
Ice Cream Bars (12 per pack)	$ 6,320,965	$8,912,561	180,599	254,645	74,046
Ice Cream Bites (36 per bag)	$ 6,097,385	$8,597,313	174,211	245,638	71,427
Ice Cream Gallon	$ 8,003,835	$11,285,407	177,863	250,787	72,924
Ice Cream Mini-Cakes	$ 6,019,360	$8,487,298	75,242	106,091	30,849
Ice Cream Mini-Cups (12 per pack)	$ 4,472,800	$6,306,648	178,912	252,266	73,354
Ice Cream Pint	$ 8,130,645	$11,464,209	180,681	254,760	74,079
Ice Cream Sandwiches (12 per pack)	$ 4,581,025	$6,459,245	183,241	258,370	75,129
Ice Cream Taco (12 per pack)	$ 6,273,785	$8,846,037	179,251	252,744	73,493

Potential Sheet Solution:

Forecast Analysis

TC Ice Cream Inc.

Product Name	Flavor Name	2019 Quantity Sold	Forecast Quantity Sold	Variance Quantity Sold
		1,330,000	**1,875,300**	**545,300**

Enter next years Profit Goal (example 50000000) :

75000000

Slide left-to-right for Next Years Forecast Quantity Sold Percent Increase :

41

Forecast Quantity Sold

Forecast to Goal

$60,000,000 $65,000,000

$55,000,000 $70,000,000

$70,358,718
Forecast Profit

$49,899,800 $75,000,000

Forecast Analysis per Product

ProductName	2019 Sales Profit	Forecast Profit	2019 Quantity Sold	Forecast Quantity Sold	Variance Quantity Sold	
Totals	**$ 49,899,800**	**$70,358,718**	**1,330,000**	**1,875,300**	**545,300**	
Ice Cream Bars (12 per pack)	$ 6,320,965	$8,912,561	180,599	254,645	74,046	
Ice Cream Bites (36 per bag)	$ 6,097,385	$8,597,313	174,211	245,638	71,427	
Ice Cream Gallon	$ 8,003,835	$11,285,407	177,863	250,787	72,924	
Ice Cream Mini-Cakes	$ 6,019,360	$8,487,298	75,242	106,091	30,849	
Ice Cream Mini-Cups (12 per pack)	$ 4,472,800	$6,306,648	178,912	252,266	73,354	
Ice Cream Pint	$ 8,130,645	$11,464,209	180,681	254,760	74,079	
Ice Cream Sandwiches (12 per pack)	$ 4,581,025	$6,459,245	183,241	258,370	75,129	
Ice Cream Taco (12 per pack)	$ 6,273,785	$8,846,037	179,251	252,744	73,493	

Validate formulas:

- On the Forecast Analysis sheet:
    - Set the Profit Goal to: **75000000**
    - Set the Next Years Forecast Quantity Sold Percent Increase: **41**
    - *Note: The charts will change as the Next Years Forecast Quantity Sold Percent Increase changes*
- The KPIs should display the following values:

2019 Quantity Sold: 1,330,000
Forecast Quantity Sold: 1,875,300
Variance Quantity Sold: 545,300
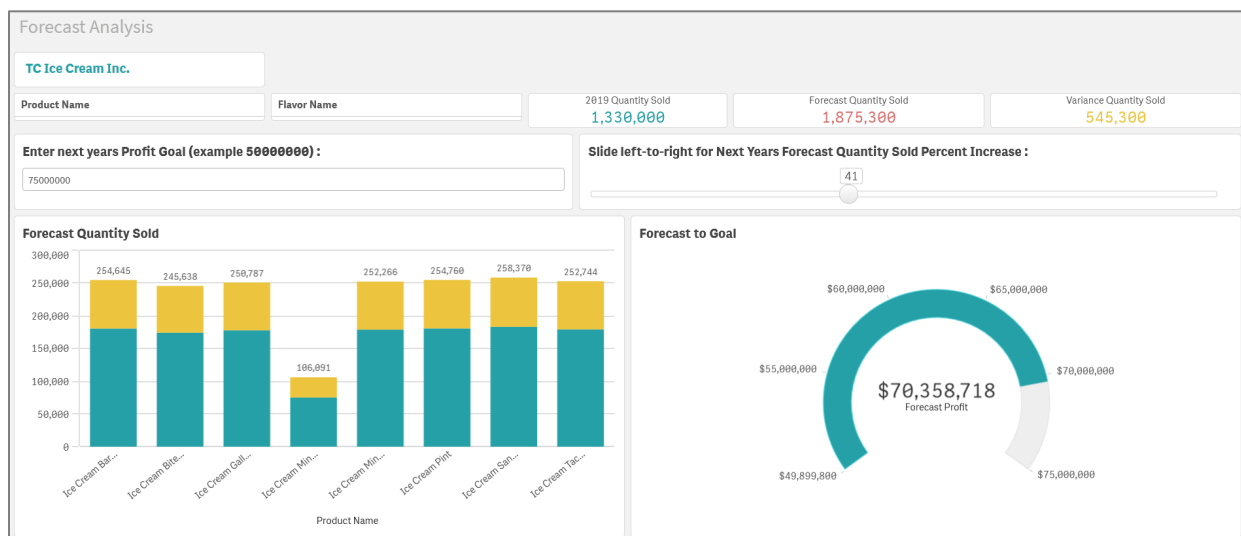
If you set the *Next Years Forecast Quantity Sold Percent Increase* to **51** the Forecast Profit will equal the Profit Goal.
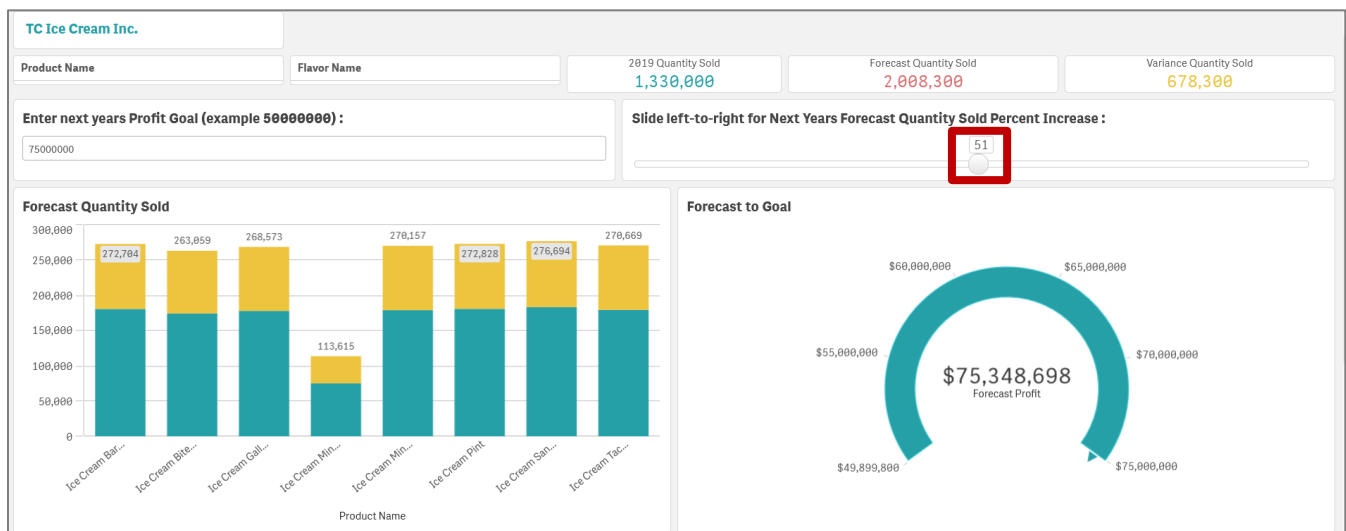
Validate formulas:

- On the Forecast Analysis sheet:
    - Select from the filters:
        - Product Name: `Ice Cream Pint`
        - Flavor: `Mint Chocolate Chip`
    - Set the Profit Goal: `1200000`
- Question:
  To meet the profit goal of $1,200,000 – what should be the Quantity Sold Percent Increase for Ice Cream Pint – Mint Chocolate Chip?
- Answer:
  Minimum of 28%
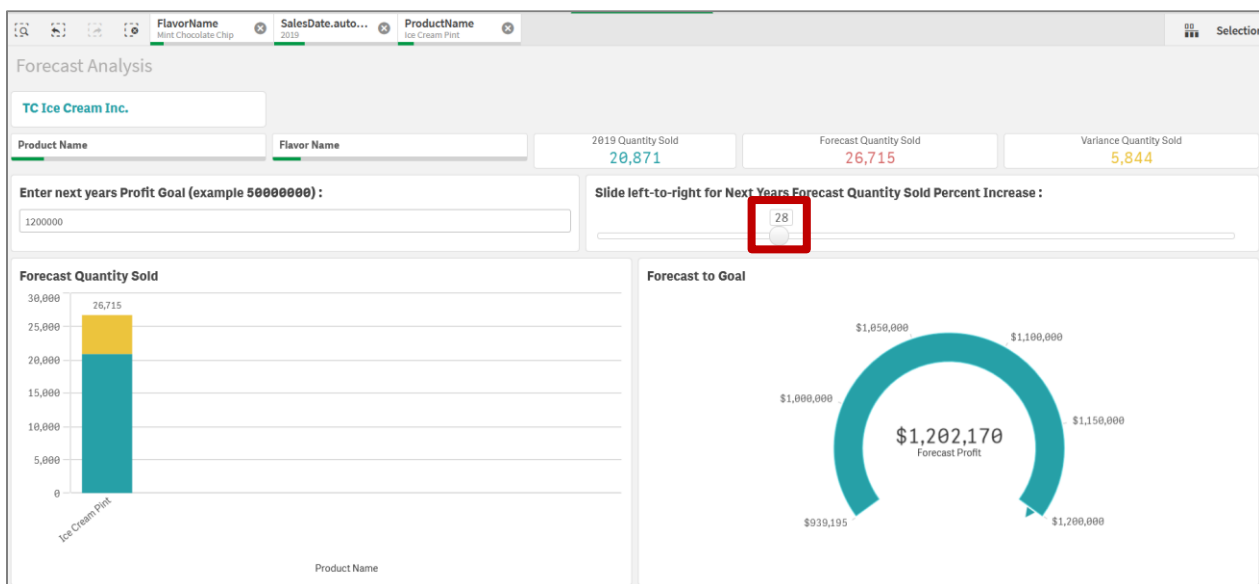
Validate formulas:

- On the State Analysis sheet:
    - Select from the filters:
        - State: **Hawaii**
        - Flavor: **Cookie Dough**
        - Sales Year: **2019**
- On the Forecast Analysis sheet:
    - Set the Profit Goal: **75000**

-
- Question:
  To meet the profit goal of $75,000 for the flavor Cookie Dough in Hawaii – what should be the Quantity Sold Percent Increase?
- Answer:
  Minimum of 56%

- Question:
  To meet the profit goal of $75,000 for the flavor Cookie Dough in Hawaii and with a Quantity Sold Percent Increase of 56%, what is the Forecast Quantity Sold for Ice Cream Gallons ?
- Answer:
  317
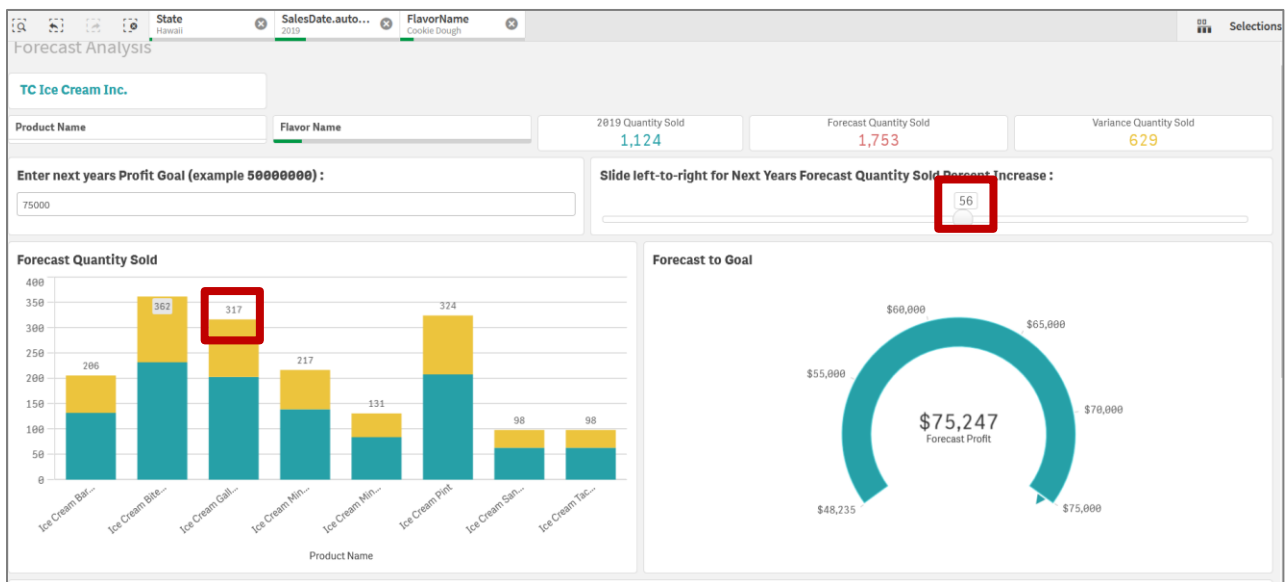
Part 4 – Descriptive Statistics

Descriptive Statistics Background

This section of the application creates a sheet to display a variety of descriptive statistics. In addition, two table visualizations display high-level and detail quantity sold data.

Note: use your template sheet as a starting point.

Sheet Name: Last Name – Descriptive Statistics

Sheet Visualizations:

Start:

- Under the sheet properties the extend sheet to should be set to on
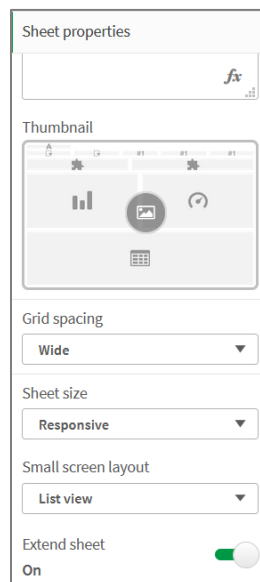
- Suggestion – add a Filter for the dimension "City-State" and "State"

Text & Image:
Add a text box with the following content:

```
Descriptive Statistics - Quantity Sold
```
(color, font size, etc…can be whatever you wish)

KPIs:
Add the following KPIs:

KPI	Expression	Label	Number Fomatting
Sum	`Sum(QuantitySold)`	Sum	Number (Simple 1,000)
Count	`Count(QuantitySold)`	Count	Number (Simple 1,000)
Mean	`Avg(QuantitySold)`	Mean	Number (Simple 1,000.12)
Min	`Min(QuantitySold)`	Min	Number (Simple 1,000)
Max	`Max(QuantitySold)`	Max	Number (Simple 1,000)
Range	`Max(QuantitySold)- Min(QuantitySold)`	Range	Number (Simple 1,000)
Standard Deviation	`StDev(QuantitySold)`	Standard Deviation	Number (Simple 1,000.12)

Number of Sales Transactions by Product Description / Flavor Description PivotTable:
- Rows: `ProductName`
  - Label: Product Name
  - Turn "Show Total" to ON
- Columns: `FlavorName`
  - Label: Flavor Name
  - Turn "Show Total" to ON
- Measures: `count(SalesID)`
- Show values as numbers
  - Show values as Numbers (Simple 1,000)

Sales Data – Quantity Sold Table:
- Dimension: `SalesID` (Label: Sales ID)
- Dimension: `SalesDate.autoCalendar.Date` (Label: Sales Date)
- Dimension: `ProductName` (Label: Product Name)
- Dimension: `FlavorDescription` (Master Dimension)
- Dimension: `City-State` (Label: City-State)
- Dimension: `SalesType` (Label: Sales Type)
- Measure – `sum(QuantitySold)`

Potential Sheet Solution:

Descriptive Statistics

TC Ice Cream Inc.

			Quantity Sold		Sales Transactions
			2,833,000		150,000

Product Name	Flavor Name	Sales Date Year	Sales Date Year-Quarter	Sales Date Year Month	Sales Method
City-State	State				

Descriptive Statistics - Quantity Sold

Sum	Count	Mean	Min	Max	Range	Standard Deviation
2,833,000	150,000	18.89	4	400	396	19.79

Number of Sales Transactions by Product Description / Flavor Description

Product Name   Flavor Name

	Totals	Butter Pecan	Chocolate	Coffee	Cookie Dough	Cookies and Cream	Mint Chocolate Chip	Rocky Road	Strawberry	Vanilla
Totals	150,000	16,418	16,725	8,769	16,719	15,034	16,868	16,804	16,217	26,446
Ice Cream Bars (12 per pack)	20,240	2,247	2,248	1,153	2,298	2,051	2,218	2,242	2,218	3,565
Ice Cream Bites (36 per bag)	19,002	2,090	2,110	911	2,126	2,398	2,094	2,096	2,088	3,089
Ice Cream Gallon	25,225	2,763	2,912	1,413	2,795	2,283	2,836	2,879	2,729	4,615
Ice Cream Mini-Cakes	7,623	879	905	447	863	506	945	911	866	1,301
Ice Cream Mini-Cups (12 per pack)	18,540	2,004	1,976	1,194	2,011	1,864	2,078	2,075	1,946	3,392
Ice Cream Pint	18,521	2,034	1,983	1,175	2,066	1,877	2,079	2,091	1,957	3,259
Ice Cream Sandwiches (12 per pack)	20,512	2,168	2,352	1,214	2,296	2,092	2,300	2,214	2,247	3,629
Ice Cream Taco (12 per pack)	20,337	2,233	2,239	1,262	2,264	1,963	2,318	2,296	2,166	3,596

Sales Data - Quantity Sold

Sales ID	Sales Date	Product Name	Flavor Description	City-State	Sales Type	Quantity Sold
Totals						2,833,000
20000001	1/1/2016	Ice Cream Gallon	Strawberry	Key West - Florida	Phone	
20000002	1/1/2016	Ice Cream Pint	Chocolate	Sault Ste Marie - Michigan	Web Site	
20000003	1/1/2016	Ice Cream Pint	Cookies and Cream	Lansing - Michigan	Phone	
20000004	1/1/2016	Ice Cream Pint	Rocky Road	Frankenmuth - Michigan	Web Site	1
20000005	1/1/2016	Ice Cream Pint	Rocky Road	Frankenmuth - Michigan	Phone	1
20000006	1/1/2016	Ice Cream Mini-Cups (12 per pack)	Cookie Dough	Parkersburg - West Virginia	Phone	1
20000007	1/1/2016	Ice Cream Mini-Cups (12 per pack)	Cookies and Cream	Detroit - Michigan	Web Site	1
20000008	1/1/2016	Ice Cream Mini-Cups (12 per pack)	Vanilla	Tucson - Arizona	Web Site	1
20000009	1/1/2016	Ice Cream Sandwiches (12 per pack)	Strawberry	Sault Ste Marie - Michigan	Phone	1
20000010	1/1/2016	Ice Cream Sandwiches (12 per pack)	Vanilla	Traverse City - Michigan	Phone	1
20000011	1/1/2016	Ice Cream Sandwiches (12 per pack)	Cookies and Cream	Traverse City - Michigan	Web Site	1
20000012	1/1/2016	Ice Cream Bars (12 per pack)	Chocolate	Sault Ste Marie - Michigan	Phone	
20000013	1/1/2016	Ice Cream Bars (12 per pack)	Cookies and Cream	Lansing - Michigan	Phone	1
20000014	1/1/2016	Ice Cream Bars (12 per pack)	Cookies and Cream	Lansing - Michigan	Web Site	1
20000015	1/1/2016	Ice Cream Bars (12 per pack)	Strawberry	Springfield - Illinois	Phone	1
20000016	1/1/2016	Ice Cream Bars (12 per pack)	Mint Chocolate Chip	Marquette - Michigan	Web Site	1

Part 5 – Simple Linear Regression Analysis

Simple Linear Regression Analysis Background

This section of the application creates a sheet to conduct simple linear regression. The analysis will create simple linear regression formulas as well as the ability to test the linear regression models. The data which will be used is the 2019 Advertising Expenditures (x) and the 2019 Quantity Sold (y).

Note: use your template sheet as a starting point.

Sheet Name: Last Name – Simple Linear Regression Analysis

Create Variables

For the simple linear regression formula, you will need to create one variable for the equation input box (x).

Create Variables:

- While in edit mode, click the 'variables' icon in the lower left corner
- Click the 'Create New' button in the upper right area of the variable screen
- Enter in the name **vLinearEquationInput**
- Formula:
  1

- *Note: to verify your formula click the fx in lower right corner. This will open up the 'edit expression' window. You will see the word "OK" if the variable was entered correctly.*
- Click the 'Create New' button to save and close the dialog box.

Sheet Visualizations:

Start:

- Under the sheet properties the extend sheet should be set to on
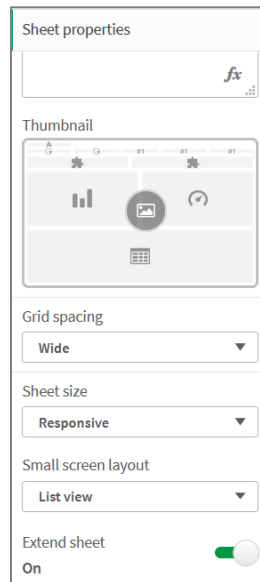
- Sheet Filters:
- The only filters for the sheet required are the following:
    - Region
    - Division
    - State

KPIs:

Add the following KPIs:

KPI - Label	Expression	Number Fomatting
Average 2019 Advertising Expenditures	`avg([2019AdvertisingExpenditures])`	Money ($ #,##0;-$ #,##0)
Average 2019 Quantity Sold	`avg([2019QuantitySold])`	Number (Simple 1,000)

Linear Regression KPIs:

KPI - Label	Expression	Number Fomatting
r2	`=LinEst_R2([2019QuantitySold],[2019AdvertisingExpenditures])`	Custom (#,##0.0000)
Slope	`=LinEst_M([2019QuantitySold],[2019AdvertisingExpenditures])`	Custom (#,##0.0000)
Intercept	`=LinEst_B([2019QuantitySold],[2019AdvertisingExpenditures])`	Custom (#,##0.0000)

Example/validation:

- Set the Division filter to "South Atlantic"
- Results:

r2	Slope	Intercept
0.4164	0.0633	5,434.7158

Linear Regression Notes (for your information only):

Linear Regression Formula:
$y = mx + b$

	Definition
y	Dependent variable: dependent on the x variable – also known as predicted y. The quantity sold is the predicted y value
m	Slope: shows the incremental change in y for each unit change in x (rise over run).
x	Independent variable: the explanatory variable, explains the y variable. The advertising expenditures is the x value.
b	y-intercept: the point at which the regression line crosses the y axis

Coefficient of determination (r^2):
$r^2 = SSR/SST$
where:

> $SSR = sum\ of\ squares\ due\ to\ regression$
> $SST = total\ sum\ of\ squares$

"The coefficient of determination can be thought of as a percent. It gives you an idea of how many data points fall within the results of the line formed by the regression equation. The higher the coefficient, the higher percentage of points the line passes through when the data points and line are plotted. If the coefficient is 0.80, then 80% of the points should fall within the regression line. Values of 1 or 0 would indicate the regression line represents all or none of the data, respectively. A higher coefficient is an indicator of a better goodness of fit for the observations." -
https://www.statisticshowto.com/probability-and-statistics/coefficient-of-determination-r-squared/

0	.5	1
worst fit	moderate fit	perfect fit

Variable Input – advertising expenditures (x):
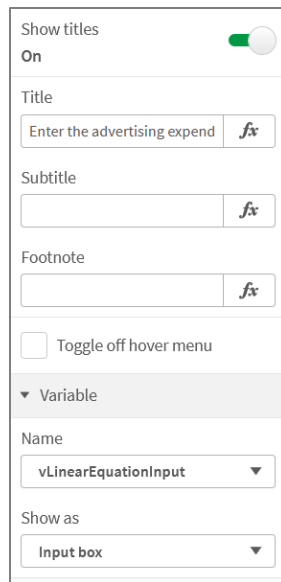
To add variable input to the Simple Linear Regression Analysis Sheet:

- Click on 'Custom Objects'
- Search for 'variable'
- Drag-and-Drop 'variable input' onto the Forecast Analysis sheet
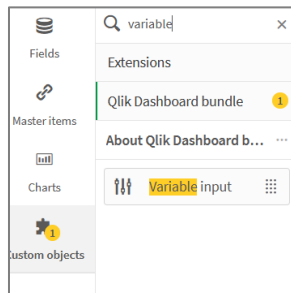
Settings:
- Under 'General' change the title to the following:
  =' **Enter the advertising expenditures (x):'**
- Under 'Variable' change the variable name to **vLinearEquationInput**
- Under 'Variable' change the show as to **InputBox**

Linear Regression Formula and Calculation KPI:

Label:
```
='Quantity Sold (Predicted y):'
```

Expression:
```
=round((LinEst_M([2019QuantitySold],[2019AdvertisingExpenditures])*$(vLinearEquationInput))+(LinEst_B([2019Quant
itySold],[2019AdvertisingExpenditures])))&' = '
&num(LinEst_M([2019QuantitySold],[2019AdvertisingExpenditures]),'#,##0.00')&'('&$(vLinearEquationInput)&') + '
'&num(LinEst_B([2019QuantitySold],[2019AdvertisingExpenditures]),'#,##0.00')
```

Suggestion: copy and paste the above formula into the expression box. The word "OK" should appear in the bottom left corner.

Example/Validation:

- Set the Division filter to "South Atlantic"
- Enter 11500 in the variable input box for advertising expenditures:

Enter the advertising expenditures (x):

11500

- Results:

Quantity Sold (Predicted y):
$6163 = 0.06(11500) + 5{,}434.72$

Gauge Chart:
- Measures:
  - Expression:
    ```
    =LinEst_R2([2019QuantitySold],[2019AdvertisingExpenditures])
    ```
    Label:
    ```
    r2
    ```
    Format (Custom):
    ```
    #,##0.0000
    ```

- Appearance:
  - Min: 0
  - Max: 1
  - Set the display as 'Bar'

Example/Validation:

- Set the Division filter to "South Atlantic"
- Results:
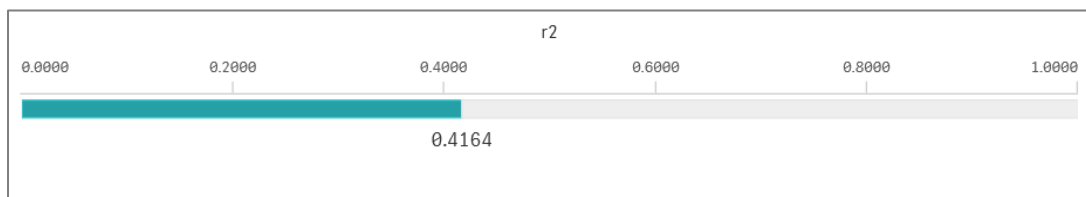
Scatter Chart:
- Title:
  ='2019 Advertising Expenditures vs. 2019 Quantity Sold'
- Dimensions:
  City-State
- Measures (x-axis):
    Sum([2019AdvertisingExpenditures])
    Label:
    ='X = 2019 Advertising Expenditures'
    Format: Number – Simple (1,000)

- Measures (y-axis):
    Sum([2019QuantitySold])
    Label:
    ='Y = 2019 Quantity Sold'
    Format: Number – Simple (1,000)

Example/Validation:

- Set the Division filter to "South Atlantic"
- Results:
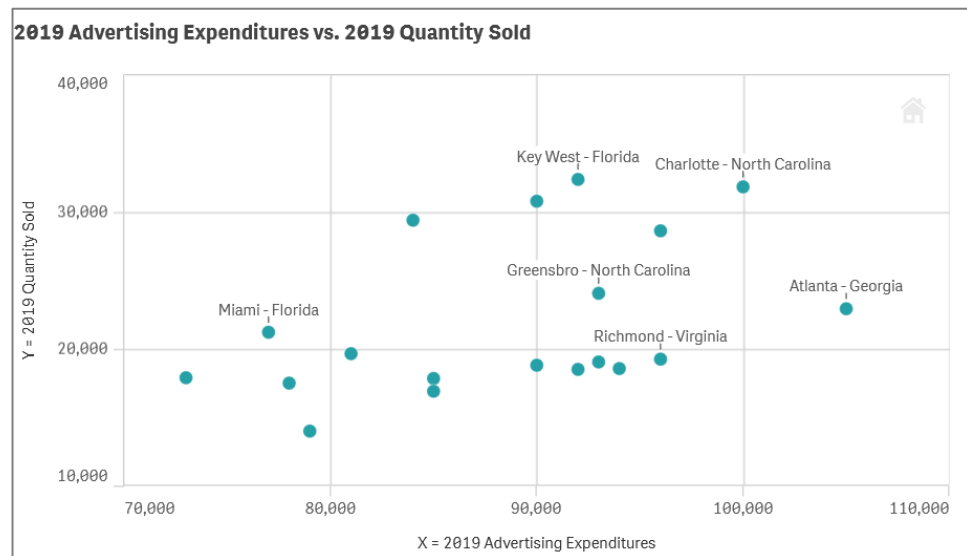
Sankey Chart:
- Title:
  `2019 Advertising Expenditures Sankey Chart`
- Dimensions:
  - `Region`
  - `Division`
  - `State`
  - `City`
- Measures:
  `Sum([2019AdvertisingExpenditures])`
  Label:
  `='2019 Advertising Expenditures'`
  Format: Money ($ #,##0;-$ #,##0)

Example/Validation:

- Set the Division filter to "South Atlantic"
- Results:
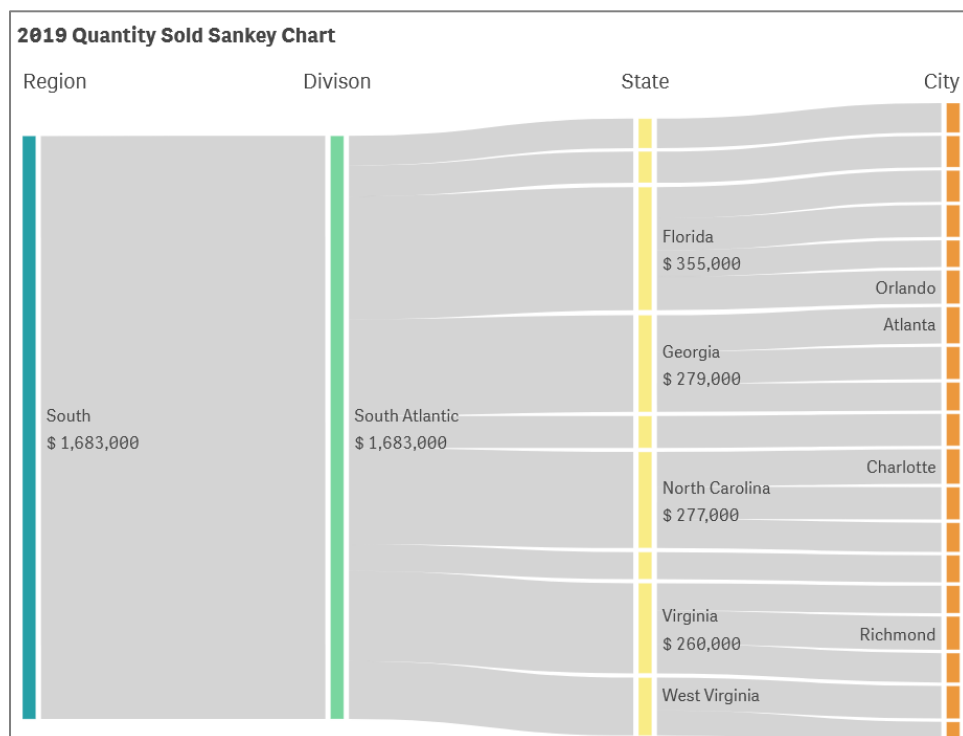
Map Chart:
- Title:
  2019 Advertising Expenditures and Quantity Sold Map

- Layers – Point Layer
- Click on Point Layer for the following settings:
  - Dimension – City
  - Location – check the "Longitude and Latitude fields" checkbox. Use the Longitude for the Longitude field and Latitude for the Latitude field
  - Size and Shape:
    - Size by: sum(2019QuantitySold)
    - Bubble Size Range: adjust accordingly
    - Range: Auto
  - Set the colors to "by measure" and the measure QuantitySold (Library Colors should be set to "on")

- Layers – Area Layer
- Click on Area Layer for the following settings:
  - Dimension – State
  - Location:
    - Location Field: [State]
    - Location Type: auto
    - County: [Country Code]
  - Colors:
    - Custom: by measure
  - Measure:
    - Sum([2019AdvertisingExpenditures])
  - Label:
    - ='2019 Advertising Expenditures'
    - Format: Money ($ #,##0;-$ #,##0)

Example/Validation:

- Set the Division filter to "South Atlantic"
- Results:
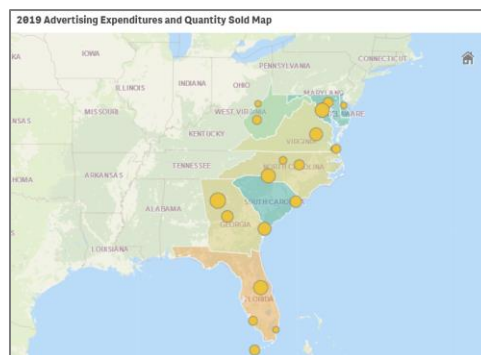
Detailed Data Table:
- Title:
  Detailed Data Table
- Dimension: `Region` (Label: Region)
- Dimension: `Division` (Label: Division)
- Dimension: `City` (Label: City)
- Dimension: `State` (Label: State)
- Measure – `Sum([2019AdvertisingExpenditures])`
  - Label:
  - ='2019 Advertising Expenditures'
  - Format: Money ($ #,##0;-$ #,##0)
- Measure – `Sum([2019QuantitySold])`
  - Label:
  - ='2019 Quantity Sold'
  - Format: Number ($ #,##0;-$ #,##0)

Example/Validation:

- Set the Division filter to "South Atlantic"
- Results:

Detailed Data Table

Region	Divison	State	City	2019 Advertising Expenditures	2019 Quantity Sold
Totals				**$ 1,683,000**	**209,817**
South	South Atlantic	Georgia	Atlanta	$ 105,000	12,449
South	South Atlantic	Maryland	Baltimore	$ 92,000	11,103
South	South Atlantic	West Virginia	Charleston	$ 94,000	10,742
South	South Atlantic	North Carolina	Charlotte	$ 100,000	11,996
South	South Atlantic	Virginia	Chesapeake	$ 79,000	9,600
South	South Atlantic	Delaware	Dover	$ 85,000	9,926
South	South Atlantic	Florida	Fort Myers Beach	$ 90,000	10,791
South	South Atlantic	North Carolina	Greensbro	$ 93,000	10,178
South	South Atlantic	Florida	Key West	$ 92,000	11,100

Potential Solution:

Example/Validation:

- Set the Division filter to "South Atlantic"
- Results:

Simple Linear Regression Analysis

			Average 2019 Advertising Expenditures	Average 2019 Quantity Sold
TC Ice Cream Inc.			$ 88,579	11,043

Region   Divison   State

r2	Slope	Intercept
0.4164	0.0633	5,434.7158

Enter the advertising expenditures (x):

1

Quantity Sold (Predicted y):

$5435 = 0.06(1) + 5,434.72$

r2

0.0000   0.2000   0.4000   0.6000   0.8000   1.0000

0.4164

2019 Advertising Expenditures vs. 2019 Quantity Sold

Key West - Florida   Charlotte - North Carolina
Greensbro - North Carolina   Atlanta - Georgia
Miami - Florida   Richmond - Virginia

Y = 2019 Quantity Sold — X = 2019 Advertising Expenditures

2019 Advertising Expenditures and Quantity Sold Map

© OpenStreetMap contributors

2019 Quantity Sold Sankey Chart

Region	Divison	State	City
South $1,683,000	South Atlantic $1,683,000	Florida $355,000	Orlando / Atlanta
		Georgia $279,000	
		North Carolina $277,000	Charlotte
		Virginia $260,000	Richmond
		West Virginia	

Detailed Data Table

Region	Divison	State	City	2019 Advertising Expenditures	2019 Quantity Sold
Totals				$ 1,683,000	209,817
South	South Atlantic	Georgia	Atlanta	$ 105,000	12,449
South	South Atlantic	Maryland	Baltimore	$ 92,000	11,103
South	South Atlantic	West Virginia	Charleston	$ 94,000	10,742
South	South Atlantic	North Carolina	Charlotte	$ 100,000	11,996
South	South Atlantic	Virginia	Chesapeake	$ 79,000	9,600
South	South Atlantic	Delaware	Dover	$ 85,000	9,926
South	South Atlantic	Florida	Fort Myers Beach	$ 90,000	10,791
South	South Atlantic	North Carolina	Greensbro	$ 93,000	10,178
South	South Atlantic	Florida	Key West	$ 92,000	11,100
South	South Atlantic	Georgia	Macon	$ 93,000	11,502
South	South Atlantic	Florida	Miami	$ 77,000	9,975
South	South Atlantic	South Carolina	Myrtle Beach	$ 78,000	11,433
South	South Atlantic	Florida	Orlando	$ 96,000	12,011
South	South Atlantic	West Virginia	Parkersburg	$ 73,000	10,089
South	South Atlantic	North Carolina	Raleigh	$ 84,000	10,877
South	South Atlantic	Virginia	Richmond	$ 96,000	11,661
South	South Atlantic	Georgia	Savannah	$ 81,000	11,714
South	South Atlantic	Virginia	Virginia Beach	$ 85,000	10,657
South	South Atlantic	District of Columbia	Washington	$ 90,000	12,013

Optional Visualizations
Quantity Sold by Flavor/Product Combination

The purpose of this optional visualization is to display a bar chart showing the Flavor/Product Combination (dimension) and Quantity Sold (measure). This chart can be added to the Product Analysis Sheet.

Create Master Items

When you create and build your application, you can save assets which can be used the sheets throughout your application. You can save visualizations, dimensions and measures, as master items. Any modifications you make to the master item are applied everywhere the master item is in use.

Create Master Items – Master Dimension- Flavor-Product-Combination:
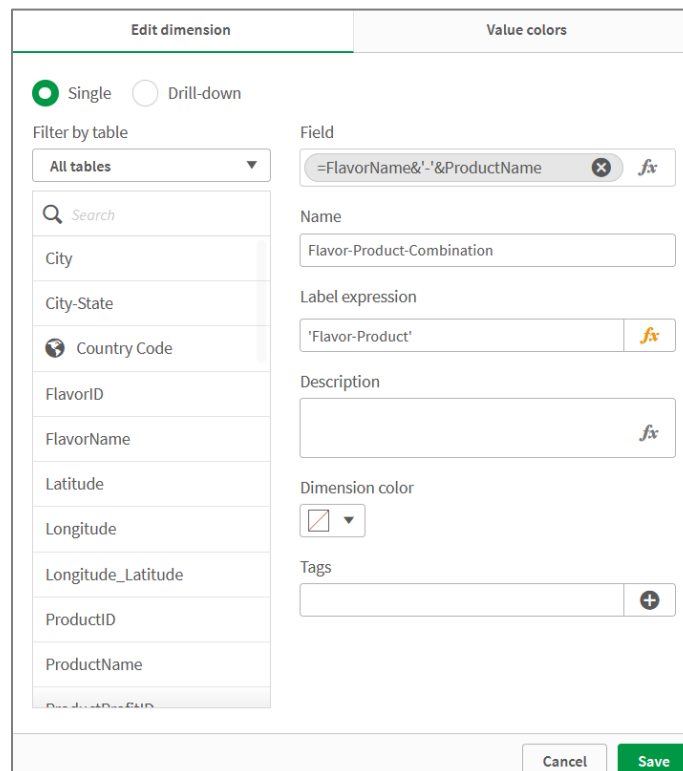You need to create a Master Dimension.
Type: Single
Field: In the expression box enter the following:
=FlavorName&'-'&ProductName
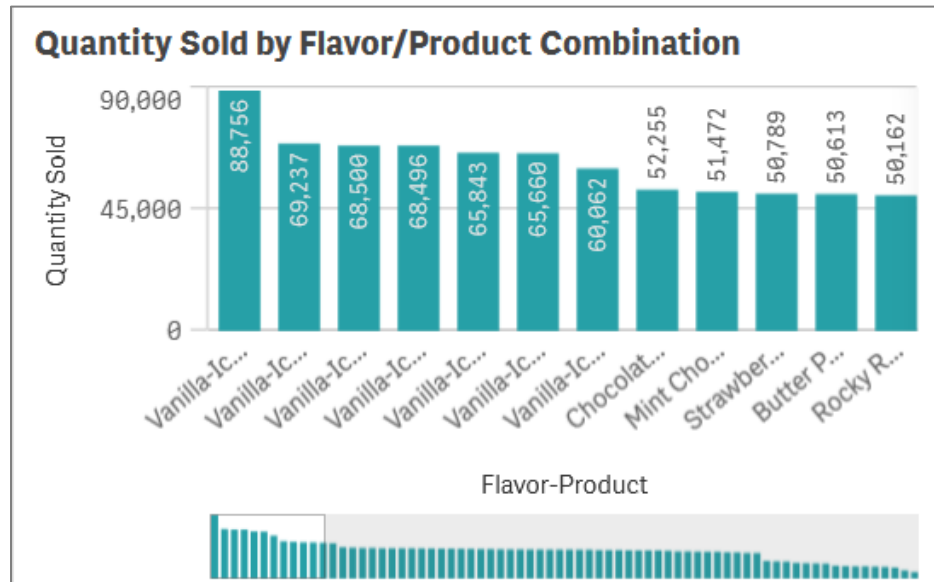Name: Flavor-Product-Combination
Label Expression: 'Flavor-Product'

Quantity Sold by Flavor/Product Combination Bar Chart
- Dimension – Flavor-Product-Combination (master dimension)
- Measure:
    - Sum(QuantitySold)
    - Show values as numbers
    - Label: Quantity Sold
- Under 'Appearance' – 'Presentation' – Value Labels "On"
- Note: the color of the bars is your choice

Example:

Example of the visualization on the Product Analysis Sheet:
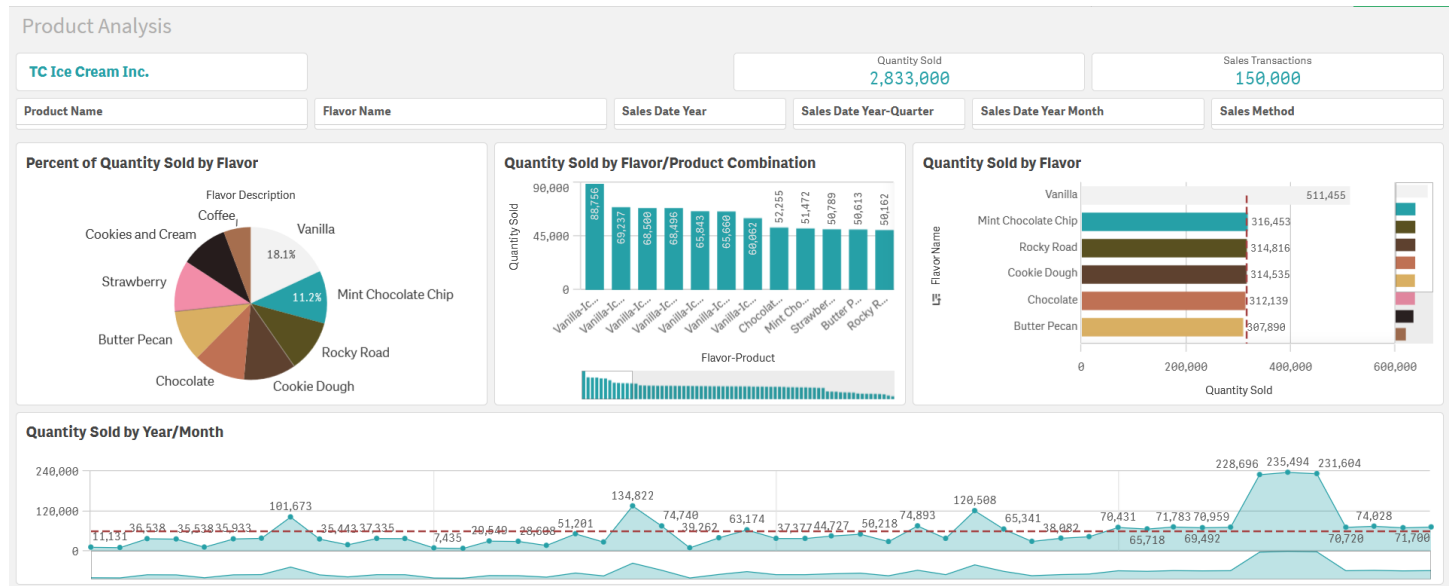
Completion and Publishing

Once you have completed building your application, the application overview should look something like the below.

Potential Solution:
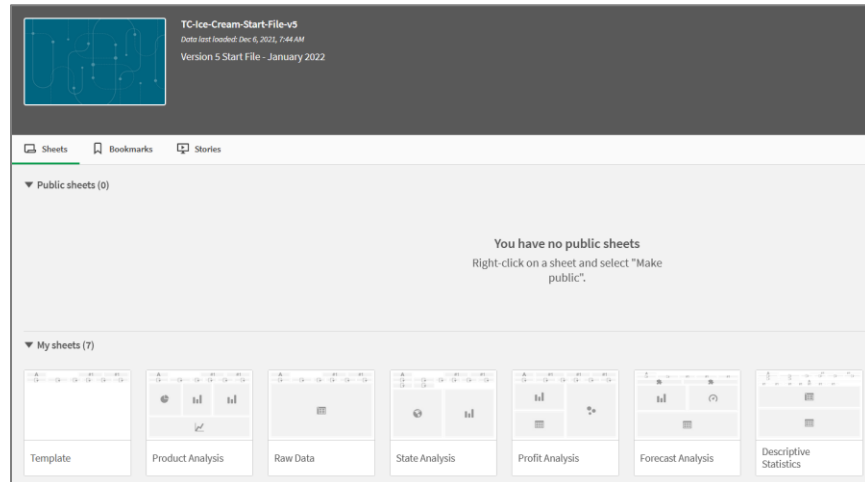
You can now proceed with publishing your application.
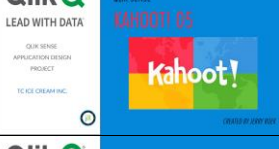
Notes:

1. Please be sure to name your sheets with your Last Name – Sheet Name
2. Simply right click on each sheet and select 'make public'.
3. Once you publish a sheet, the only way to make modifications is to right click on the sheet and select 'make private.
4. Your professor will communicate instructions in regards to review/grading your application.
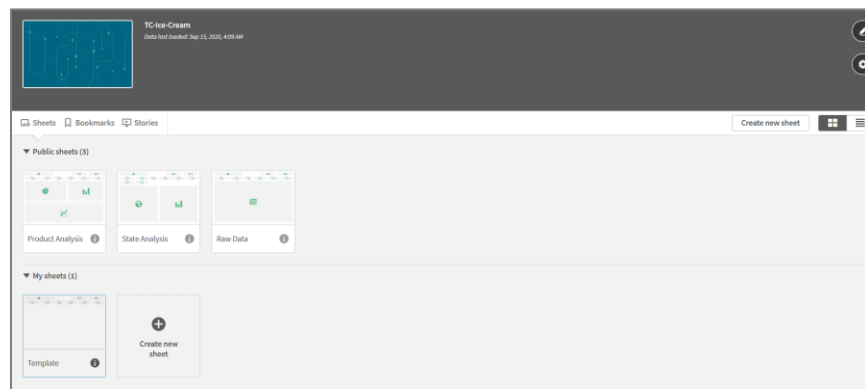
Test your knowledge – Kahoot!

The following below are links to Kahoot! games for you to test your knowledge. Please feel free to play the games as often as you wish. Answers are provided at the end of each question. Each game consists of six questions.

Kahoot!	Scope	Link
	Basic Qlik Sense Questions	https://kahoot.it/challenge/00685759
	Part 1 related questions	https://kahoot.it/challenge/001506877
	Part 1 related questions	https://kahoot.it/challenge/003008536
	Part 2 related questions	https://kahoot.it/challenge/007913814
	Part 3 related questions	https://kahoot.it/challenge/002662370
	Questions related to Michigan (Part 1)	https://kahoot.it/challenge/009033338
	Part 4 related questions	https://kahoot.it/challenge/008523377
	Part 5 related questions	https://kahoot.it/challenge/007710977

Data Model and Data Dictionary

Application Data

The data for TC Ice Cream consists of the following tables:
- Sales Table – contains sales information
- Sales Method Table – contains the sales method information
- Location Table – contains the location of the sales (major locations)
- Product Table – contains product information
- Flavor Table – contains ice cream flavor information
- StateYearSummary Table – contains summary information for 2019

Table Relations and Fields

SalesTable
- SalesLocationID
- SalesMethodID
- FlavorID
- ProductID
- SalesID
- SalesDate
- SalesYear
- SalesMonth
- QuantitySold

StateYearSummaryTable
- SalesLocationID
- 2019QuantitySold
- 2019SalesTransactions
- 2019AdvertisingExpenditures

SalesMethodTable
- SalesMethodID
- SalesType

LocationTable
- SalesLocationID
- City
- State
- Zip
- City-State
- Country Code
- Latitude
- Longitude
- Region
- Divison
- LocationTable.Country Code_GeoInfo
- Longitude_Latitude

FlavorTable
- FlavorID
- FlavorName

ProductTable
- ProductID
- ProductName
- ProductProfitID

Data Dictionary

Table	Field	Field Type	Description
SalesTable	SalesID	Primary Key	Unique Key Assigned to each sales transaction
SalesTable	SalesDate	Dated	Date of the sale
SalesTable	SalesYear	Text	Year of the sale
SalesTable	QuantitySold	Number	The quantity of the product sold for the specific sales transaction
SalesTable	SalesMethodID	Foreign Key	Refers to the SalesMethodTable
SalesTable	ProductID	Foreign Key	Refers to the ProductTable
SalesTable	FlavorID	Foreign Key	Refers to the FlavorTable
SalesTable	SalesLocationID	Foreign Key	Refers to the LocationTable
SalesMethodTable	SalesMethodID	Primary Key	Unique Key assigned to each Sales Method
SalesMethodTable	SalesType	Text	Type of Sale (example – Web, Phone)
ProductTable	ProductID	Primary Key	Unique key assigned to the Product
ProductTable	ProductName	Text	Name of the Product (example – Ice Cream Gallon)
ProductTable	ProductProfitID	Number	Profit Segment for the specific product
FlavorTable	FlavorID	Primary Key	Unique Key assigned to each Flavor
FlavorTable	FlavorName	Text	Name of the Flavor (example – Cookie Dough)
LocationTable	SalesLocationID	Primary Key	Unique Key Assigned to each major sales location
LocationTable	City	Text	City
LocationTable	State	Text	State
LocationTable	Zip	Text	Zip Code
LocationTable	City-State	Text	City – Sale Concatenation
LocationTable	Country Code	Text	Country Code (used for Qlik Sense Mapping Visualizations)
LocationTable	Latitude	Number	Location Latitude (used for Qlik Sense Mapping Visualizations)
LocationTable	Longitude	Number	Location Longitude (used for Qlik Sense Mapping Visualizations)
LocationTable	Region	Text	Location Region (example – South; used for Qlik Sense Mapping Visualizations)
LocationTable	Division	Text	Location Division (example – South Atlantic; used for Qlik Sense Mapping Visualizations)
StateYearSummaryTable	SalesLocationID	Primary Key	Unique Key Assigned to each major sales location
StateYearSummaryTable	2019QuantitySold	Number	Sum of 2019 Quantity Sold by major sales location
StateYearSummaryTable	2019SalesTransactions	Number	Sum of 2019 Sales Transactions by major sales location
StateYearSummaryTable	2019AdvertisingExpenditures	Number	2019 Advertising expenditures by major sales location

Application Videos

Videos related to the development and functionality of the TC Ice Cream Application can be found on the following You Tube Playlist:

https://youtube.com/playlist?list=PLl4F1FsqnyHD6Wz9Q63gxqp9EnIpkqfNt

Part 1 Videos	Time
0: TC Ice Cream Application Introduction	3:17
1: Qlik Sense Account Overview	5:46
2: Application Upload	
3: TC Ice Cream Project Overview (Part 1)	9:43
4: Application Overview (Part 1)	7:57
5: Creating Master Dimensions (Part 1)	5:04
6: Product Analysis Sheet (Part 1)	17:25
7: State Analysis Sheet (Part 1)	9:56
8: Raw Data Sheet (Part 1)	6:02
9: Filtering Data (Part 1)	16:37
10: Exporting Charts/Data	6:00
11: Publishing	
12: Additional Product Analysis Chart (Part 1)	6:58
24. Test your Knowledge (Kahoot!)	3:21

Part 1 Videos Total approximate time: 1 Hours and 39 Minutes

Part 2 Videos	Time
13: Creating Variables and Master Measures (Part 2)	7:15
14: Profit Analysis Sheet (Part 2)	8:12
15: Filtering Data and Analysis (Part 2)	3:34

Part 2 Videos Total approximate time: 19 Minutes

Part 3 Videos	Time
16: Creating Variables (Part 3)	3:00
17: Creating Master Measures (Part 3)	11:11
18. Forecast Analysis Sheet - Creating KPIs and Variable Input (Part 3)	9:22
19. Forecast Analysis Sheet – Bar Chart, Gauge Chart and Table (Part 3)	11:42
20. Filtering Data and Analysis (Part 3)	7:41

Part 3 Videos Total approximate time: 43 Minutes

Part 4 Videos	Time
21. Set-up and KPIs (Part 4)	9:42
22. Cross Tabulation Table and Data Table (Part 4)	11:11
23. Exporting Data (Part 4)	7:46

Part 4 Videos Total approximate time: 29 Minutes

Part 5 Videos	Time
25. Set-up, Creating Variables, Filters and Average KPIs (Part 5)	7:08
26. Simple Linear Regression KPIs (Part 5)	4:37
27. Variable Input and Simple Linear Regression Formula (Part 5)	7:35
28. Gauge Chart, Scatter Plot Chart and Sankey Chart (Part 5)	12:45
29. Map Chart and Data Table (Part 5)	12:40
30. Exporting Data and Testing (Part 5)	3:09

Part 5 Videos Total approximate time: 48 Minutes

Total approximate time: 4 Hours

Additional Videos for your reference – Business Analyst

https://learning.qlik.com/mod/page/view.php?id=24708&Category=How%20do%20I%20Videos
Note: you only have to view the interactive videos only and you need a Qlik Sense Continuous Class account.

Learning Objectives

Part	Topics
1	Difficulty: Easy • Uploading a QVF file • Master Dimensions • Pie Chart • Line Chart • Bar Chart • Map • Pivot Table • Filters • Chart Formatting • Trend Lines • Publishing
2	Difficulty: Medium (Part 1 must be completed in order to complete Part 2) • Variables • Master Measures • Filters • KPI • Table • Line Chart • Scatter Plot • Chart Formatting • Publishing
3	Difficulty: Advance (Part 1 and 2 must be completed in order to complete Part 3) • Variables • Master Measures • Variable Input Extension • Filters • KPI • Table • Bar Chart • Gauge • Chart Formatting • Publishing

Part	Topics
4	Difficulty: Medium (Part 1 must be completed in order to complete Part 4) • Filters • KPI • Table • Pivot Table • Text & Image • Chart Formatting • Publishing
5	Difficulty: Advance (Part 1 must be completed in order to complete Part 5) • Variables • Variable Input Extension • Filters • KPI • Table • Scatter Plot • Map • Sankey • Linear Regression functions • Chart Formatting • Publishing

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