

Final Project

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Have you ever wondered which fruits and vegetables are the most and least expensive?

This project explores the retail prices of fruits and vegetables in different forms. Using the 2022 fruit and vegetable price datasets, we compared retail prices, cup equivalent prices, and average prices by market form.

The goal was to identify any possible differences between fruit and vegetable prices according to the form they were sold in.

Both data sets are from the Economic Research Service on the the US Department of Agriculture website; <http://www.ers.usda.gov/data-products/fruit-and-vegetable-prices>.

Below are the some of the packages we installed to view and map our data.

```
#tinytex::install_tinytex()  
#install packages and set up the data  
#install.packages("ggplot2")  
#install.packages("dplyr")  
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 4.4.3
```

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 4.4.3
```

```
##
```

```
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
```

```
##
```

```
## filter, lag
```

```
## The following objects are masked from 'package:base':
```

```
##
```

```
## intersect, setdiff, setequal, union
```

This is the data and a glimpse of the data we used. Along with the actual data we got from these files we also mutated the charts to include 2 additional terms. Below is the list of all the terms we used: Fruit: name of the fruit or vegetable Form: how the fruit or vegetable was sold Retail Price: cost of the produce in dollars Retail price unit: unit of measurement the produce was sold Yield: how much the produce is usually sold in based on the retail price unit Retail price per yeild: the total cost of the prduce basde on the retail price and the yeild Cup equivalent size: measurement of produce equivalent to one cup Cup equivalent unit: unit of measurement the produce to one cup Cup equivalent price: cost produce sold based on cup equivalent unit Price per cup: cost of produce for one cup Price per 5 cups: cost of produce for 5 cups

```
#Load and view data
VegetableData <- read.csv("Vegetable-Prices-2022.csv")
FruitData <- read.csv("Fruit-Prices-2022.csv")

glimpse(FruitData)
```

```
## Rows: 62
## Columns: 8
## $ Fruit      <chr> "Apples", "Apples, applesauce", "Apples, ready-to-d~
## $ Form       <chr> "Fresh", "Canned", "Juice", "Juice", "Fresh", "Cann~
## $ RetailPrice <dbl> 1.8541, 1.1705, 0.8699, 0.6086, 3.6162, 1.8645, 2.2~
## $ RetailPriceUnit <chr> "per pound", "per pound", "per pint", "per pint", "~
## $ Yield      <dbl> 0.90, 1.00, 1.00, 1.00, 0.93, 1.00, 0.65, 1.00, 0.6~
## $ CupEquivalentSize <dbl> 0.2425, 0.5401, 8.0000, 8.0000, 0.3638, 0.5401, 0.4~
## $ CupEquivalentUnit <chr> "pounds", "pounds", "fluid ounces", "fluid ounces",~
## $ CupEquivalentPrice <dbl> 0.4996, 0.6323, 0.4349, 0.3043, 1.4145, 1.0071, 1.5~
```

```
glimpse(VegetableData)
```

```
## Rows: 93
## Columns: 8
## $ Vegetable  <chr> "Acorn squash", "Artichoke", "Artichoke", "Asparagu~
## $ Form       <chr> "Fresh", "Fresh", "Canned", "Fresh", "Canned", "Fro~
## $ RetailPrice <dbl> 1.2136, 2.4703, 3.4498, 2.9531, 3.4328, 6.8212, 2.6~
## $ RetailPriceUnit <chr> "per pound", "per pound", "per pound", "per pound",~
## $ Yield      <dbl> 0.4586, 0.3750, 0.6500, 0.4938, 0.6500, 1.0335, 0.7~
## $ CupEquivalentSize <dbl> 0.4519, 0.3858, 0.3858, 0.3968, 0.3968, 0.3968, 0.3~
## $ CupEquivalentUnit <chr> "pounds", "pounds", "pounds", "pounds", "pounds", "~
## $ CupEquivalentPrice <dbl> 1.1961, 2.5415, 2.0476, 2.3731, 2.0958, 2.6191, 1.1~
```

Our main question when we started looking over the data was, can we compare fruits and vegetables and if so, how? So, we started looking through the data to see if there was anything we could compare. Because both data sets shared the same terms, we decided we we could actually compare the two different types of produce! But before we could do that, we wanted to compare the fruit prices and the vegetable prices individually.

The original data sets did not include all of the above terms. So, we mutated the data set to include the “Retail price per yield.”

```
#view just the fruit, form, price, price unit, and yield. Then add a column that shows the prices per u
FruitPriceperYield <- FruitData %>% select("Fruit", "Form", "RetailPrice", "RetailPriceUnit", "Yield") %
FruitPriceperYield
```

```
##           Fruit    Form RetailPrice RetailPriceUnit
## 1           Apples  Fresh      1.8541      per pound
## 2    Apples, applesauce Canned      1.1705      per pound
## 3    Apples, ready-to-drink Juice      0.8699      per pint
## 4 Apples, frozen concentrate Juice      0.6086      per pint
## 5           Apricots  Fresh      3.6162      per pound
## 6    Apricots, packed in juice Canned      1.8645      per pound
## 7 Apricots, packed in syrup or water Canned      2.2362      per pound
## 8           Apricots  Dried      7.6611      per pound
```

## 9	Bananas	Fresh	0.5971	per pound
## 10	Berries, mixed	Frozen	4.2673	per pound
## 11	Blackberries	Fresh	6.7483	per pound
## 12	Blackberries	Frozen	4.8277	per pound
## 13	Blueberries	Fresh	4.1575	per pound
## 14	Blueberries	Frozen	3.8210	per pound
## 15	Cantaloupe	Fresh	0.7523	per pound
## 16	Cherries	Fresh	4.6632	per pound
## 17	Cherries, packed in syrup or water	Canned	5.2418	per pound
## 18	Clementines	Fresh	1.5811	per pound
## 19	Cranberries	Dried	5.0828	per pound
## 20	Dates	Dried	5.7499	per pound
## 21	Figs	Dried	7.3233	per pound
## 22	Fruit cocktail, packed in juice	Canned	2.3940	per pound
## 23	Fruit cocktail, packed in syrup or water	Canned	2.0996	per pound
## 24	Grapefruit	Fresh	1.4444	per pound
## 25	Grapefruit, ready-to-drink	Juice	1.1935	per pint
## 26	Grapes	Fresh	2.0363	per pound
## 27	Grapes (raisins)	Dried	3.9936	per pound
## 28	Grapes, ready-to-drink	Juice	1.0509	per pint
## 29	Grapes, frozen concentrate	Juice	0.7524	per pint
## 30	Honeydew	Fresh	1.1589	per pound
## 31	Kiwi	Fresh	2.6064	per pound
## 32	Mangoes	Fresh	1.4698	per pound
## 33	Mangoes	Dried	10.3035	per pound
## 34	Nectarines	Fresh	2.3721	per pound
## 35	Oranges	Fresh	1.4624	per pound
## 36	Oranges, ready-to-drink	Juice	1.0572	per pint
## 37	Oranges, frozen concentrate	Juice	0.7338	per pint
## 38	Papaya	Fresh	1.3375	per pound
## 39	Papaya	Dried	7.4854	per pound
## 40	Peaches	Fresh	2.1785	per pound
## 41	Peaches, packed in juice	Canned	2.2503	per pound
## 42	Peaches, packed in syrup or water	Canned	2.0102	per pound
## 43	Peaches	Frozen	3.6058	per pound
## 44	Pears	Fresh	1.8472	per pound
## 45	Pears, packed in juice	Canned	2.1400	per pound
## 46	Pears, packed in syrup or water	Canned	2.0920	per pound
## 47	Pineapple	Fresh	0.6170	per pound
## 48	Pineapple, packed in juice	Canned	1.6509	per pound
## 49	Pineapple, packed in syrup or water	Canned	1.7771	per pound
## 50	Pineapple	Dried	7.0133	per pound
## 51	Pineapple, ready-to-drink	Juice	1.2243	per pint
## 52	Pineapple, frozen concentrate	Juice	0.7256	per pint
## 53	Plum	Fresh	2.5259	per pound
## 54	Plum (prunes)	Dried	6.3293	per pound
## 55	Plum (prune), ready-to-drink	Juice	1.6988	per pint
## 56	Pomegranate	Fresh	2.4672	per pound
## 57	Pomegranate, ready-to-drink	Juice	3.2788	per pint
## 58	Raspberries	Fresh	7.7338	per pound
## 59	Raspberries	Frozen	6.1590	per pound
## 60	Strawberries	Fresh	2.9682	per pound
## 61	Strawberries	Frozen	3.3421	per pound
## 62	Watermelon	Fresh	0.3820	per pound

##	Yield	RetailPriceperYield
## 1	0.90	1.668690
## 2	1.00	1.170500
## 3	1.00	0.869900
## 4	1.00	0.608600
## 5	0.93	3.363066
## 6	1.00	1.864500
## 7	0.65	1.453530
## 8	1.00	7.661100
## 9	0.64	0.382144
## 10	1.00	4.267300
## 11	0.96	6.478368
## 12	1.00	4.827700
## 13	0.95	3.949625
## 14	1.00	3.821000
## 15	0.51	0.383673
## 16	0.92	4.290144
## 17	0.65	3.407170
## 18	0.77	1.217447
## 19	1.00	5.082800
## 20	1.00	5.749900
## 21	0.96	7.030368
## 22	1.00	2.394000
## 23	0.65	1.364740
## 24	0.49	0.707756
## 25	1.00	1.193500
## 26	0.96	1.954848
## 27	1.00	3.993600
## 28	1.00	1.050900
## 29	1.00	0.752400
## 30	0.46	0.533094
## 31	0.76	1.980864
## 32	0.71	1.043558
## 33	1.00	10.303500
## 34	0.91	2.158611
## 35	0.68	0.994432
## 36	1.00	1.057200
## 37	1.00	0.733800
## 38	0.62	0.829250
## 39	1.00	7.485400
## 40	0.96	2.091360
## 41	1.00	2.250300
## 42	0.65	1.306630
## 43	1.00	3.605800
## 44	0.90	1.662480
## 45	1.00	2.140000
## 46	0.65	1.359800
## 47	0.51	0.314670
## 48	1.00	1.650900
## 49	0.65	1.155115
## 50	1.00	7.013300
## 51	1.00	1.224300
## 52	1.00	0.725600
## 53	0.94	2.374346

```
## 54 1.00          6.329300
## 55 1.00          1.698800
## 56 0.56          1.381632
## 57 1.00          3.278800
## 58 0.96          7.424448
## 59 1.00          6.159000
## 60 0.94          2.790108
## 61 1.00          3.342100
## 62 0.52          0.198640
```

We also mutated the data sets to include the “price per cup.”

```
#Providing the yield per cuup and price per cup for each fruit.
```

```
CupEquivalentData <- FruitData %>% select(Fruit, Yield, CupEquivalentSize, CupEquivalentUnit, CupEquivalentPrice)
CupEquivalentData
```

```
##           Fruit Yield CupEquivalentSize
## 1           Apples  0.90           0.2425
## 2 Apples, applesauce  1.00           0.5401
## 3 Apples, ready-to-drink  1.00           8.0000
## 4 Apples, frozen concentrate  1.00           8.0000
## 5           Apricots  0.93           0.3638
## 6 Apricots, packed in juice  1.00           0.5401
## 7 Apricots, packed in syrup or water  0.65           0.4409
## 8           Apricots  1.00           0.1433
## 9           Bananas  0.64           0.3307
## 10          Berries, mixed  1.00           0.3307
## 11          Blackberries  0.96           0.3197
## 12          Blackberries  1.00           0.3307
## 13          Blueberries  0.95           0.3197
## 14          Blueberries  1.00           0.3307
## 15          Cantaloupe  0.51           0.3748
## 16          Cherries  0.92           0.3417
## 17 Cherries, packed in syrup or water  0.65           0.4409
## 18          Clementines  0.77           0.4630
## 19          Cranberries  1.00           0.1232
## 20           Dates  1.00           0.1653
## 21           Figs  0.96           0.1653
## 22 Fruit cocktail, packed in juice  1.00           0.5401
## 23 Fruit cocktail, packed in syrup or water  0.65           0.4409
## 24          Grapefruit  0.49           0.4630
## 25 Grapefruit, ready-to-drink  1.00           8.0000
## 26           Grapes  0.96           0.3307
## 27 Grapes (raisins)  1.00           0.1653
## 28 Grapes, ready-to-drink  1.00           8.0000
## 29 Grapes, frozen concentrate  1.00           8.0000
## 30          Honeydew  0.46           0.3748
## 31           Kiwi  0.76           0.3858
## 32          Mangoes  0.71           0.3638
## 33          Mangoes  1.00           0.1253
## 34          Nectarines  0.91           0.3197
## 35          Oranges  0.68           0.4079
## 36 Oranges, ready-to-drink  1.00           8.0000
```

## 37	Oranges, frozen concentrate	1.00	8.0000
## 38	Papaya	0.62	0.3086
## 39	Papaya	1.00	0.1543
## 40	Peaches	0.96	0.3417
## 41	Peaches, packed in juice	1.00	0.5401
## 42	Peaches, packed in syrup or water	0.65	0.4409
## 43	Peaches	1.00	0.3307
## 44	Pears	0.90	0.3638
## 45	Pears, packed in juice	1.00	0.5401
## 46	Pears, packed in syrup or water	0.65	0.4409
## 47	Pineapple	0.51	0.3638
## 48	Pineapple, packed in juice	1.00	0.5401
## 49	Pineapple, packed in syrup or water	0.65	0.4409
## 50	Pineapple	1.00	0.1543
## 51	Pineapple, ready-to-drink	1.00	8.0000
## 52	Pineapple, frozen concentrate	1.00	8.0000
## 53	Plum	0.94	0.3638
## 54	Plum (prunes)	1.00	0.1874
## 55	Plum (prune), ready-to-drink	1.00	8.0000
## 56	Pomegranate	0.56	0.3417
## 57	Pomegranate, ready-to-drink	1.00	8.0000
## 58	Raspberries	0.96	0.3197
## 59	Raspberries	1.00	0.3307
## 60	Strawberries	0.94	0.3197
## 61	Strawberries	1.00	0.3307
## 62	Watermelon	0.52	0.3307

##	CupEquivalentUnit	CupEquivalentPrice	YieldPerCup	PricePerCup
## 1	pounds	0.4996	3.711340	1.8541856
## 2	pounds	0.6323	1.851509	1.1707091
## 3	fluid ounces	0.4349	0.125000	0.0543625
## 4	fluid ounces	0.3043	0.125000	0.0380375
## 5	pounds	1.4145	2.556350	3.6159566
## 6	pounds	1.0071	1.851509	1.8646547
## 7	pounds	1.5169	1.474257	2.2363007
## 8	pounds	1.0978	6.978367	7.6608514
## 9	pounds	0.3085	1.935289	0.5970366
## 10	pounds	1.4112	3.023889	4.2673118
## 11	pounds	2.2471	3.002815	6.7476259
## 12	pounds	1.5965	3.023889	4.8276383
## 13	pounds	1.3990	2.971536	4.1571786
## 14	pounds	1.2636	3.023889	3.8209858
## 15	pounds	0.5528	1.360726	0.7522092
## 16	pounds	1.7321	2.692420	4.6635411
## 17	pounds	3.5558	1.474257	5.2421638
## 18	pounds	0.9507	1.663067	1.5810778
## 19	pounds	0.6260	8.116883	5.0811688
## 20	pounds	0.9507	6.049607	5.7513612
## 21	pounds	1.2613	5.807623	7.3251543
## 22	pounds	1.2931	1.851509	2.3941863
## 23	pounds	1.4242	1.474257	2.0996371
## 24	pounds	1.3647	1.058315	1.4442829
## 25	fluid ounces	0.5968	0.125000	0.0746000
## 26	pounds	0.7014	2.902933	2.0361173
## 27	pounds	0.6603	6.049607	3.9945554

## 28	fluid ounces	0.5255	0.125000	0.0656875
## 29	fluid ounces	0.3762	0.125000	0.0470250
## 30	pounds	0.9442	1.227321	1.1588367
## 31	pounds	1.3231	1.969933	2.6064178
## 32	pounds	0.7531	1.951622	1.4697664
## 33	pounds	1.2906	7.980846	10.3000798
## 34	pounds	0.8333	2.846419	2.3719206
## 35	pounds	0.8771	1.667075	1.4621917
## 36	fluid ounces	0.5286	0.125000	0.0660750
## 37	fluid ounces	0.3669	0.125000	0.0458625
## 38	pounds	0.6658	2.009073	1.3376410
## 39	pounds	1.1552	6.480881	7.4867142
## 40	pounds	0.7755	2.809482	2.1787533
## 41	pounds	1.2155	1.851509	2.2505092
## 42	pounds	1.3636	1.474257	2.0102971
## 43	pounds	1.1924	3.023889	3.6056849
## 44	pounds	0.7466	2.473887	1.8470038
## 45	pounds	1.1559	1.851509	2.1401592
## 46	pounds	1.4191	1.474257	2.0921184
## 47	pounds	0.4401	1.401869	0.6169626
## 48	pounds	0.8917	1.851509	1.6509906
## 49	pounds	1.2055	1.474257	1.7772171
## 50	pounds	1.0823	6.480881	7.0142579
## 51	fluid ounces	0.6122	0.125000	0.0765250
## 52	fluid ounces	0.3628	0.125000	0.0453500
## 53	pounds	0.9775	2.583837	2.5257009
## 54	pounds	1.1861	5.336179	6.3292423
## 55	fluid ounces	0.8494	0.125000	0.1061750
## 56	pounds	1.5055	1.638865	2.4673105
## 57	fluid ounces	1.6394	0.125000	0.2049250
## 58	pounds	2.5753	3.002815	7.7331498
## 59	pounds	2.0368	3.023889	6.1590565
## 60	pounds	1.0094	2.940256	2.9678949
## 61	pounds	1.1052	3.023889	3.3420018
## 62	pounds	0.2429	1.572422	0.3819413

Now we were ready to start answering our first question.

We decided to start with fruits. When viewing the data the first question that came to our mind, was probably the most obvious question. What was the most expensive and least expensive fruit in 2022. When we went to put this data into a graph, the data was not allowing us to show this clearly, so instead we put this data in a scrolling table, sorted from most expensive to least expensive. Before we could put the data into a scrolling table, we need to install kableExtra. Once we did this, we were able to answer our first question.

Most Expensive: Canned cherries, packed in syrup or water at \$3.55 per cup Least Expensive: Fresh watermelons at \$0.24 per cup

```
library(kableExtra)
```

```
## Warning: package 'kableExtra' was built under R version 4.4.3
```

```
##
```

```
## Attaching package: 'kableExtra'
```

```
## The following object is masked from 'package:dplyr':
##
##      group_rows
```

```
FruitData %>% select(Fruit, Form, CupEquivalentPrice) %>% arrange(-CupEquivalentPrice) %>% knitr::kable()
```

Fruit	Form	CupEquivalentPrice
Cherries, packed in syrup or water	Canned	3.5558
Raspberries	Fresh	2.5753
Blackberries	Fresh	2.2471
Raspberries	Frozen	2.0368
Cherries	Fresh	1.7321
Pomegranate, ready-to-drink	Juice	1.6394
Blackberries	Frozen	1.5965
Apricots, packed in syrup or water	Canned	1.5169
Pomegranate	Fresh	1.5055
Fruit cocktail, packed in syrup or water	Canned	1.4242
Pears, packed in syrup or water	Canned	1.4191
Apricots	Fresh	1.4145
Berries, mixed	Frozen	1.4112
Blueberries	Fresh	1.3990
Grapefruit	Fresh	1.3647
Peaches, packed in syrup or water	Canned	1.3636
Kiwi	Fresh	1.3231
Fruit cocktail, packed in juice	Canned	1.2931
Mangoes	Dried	1.2906
Blueberries	Frozen	1.2636
Figs	Dried	1.2613
Peaches, packed in juice	Canned	1.2155
Pineapple, packed in syrup or water	Canned	1.2055
Peaches	Frozen	1.1924
Plum (prunes)	Dried	1.1861
Pears, packed in juice	Canned	1.1559
Papaya	Dried	1.1552
Strawberries	Frozen	1.1052
Apricots	Dried	1.0978
Pineapple	Dried	1.0823
Strawberries	Fresh	1.0094
Apricots, packed in juice	Canned	1.0071
Plum	Fresh	0.9775
Clementines	Fresh	0.9507
Dates	Dried	0.9507
Honeydew	Fresh	0.9442
Pineapple, packed in juice	Canned	0.8917
Oranges	Fresh	0.8771
Plum (prune), ready-to-drink	Juice	0.8494
Nectarines	Fresh	0.8333
Peaches	Fresh	0.7755
Mangoes	Fresh	0.7531

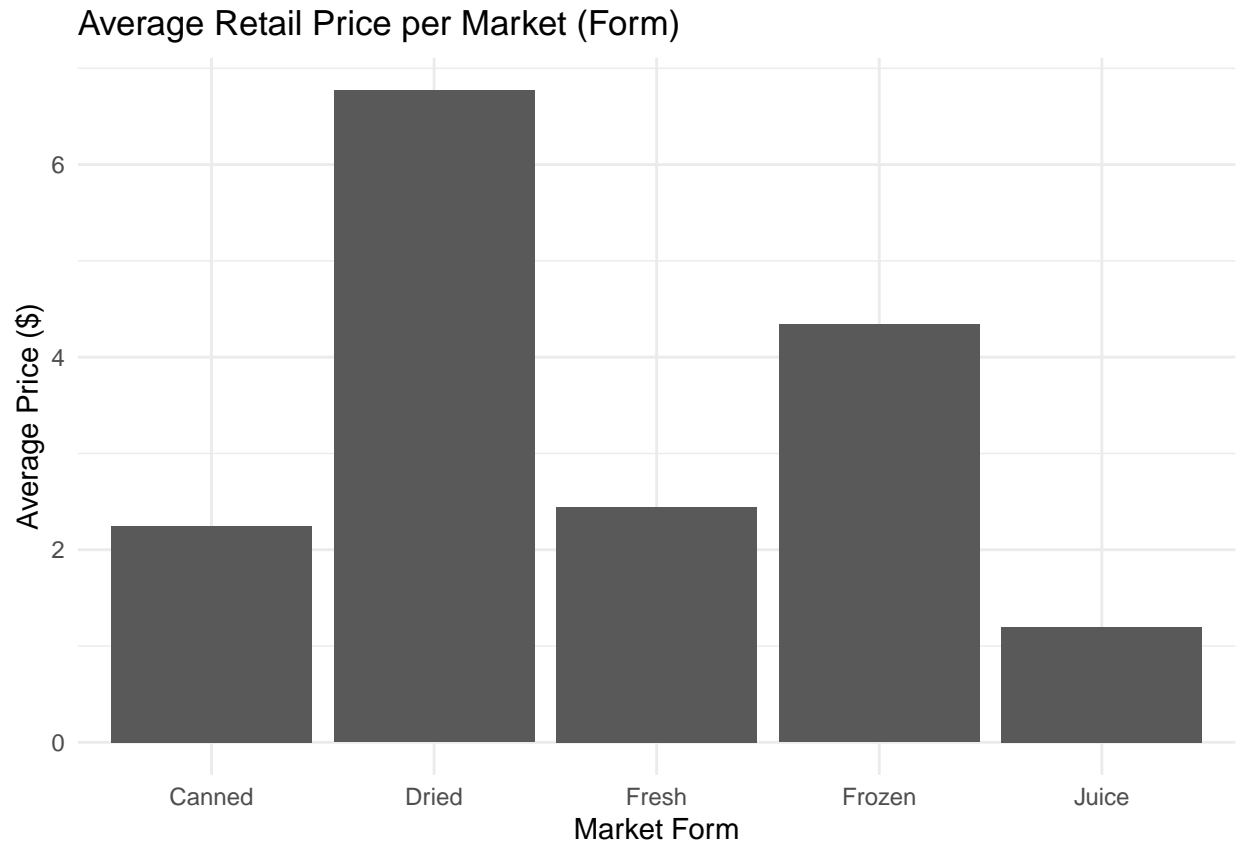
Pears	Fresh	0.7466
Grapes	Fresh	0.7014
Papaya	Fresh	0.6658
Grapes (raisins)	Dried	0.6603
Apples, applesauce	Canned	0.6323
Cranberries	Dried	0.6260
Pineapple, ready-to-drink	Juice	0.6122
Grapefruit, ready-to-drink	Juice	0.5968
Cantaloupe	Fresh	0.5528
Oranges, ready-to-drink	Juice	0.5286
Grapes, ready-to-drink	Juice	0.5255
Apples	Fresh	0.4996
Pineapple	Fresh	0.4401
Apples, ready-to-drink	Juice	0.4349
Grapes, frozen concentrate	Juice	0.3762
Oranges, frozen concentrate	Juice	0.3669
Pineapple, frozen concentrate	Juice	0.3628
Bananas	Fresh	0.3085
Apples, frozen concentrate	Juice	0.3043
Watermelon	Fresh	0.2429

After we answered the first question, we were curious about which form was the most expensive and least expensive. So, to do this we had to group each of the fruits together by their form and then average the price. Do this allowed us to answer this question.

Most expensive: Dried fruits Least expensive: Fruit Juice

In addition to answering our second question, we were able to see canned and fresh fruit showed a similar average price. And the average price per cup for eac form had a wide range.

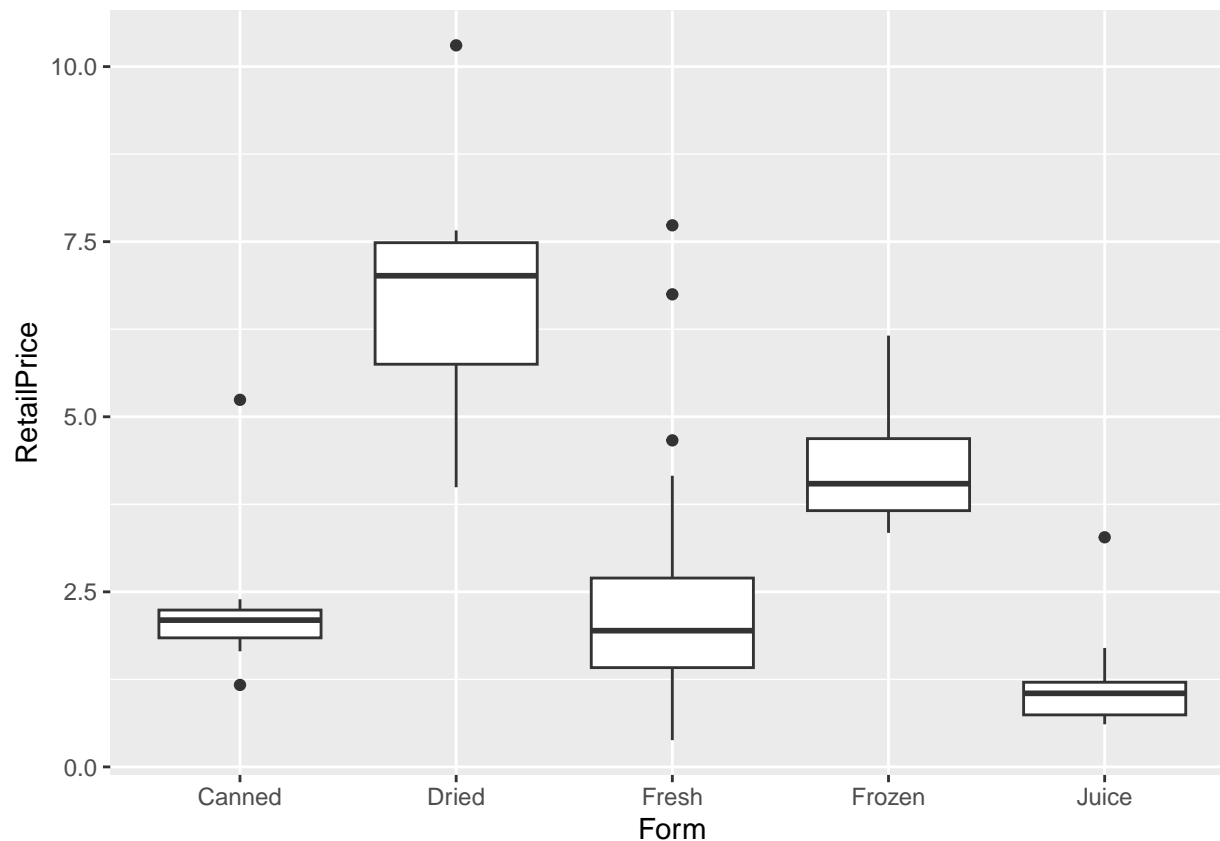
```
AveragePriceperForm <- FruitData %>% group_by(Form) %>% summarise(AveragePrice = mean(RetailPrice, na.rm = TRUE))
AveragePriceperForm %>% ggplot(aes(x = Form, y = AveragePrice)) + geom_col() + labs(title = "Average Retail Price by Form")
```



Then we took the data set that showed each fruit grouped together by form and created a box plot, which allowed us to see why the average calculations of each fruit was what it was.

Dried fruits showed a higher average price per cup with an even higher outlier. Fresh fruit showed the most outliers. Juice showed the lowest average price per cup. Overall this confirmed the data from the previous graph.

```
FruitData %>% ggplot(aes(x = Form, y = RetailPrice)) + geom_boxplot()
```



Once we made it through the fruit data it was time to see what the vegetable data said! So, once again we wanted to know what was the most expensive and least expensive vegetable?

So, we needed to add the “Retail price per year” and “Price per cup” to the vegetable data set.

```
#view just the vegetable, form, price, price unit, and yield. Then add a column that shows the prices p
VegetablePriceperYield <- VegetableData %>% select("Vegetable", "Form", "RetailPrice", "RetailPriceUnit
VegetablePriceperYield
```

##	Vegetable	Form	RetailPrice
## 1	Acorn squash	Fresh	1.2136
## 2	Artichoke	Fresh	2.4703
## 3	Artichoke	Canned	3.4498
## 4	Asparagus	Fresh	2.9531
## 5	Asparagus	Canned	3.4328
## 6	Asparagus	Frozen	6.8212
## 7	Avocados	Fresh	2.6737
## 8	Beets	Canned	1.1431
## 9	Black beans	Canned	1.2387
## 10	Black beans	Dried	1.5250
## 11	Blackeye peas	Canned	1.3164
## 12	Blackeye peas	Dried	1.9265
## 13	Broccoli florets	Fresh	2.9162
## 14	Broccoli heads	Fresh	3.0820
## 15	Broccoli	Frozen	2.3458
## 16	Brussels sprouts	Fresh	2.9139

## 17	Brussels sprouts	Frozen	2.5949
## 18	Butternut squash	Fresh	1.2691
## 19	Cabbage, green	Fresh	0.7970
## 20	Cabbage, red	Fresh	1.2604
## 21	Cabbage, sauerkraut	Canned	1.4780
## 22	Carrots, cooked whole	Fresh	0.9761
## 23	Carrots, raw whole	Fresh	0.9761
## 24	Carrots, baby	Fresh	1.3507
## 25	Carrots	Canned	1.1979
## 26	Carrots	Frozen	1.7277
## 27	Cauliflower florets	Fresh	3.8022
## 28	Cauliflower heads	Fresh	2.1841
## 29	Cauliflower	Frozen	2.3974
## 30	Celery, trimmed bunches	Fresh	1.1637
## 31	Celery sticks	Fresh	2.4941
## 32	Collard greens	Fresh	3.0881
## 33	Collard greens	Canned	1.3315
## 34	Collard greens	Frozen	2.3512
## 35	Corn	Fresh	2.2281
## 36	Corn	Canned	1.1543
## 37	Corn	Frozen	1.6889
## 38	Cucumbers with peel	Fresh	1.2473
## 39	Cucumbers without peel	Fresh	1.2473
## 40	Great northern beans	Canned	1.1583
## 41	Great northern beans	Dried	1.7202
## 42	Green beans	Fresh	2.6199
## 43	Green beans	Canned	1.1291
## 44	Green beans	Frozen	1.9983
## 45	Green peas	Canned	1.3118
## 46	Green peas	Frozen	1.9960
## 47	Green peppers	Fresh	1.4789
## 48	Kale	Fresh	3.4338
## 49	Kale	Frozen	2.2983
## 50	Kidney beans	Canned	1.1208
## 51	Kidney beans	Dried	1.9176
## 52	Lentils	Dried	1.8390
## 53	Lettuce, iceberg	Fresh	1.2512
## 54	Lettuce, romaine, heads	Fresh	2.3074
## 55	Lettuce, romaine, hearts	Fresh	3.2802
## 56	Lima beans	Canned	1.4785
## 57	Lima beans	Frozen	2.4401
## 58	Lima beans	Dried	2.3933
## 59	Mixed vegetables, peas & carrots	Canned	1.4754
## 60	Mixed vegetables, peas & carrots	Frozen	1.8433
## 61	Mixed vegetables, carrots, peas, corn, green beans	Frozen	1.7859
## 62	Mixed vegetables, broccoli, cauliflower, carrots	Frozen	2.1538
## 63	Mushrooms, whole	Fresh	3.8929
## 64	Mushrooms, sliced	Fresh	3.9224
## 65	Mustard greens	Canned	1.3367
## 66	Mustard greens	Frozen	2.4324
## 67	Navy beans	Canned	1.2738
## 68	Navy beans	Dried	1.6073
## 69	Okra	Fresh	5.1567
## 70	Okra	Frozen	2.2528

## 71	Olives	Canned	5.3496
## 72	Onions	Fresh	1.1062
## 73	Pinto beans	Canned	1.1189
## 74	Pinto beans	Dried	1.4173
## 75	Potatoes	Fresh	0.8166
## 76	Potatoes, french fries	Frozen	1.9018
## 77	Potatoes	Canned	1.0266
## 78	Pumpkin	Canned	1.8642
## 79	Radish	Fresh	1.8126
## 80	Red peppers	Fresh	1.8742
## 81	Spinach, boiled	Fresh	4.1214
## 82	Spinach, eaten raw	Fresh	4.1214
## 83	Spinach	Canned	1.5676
## 84	Spinach	Frozen	2.2796
## 85	Sweet potatoes	Fresh	1.1565
## 86	Tomatoes, grape & cherry	Fresh	3.8729
## 87	Tomatoes, roma & plum	Fresh	1.2453
## 88	Tomatoes, large round	Fresh	2.1868
## 89	Tomatoes	Canned	1.0715
## 90	Turnip greens	Fresh	2.9250
## 91	Turnip greens	Canned	1.3154
## 92	Turnip greens	Frozen	2.5169
## 93	Zucchini	Fresh	1.6359

##	RetailPriceUnit	Yield	RetailPriceperYield
## 1	per pound	0.4586	0.5565570
## 2	per pound	0.3750	0.9263625
## 3	per pound	0.6500	2.2423700
## 4	per pound	0.4938	1.4582408
## 5	per pound	0.6500	2.2313200
## 6	per pound	1.0335	7.0497102
## 7	per pound	0.7408	1.9806770
## 8	per pound	0.6500	0.7430150
## 9	per pound	0.6500	0.8051550
## 10	per pound	2.4692	3.7655300
## 11	per pound	0.6500	0.8556600
## 12	per pound	2.5397	4.8927321
## 13	per pound	1.0000	2.9162000
## 14	per pound	0.7800	2.4039600
## 15	per pound	0.8818	2.0685264
## 16	per pound	1.0600	3.0887340
## 17	per pound	0.9600	2.4911040
## 18	per pound	0.7140	0.9061374
## 19	per pound	0.7788	0.6207036
## 20	per pound	0.7791	0.9819776
## 21	per pound	0.6500	0.9607000
## 22	per pound	0.8158	0.7963024
## 23	per pound	0.8900	0.8687290
## 24	per pound	1.0000	1.3507000
## 25	per pound	0.6500	0.7786350
## 26	per pound	0.9800	1.6931460
## 27	per pound	0.9702	3.6888944
## 28	per pound	0.8926	1.9495277
## 29	per pound	0.9304	2.2305410
## 30	per pound	0.7300	0.8495010

## 31	per pound 1.0000	2.4941000
## 32	per pound 1.1600	3.5821960
## 33	per pound 0.6500	0.8654750
## 34	per pound 0.8818	2.0732882
## 35	per pound 0.5400	1.2031740
## 36	per pound 0.6500	0.7502950
## 37	per pound 0.9630	1.6264107
## 38	per pound 0.9700	1.2098810
## 39	per pound 0.7300	0.9105290
## 40	per pound 0.6500	0.7528950
## 41	per pound 2.4692	4.2475178
## 42	per pound 0.8466	2.2180073
## 43	per pound 0.6500	0.7339150
## 44	per pound 0.9030	1.8044649
## 45	per pound 0.6500	0.8526700
## 46	per pound 0.8924	1.7812304
## 47	per pound 0.8200	1.2126980
## 48	per pound 1.0500	3.6054900
## 49	per pound 0.8995	2.0673208
## 50	per pound 0.6500	0.7285200
## 51	per pound 2.4692	4.7349379
## 52	per pound 2.4692	4.5408588
## 53	per pound 0.9500	1.1886400
## 54	per pound 0.9400	2.1689560
## 55	per pound 0.8500	2.7881700
## 56	per pound 0.6500	0.9610250
## 57	per pound 1.0970	2.6767897
## 58	per pound 2.5397	6.0782640
## 59	per pound 0.6500	0.9590100
## 60	per pound 0.9900	1.8248670
## 61	per pound 0.9700	1.7323230
## 62	per pound 0.9700	2.0891860
## 63	per pound 0.9700	3.7761130
## 64	per pound 1.0000	3.9224000
## 65	per pound 0.6500	0.8688550
## 66	per pound 0.7478	1.8189487
## 67	per pound 0.6500	0.8279700
## 68	per pound 2.4692	3.9687452
## 69	per pound 0.7695	3.9680806
## 70	per pound 0.8995	2.0263936
## 71	per pound 1.0000	5.3496000
## 72	per pound 0.9000	0.9955800
## 73	per pound 0.6500	0.7272850
## 74	per pound 2.4692	3.4995972
## 75	per pound 0.8113	0.6625076
## 76	per pound 0.7760	1.4757968
## 77	per pound 0.6500	0.6672900
## 78	per pound 1.0000	1.8642000
## 79	per pound 0.9000	1.6313400
## 80	per pound 0.8200	1.5368440
## 81	per pound 0.7700	3.1734780
## 82	per pound 1.0000	4.1214000
## 83	per pound 0.6500	1.0189400
## 84	per pound 0.7760	1.7689696

```
## 85      per pound 0.8818      1.0198017
## 86      per pound 0.9100      3.5243390
## 87      per pound 0.9100      1.1332230
## 88      per pound 0.9100      1.9899880
## 89      per pound 1.0000      1.0715000
## 90      per pound 0.7500      2.1937500
## 91      per pound 0.6500      0.8550100
## 92      per pound 0.7760      1.9531144
## 93      per pound 0.7695      1.2588250
```

#Providing the yield per cup and price per cup for each fruit.

```
VegetableCupEquivalentData <- VegetableData %>% select(Vegetable, Yield, CupEquivalentSize, CupEquivalentPrice)
VegetableCupEquivalentData
```

```
##           Vegetable  Yield CupEquivalentSize
## 1      Acorn squash 0.4586           0.4519
## 2      Artichoke 0.3750           0.3858
## 3      Artichoke 0.6500           0.3858
## 4      Asparagus 0.4938           0.3968
## 5      Asparagus 0.6500           0.3968
## 6      Asparagus 1.0335           0.3968
## 7      Avocados 0.7408           0.3197
## 8           Beets 0.6500           0.3748
## 9      Black beans 0.6500           0.3858
## 10     Black beans 2.4692           0.3858
## 11     Blackeye peas 0.6500           0.3748
## 12     Blackeye peas 2.5397           0.3858
## 13     Broccoli florets 1.0000           0.3417
## 14     Broccoli heads 0.7800           0.3417
## 15           Broccoli 0.8818           0.3417
## 16     Brussels sprouts 1.0600           0.3417
## 17     Brussels sprouts 0.9600           0.3417
## 18     Butternut squash 0.7140           0.4519
## 19     Cabbage, green 0.7788           0.3307
## 20     Cabbage, red 0.7791           0.3307
## 21     Cabbage, sauerkraut 0.6500           0.3086
## 22     Carrots, cooked whole 0.8158           0.3197
## 23     Carrots, raw whole 0.8900           0.2756
## 24           Carrots, baby 1.0000           0.2756
## 25           Carrots 0.6500           0.3197
## 26           Carrots 0.9800           0.3197
## 27     Cauliflower florets 0.9702           0.2756
## 28     Cauliflower heads 0.8926           0.2756
## 29           Cauliflower 0.9304           0.2756
## 30     Celery, trimmed bunches 0.7300           0.2646
## 31           Celery sticks 1.0000           0.2646
## 32     Collard greens 1.1600           0.2866
## 33     Collard greens 0.6500           0.3638
## 34     Collard greens 0.8818           0.3638
## 35           Corn 0.5400           0.3638
## 36           Corn 0.6500           0.3638
## 37           Corn 0.9630           0.3638
## 38     Cucumbers with peel 0.9700           0.2646
## 39     Cucumbers without peel 0.7300           0.2646
```

## 40	Great northern beans	0.6500	0.3858
## 41	Great northern beans	2.4692	0.3858
## 42	Green beans	0.8466	0.2756
## 43	Green beans	0.6500	0.2976
## 44	Green beans	0.9030	0.2976
## 45	Green peas	0.6500	0.3527
## 46	Green peas	0.8924	0.3527
## 47	Green peppers	0.8200	0.2646
## 48	Kale	1.0500	0.2866
## 49	Kale	0.8995	0.3638
## 50	Kidney beans	0.6500	0.3858
## 51	Kidney beans	2.4692	0.3858
## 52	Lentils	2.4692	0.3858
## 53	Lettuce, iceberg	0.9500	0.2425
## 54	Lettuce, romaine, heads	0.9400	0.2094
## 55	Lettuce, romaine, hearts	0.8500	0.2094
## 56	Lima beans	0.6500	0.3748
## 57	Lima beans	1.0970	0.3748
## 58	Lima beans	2.5397	0.3858
## 59	Mixed vegetables, peas & carrots	0.6500	0.3392
## 60	Mixed vegetables, peas & carrots	0.9900	0.3392
## 61	Mixed vegetables, carrots, peas, corn, green beans	0.9700	0.3340
## 62	Mixed vegetables, broccoli, cauliflower, carrots	0.9700	0.3105
## 63	Mushrooms, whole	0.9700	0.1543
## 64	Mushrooms, sliced	1.0000	0.1543
## 65	Mustard greens	0.6500	0.3307
## 66	Mustard greens	0.7478	0.3307
## 67	Navy beans	0.6500	0.3858
## 68	Navy beans	2.4692	0.3858
## 69	Okra	0.7695	0.3527
## 70	Okra	0.8995	0.3748
## 71	Olives	1.0000	0.2976
## 72	Onions	0.9000	0.3527
## 73	Pinto beans	0.6500	0.3858
## 74	Pinto beans	2.4692	0.3858
## 75	Potatoes	0.8113	0.2646
## 76	Potatoes, french fries	0.7760	0.3417
## 77	Potatoes	0.6500	0.3417
## 78	Pumpkin	1.0000	0.5401
## 79	Radish	0.9000	0.2756
## 80	Red peppers	0.8200	0.2646
## 81	Spinach, boiled	0.7700	0.3307
## 82	Spinach, eaten raw	1.0000	0.1543
## 83	Spinach	0.6500	0.3748
## 84	Spinach	0.7760	0.3748
## 85	Sweet potatoes	0.8818	0.4409
## 86	Tomatoes, grape & cherry	0.9100	0.3748
## 87	Tomatoes, roma & plum	0.9100	0.3748
## 88	Tomatoes, large round	0.9100	0.3748
## 89	Tomatoes	1.0000	0.5401
## 90	Turnip greens	0.7500	0.3197
## 91	Turnip greens	0.6500	0.3527
## 92	Turnip greens	0.7760	0.3527
## 93	Zucchini	0.7695	0.3968

##	CupEquivalentUnit	CupEquivalentPrice	YieldPerCup	PricePerCup
## 1	pounds	1.1961	1.0148263	1.2138337
## 2	pounds	2.5415	0.9720062	2.4703538
## 3	pounds	2.0476	1.6848108	3.4498186
## 4	pounds	2.3731	1.2444556	2.9532177
## 5	pounds	2.0958	1.6381048	3.4331401
## 6	pounds	2.6191	2.6045867	6.8216730
## 7	pounds	1.1538	2.3171723	2.6735535
## 8	pounds	0.6591	1.7342583	1.1430496
## 9	pounds	0.7352	1.6848108	1.2386729
## 10	pounds	0.2383	6.4002074	1.5251694
## 11	pounds	0.7590	1.7342583	1.3163020
## 12	pounds	0.2926	6.5829445	1.9261696
## 13	pounds	0.9965	2.9265438	2.9163008
## 14	pounds	1.3502	2.2827041	3.0821071
## 15	pounds	0.9090	2.5806263	2.3457893
## 16	pounds	0.9394	3.1021364	2.9141469
## 17	pounds	0.9237	2.8094820	2.5951185
## 18	pounds	0.8033	1.5799956	1.2692104
## 19	pounds	0.3384	2.3550045	0.7969335
## 20	pounds	0.5350	2.3559117	1.2604128
## 21	pounds	0.7018	2.1062865	1.4781918
## 22	pounds	0.3825	2.5517673	0.9760510
## 23	pounds	0.3022	3.2293179	0.9758999
## 24	pounds	0.3722	3.6284470	1.3505080
## 25	pounds	0.5892	2.0331561	1.1979356
## 26	pounds	0.5636	3.0653738	1.7276447
## 27	pounds	1.0800	3.5203193	3.8019448
## 28	pounds	0.6743	3.2387518	2.1838903
## 29	pounds	0.7101	3.3759071	2.3972316
## 30	pounds	0.4217	2.7588813	1.1634203
## 31	pounds	0.6598	3.7792895	2.4935752
## 32	pounds	0.7630	4.0474529	3.0882066
## 33	pounds	0.7452	1.7866960	1.3314458
## 34	pounds	0.9699	2.4238593	2.3509011
## 35	pounds	1.5009	1.4843321	2.2278340
## 36	pounds	0.6460	1.7866960	1.1542056
## 37	pounds	0.6380	2.6470588	1.6888235
## 38	pounds	0.3402	3.6659108	1.2471429
## 39	pounds	0.4520	2.7588813	1.2470144
## 40	pounds	0.6875	1.6848108	1.1583074
## 41	pounds	0.2688	6.4002074	1.7203757
## 42	pounds	0.8528	3.0718433	2.6196679
## 43	pounds	0.5170	2.1841398	1.1292003
## 44	pounds	0.6586	3.0342742	1.9983730
## 45	pounds	0.7119	1.8429260	1.3119790
## 46	pounds	0.7889	2.5301956	1.9960713
## 47	pounds	0.4771	3.0990174	1.4785412
## 48	pounds	0.9373	3.6636427	3.4339323
## 49	pounds	0.9295	2.4725124	2.2982002
## 50	pounds	0.6652	1.6848108	1.1207361
## 51	pounds	0.2996	6.4002074	1.9175021
## 52	pounds	0.2873	6.4002074	1.8387796
## 53	pounds	0.3194	3.9175258	1.2512577

```
## 54      pounds      0.5141  4.4890162  2.3078032
## 55      pounds      0.8082  4.0592168  3.2806590
## 56      pounds      0.8525  1.7342583  1.4784552
## 57      pounds      0.8336  2.9268943  2.4398591
## 58      pounds      0.3636  6.5829445  2.3935586
## 59      pounds      0.7699  1.9162736  1.4753390
## 60      pounds      0.6315  2.9186321  1.8431162
## 61      pounds      0.6150  2.9041916  1.7860778
## 62      pounds      0.6895  3.1239936  2.1539936
## 63      pounds      0.6194  6.2864550  3.8938302
## 64      pounds      0.6053  6.4808814  3.9228775
## 65      pounds      0.6800  1.9655277  1.3365588
## 66      pounds      1.0756  2.2612640  2.4322155
## 67      pounds      0.7561  1.6848108  1.2738854
## 68      pounds      0.2511  6.4002074  1.6070921
## 69      pounds      2.3639  2.1817409  5.1574172
## 70      pounds      0.9387  2.3999466  2.2528299
## 71      pounds      1.5922  3.3602151  5.3501344
## 72      pounds      0.4335  2.5517437  1.1061809
## 73      pounds      0.6641  1.6848108  1.1188828
## 74      pounds      0.2215  6.4002074  1.4176459
## 75      pounds      0.2663  3.0661376  0.8165124
## 76      pounds      0.8374  2.2709980  1.9017337
## 77      pounds      0.5397  1.9022534  1.0266462
## 78      pounds      1.0069  1.8515090  1.8642844
## 79      pounds      0.5550  3.2656023  1.8124093
## 80      pounds      0.6047  3.0990174  1.8739758
## 81      pounds      1.7700  2.3283943  4.1212579
## 82      pounds      0.6360  6.4808814  4.1218406
## 83      pounds      0.9039  1.7342583  1.5675961
## 84      pounds      1.1010  2.0704376  2.2795518
## 85      pounds      0.5782  2.0000000  1.1564000
## 86      pounds      1.5950  2.4279616  3.8725987
## 87      pounds      0.5129  2.4279616  1.2453015
## 88      pounds      0.9006  2.4279616  2.1866222
## 89      pounds      0.5787  1.8515090  1.0714682
## 90      pounds      1.2467  2.3459493  2.9246950
## 91      pounds      0.7138  1.8429260  1.3154806
## 92      pounds      1.1440  2.2001701  2.5169946
## 93      pounds      0.8437  1.9392641  1.6361571
```

The scrolling table showed us:

Most expensive: Fresh asparagus at \$2.61 per cup Least Expensive: dried pinto beans at \$0.22 per cup

```
VegetableData %>% select(Vegetable, Form, CupEquivalentPrice) %>% arrange(-CupEquivalentPrice) %>% kn
```

Vegetable	Form	CupEquivalentPrice
Asparagus	Frozen	2.6191
Artichoke	Fresh	2.5415
Asparagus	Fresh	2.3731
Okra	Fresh	2.3639
Asparagus	Canned	2.0958

Artichoke	Canned	2.0476
Spinach, boiled	Fresh	1.7700
Tomatoes, grape & cherry	Fresh	1.5950
Olives	Canned	1.5922
Corn	Fresh	1.5009
Broccoli heads	Fresh	1.3502
Turnip greens	Fresh	1.2467
Acorn squash	Fresh	1.1961
Avocados	Fresh	1.1538
Turnip greens	Frozen	1.1440
Spinach	Frozen	1.1010
Cauliflower florets	Fresh	1.0800
Mustard greens	Frozen	1.0756
Pumpkin	Canned	1.0069
Broccoli florets	Fresh	0.9965
Collard greens	Frozen	0.9699
Brussels sprouts	Fresh	0.9394
Okra	Frozen	0.9387
Kale	Fresh	0.9373
Kale	Frozen	0.9295
Brussels sprouts	Frozen	0.9237
Broccoli	Frozen	0.9090
Spinach	Canned	0.9039
Tomatoes, large round	Fresh	0.9006
Green beans	Fresh	0.8528
Lima beans	Canned	0.8525
Zucchini	Fresh	0.8437
Potatoes, french fries	Frozen	0.8374
Lima beans	Frozen	0.8336
Lettuce, romaine, hearts	Fresh	0.8082
Butternut squash	Fresh	0.8033
Green peas	Frozen	0.7889
Mixed vegetables, peas & carrots	Canned	0.7699
Collard greens	Fresh	0.7630
Blackeye peas	Canned	0.7590
Navy beans	Canned	0.7561
Collard greens	Canned	0.7452
Black beans	Canned	0.7352
Turnip greens	Canned	0.7138
Green peas	Canned	0.7119
Cauliflower	Frozen	0.7101
Cabbage, sauerkraut	Canned	0.7018
Mixed vegetables, broccoli, cauliflower, carrots	Frozen	0.6895
Great northern beans	Canned	0.6875
Mustard greens	Canned	0.6800
Cauliflower heads	Fresh	0.6743
Kidney beans	Canned	0.6652
Pinto beans	Canned	0.6641
Celery sticks	Fresh	0.6598
Beets	Canned	0.6591

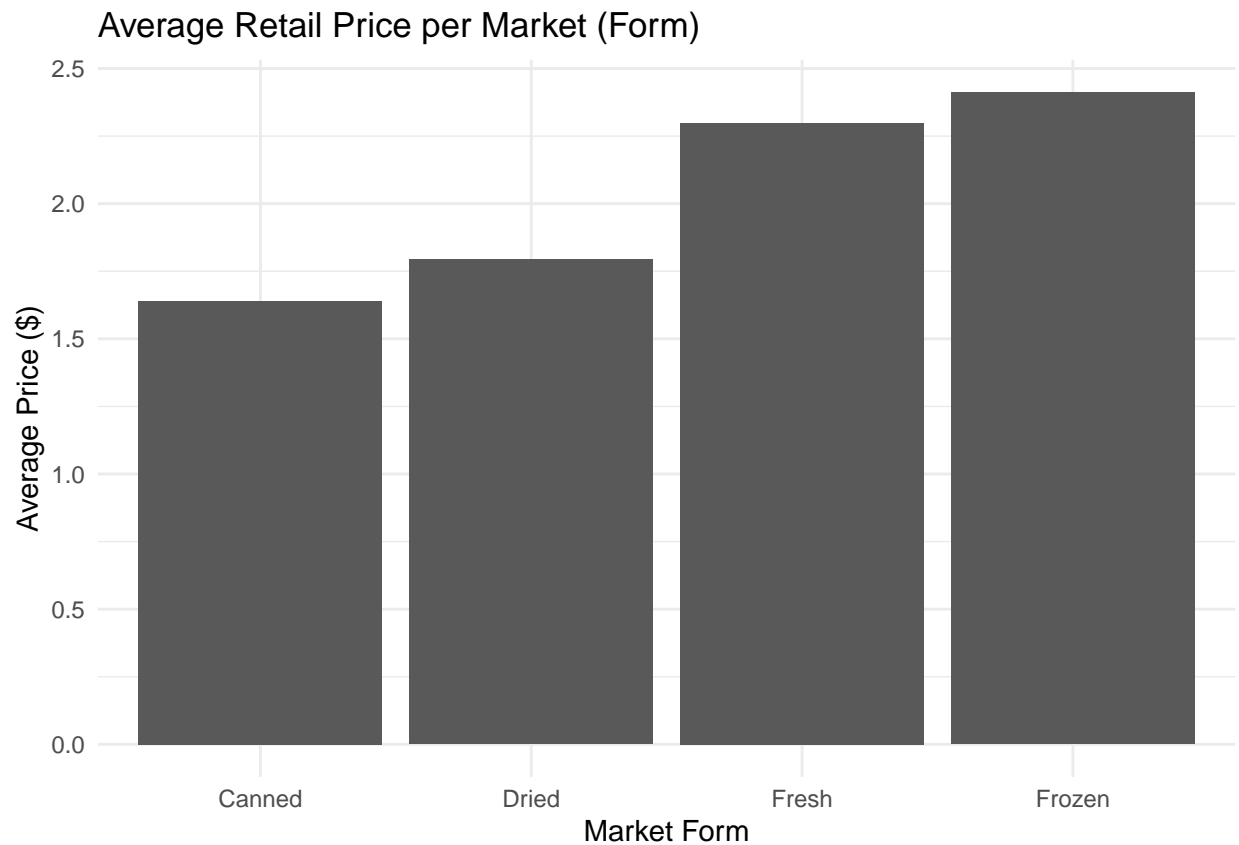
Green beans	Frozen	0.6586
Corn	Canned	0.6460
Corn	Frozen	0.6380
Spinach, eaten raw	Fresh	0.6360
Mixed vegetables, peas & carrots	Frozen	0.6315
Mushrooms, whole	Fresh	0.6194
Mixed vegetables, carrots, peas, corn, green beans	Frozen	0.6150
Mushrooms, sliced	Fresh	0.6053
Red peppers	Fresh	0.6047
Carrots	Canned	0.5892
Tomatoes	Canned	0.5787
Sweet potatoes	Fresh	0.5782
Carrots	Frozen	0.5636
Radish	Fresh	0.5550
Potatoes	Canned	0.5397
Cabbage, red	Fresh	0.5350
Green beans	Canned	0.5170
Lettuce, romaine, heads	Fresh	0.5141
Tomatoes, roma & plum	Fresh	0.5129
Green peppers	Fresh	0.4771
Cucumbers without peel	Fresh	0.4520
Onions	Fresh	0.4335
Celery, trimmed bunches	Fresh	0.4217
Carrots, cooked whole	Fresh	0.3825
Carrots, baby	Fresh	0.3722
Lima beans	Dried	0.3636
Cucumbers with peel	Fresh	0.3402
Cabbage, green	Fresh	0.3384
Lettuce, iceberg	Fresh	0.3194
Carrots, raw whole	Fresh	0.3022
Kidney beans	Dried	0.2996
Blackeye peas	Dried	0.2926
Lentils	Dried	0.2873
Great northern beans	Dried	0.2688
Potatoes	Fresh	0.2663
Navy beans	Dried	0.2511
Black beans	Dried	0.2383
Pinto beans	Dried	0.2215

Next was what is the most expensive and least expensive vegetable by form.

Most expensive: frozen vegetables Least expensive: canned vegetables

In addition to the most expensive and least expensive we also could see the average price per cup for each form was very close with a difference of less than \$1.00

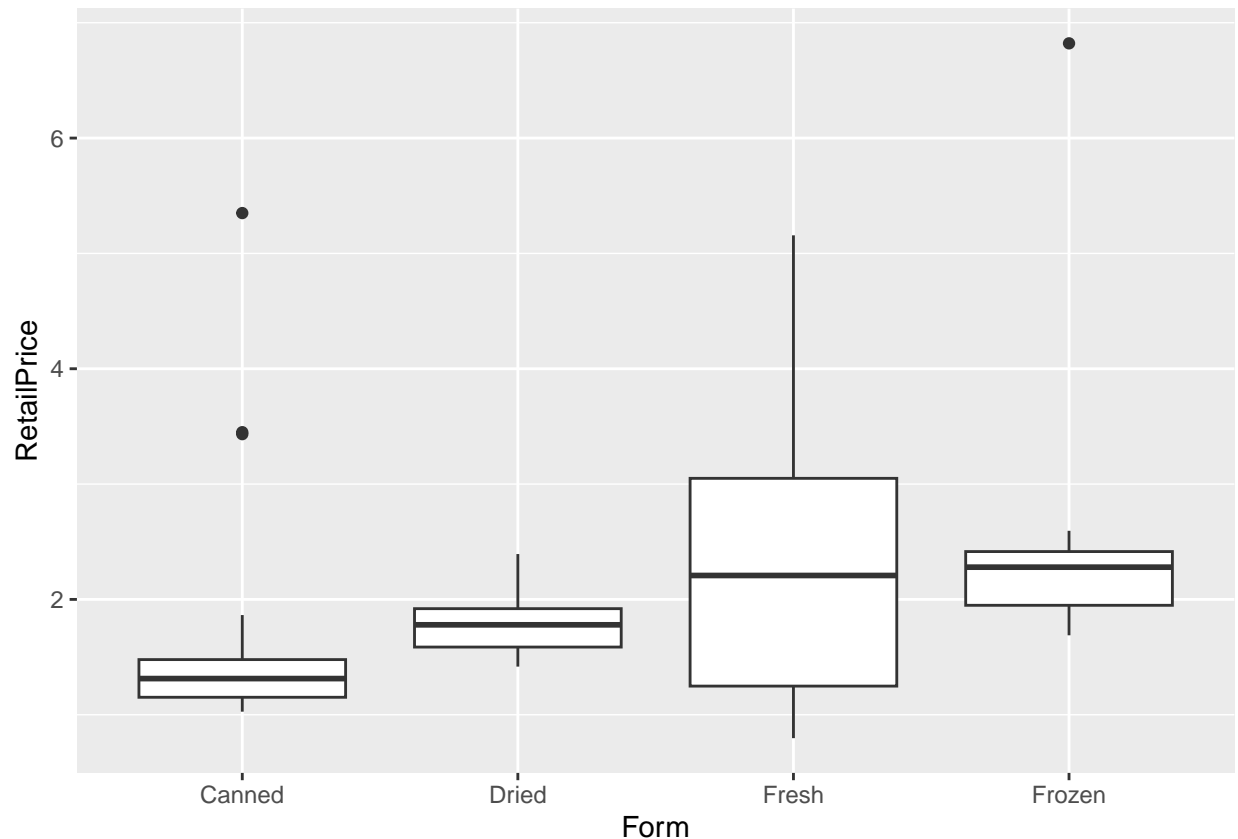
```
VegAveragePriceperForm <- VegetableData %>% group_by(Form) %>% summarise(AveragePrice = mean(RetailPrice))
VegAveragePriceperForm %>% ggplot(aes(x = Form, y = AveragePrice)) + geom_col() + labs(title = "Average Price per Form")
```



Then putting this data into a box plot allowed us to see why the average calculations for each vegetable was what it was.

Fresh vegetables showed a greater range in price per cup. Canned showed a smaller range but had a couple of outliers that had a higher average retail price.

```
VegetableData %>% ggplot(aes(x = Form, y = RetailPrice)) + geom_boxplot()
```



After showing the produce separately, we wanted to show the data together to compare and see if there were any differences in prices. This allowed us to see overall, fruit showed a higher average price per category compared to vegetables per cup. Which suggested a higher spending on price per cup when purchasing fruit compared to vegetables.

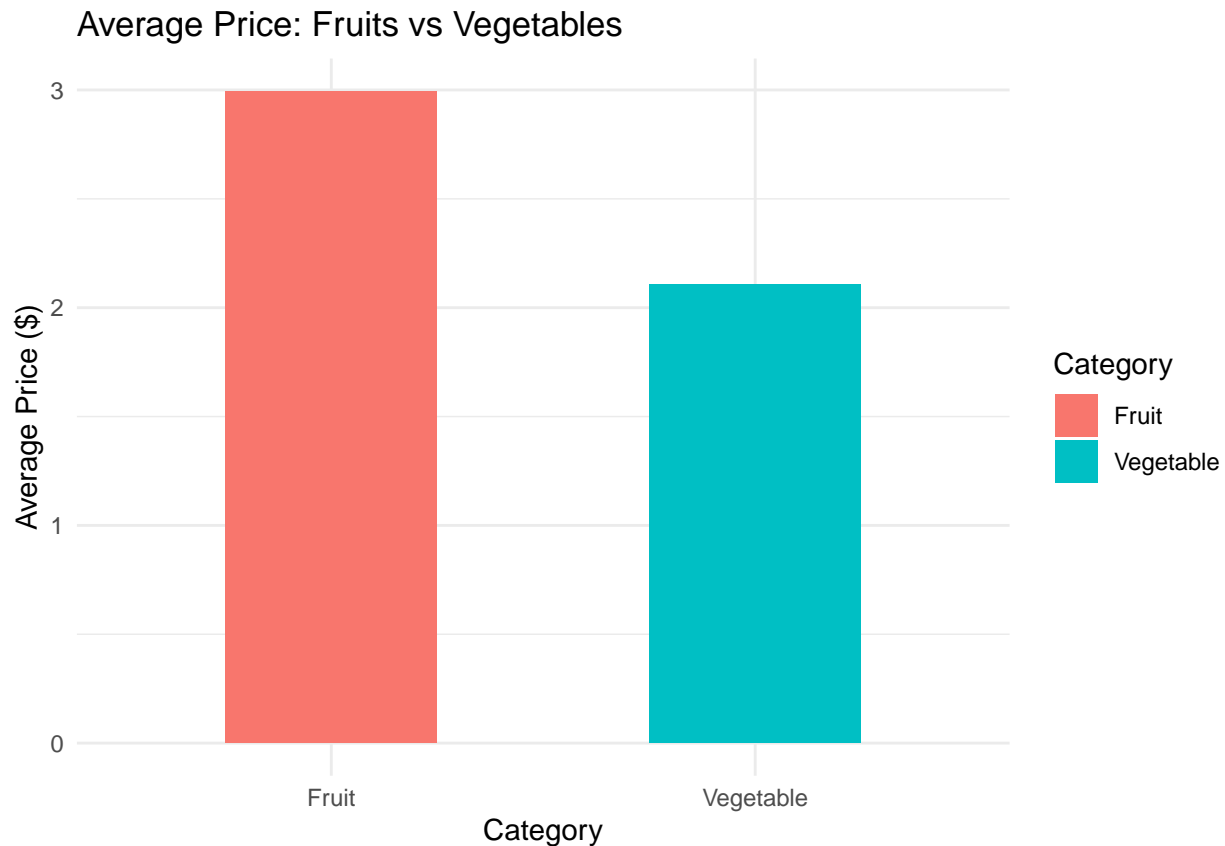
```
fruit_avg <- FruitData %>%
  summarize(AveragePrice = mean(RetailPrice)) %>%
  mutate(Category = "Fruit")

veg_avg <- VegetableData %>%
  summarize(AveragePrice = mean(RetailPrice)) %>%
  mutate(Category = "Vegetable")

compare_avg <- rbind(fruit_avg, veg_avg)

ggplot(compare_avg, aes(x = Category, y = AveragePrice, fill = Category)) +
  geom_bar(stat = "identity", width = 0.5) +
```

```
labs(title = "Average Price: Fruits vs Vegetables", x = "Category", y = "Average Price ($)") +
theme_minimal()
```



We wanted to take it a step further and compare the data's average price per form. This allow us to see:

Juice: Vegetables prices were not affected since data was not provided for vegetables in this specific form.
Frozen: About a \$2 difference in average price was shown between the categories. Fresh: The average price showed very little difference. Dried: Showed the largest difference in average price of almost \$5. Canned: Showed a relatively small difference.

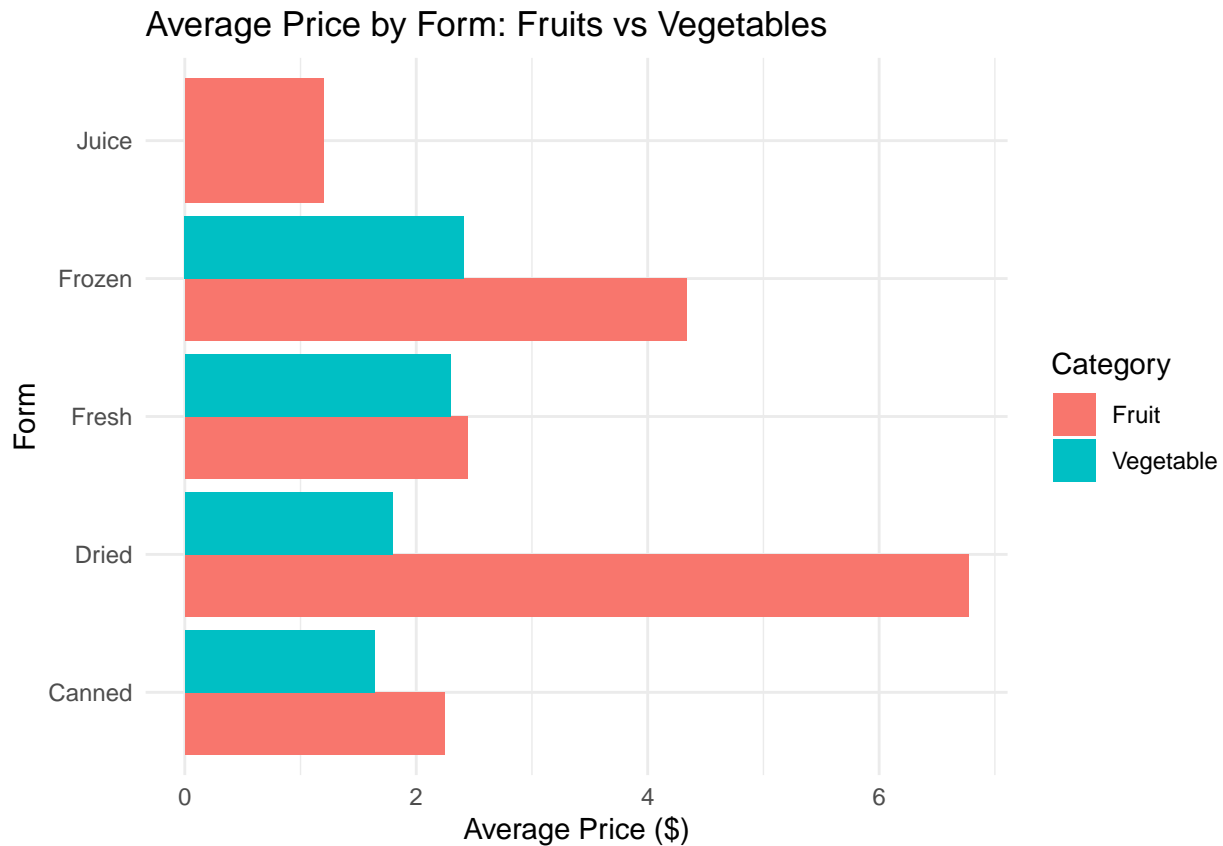
```
fruit_avg <- FruitData %>% group_by(Form) %>% summarize(AveragePrice = mean(RetailPrice))
veg_avg <- VegetableData %>% group_by(Form) %>% summarize(AveragePrice = mean(RetailPrice))

fruit_avg$Category <- "Fruit"
veg_avg$Category <- "Vegetable"

compare_avg <- rbind(fruit_avg, veg_avg)

ggplot(compare_avg, aes(x = Form, y = AveragePrice, fill = Category)) +
  geom_bar(stat = "identity", position = "dodge") +
  labs(title = "Average Price by Form: Fruits vs Vegetables", x = "Form", y = "Average Price ($)") +
  theme_minimal() +
```

```
coord_flip()
```



We didn't want to just show the data, we also wanted to show examples of how the numbers and costs could have been applied 3 years ago. This is when we mutated the data set to add in the price per 5 cups. This information lets us deal with a more realistic quantity.

```
FruitDataUnder5 <- FruitData %>% mutate(Priceper5cups = 5 * CupEquivalentPrice) %>% filter(Priceper5cups < 5)
VegetableDataUnder5 <- VegetableData %>% mutate(Priceper5cups = 5 * CupEquivalentPrice) %>% filter(Priceper5cups < 5)

FruitDataUnder3 <- FruitData %>% mutate(Priceper5cups = 5 * CupEquivalentPrice) %>% filter(Priceper5cups < 3)
VegetableDataUnder3 <- VegetableData %>% mutate(Priceper5cups = 5 * CupEquivalentPrice) %>% filter(Priceper5cups < 3)
```

We wanted to know what are the best choices for a tight budget? We looked at a meal option under \$10 and snack options under \$5. Each price is calculated based on a 5-cup quantity, which provides a clearer view of the actual cost to purchase a reasonable amount.

Meal Idea Under \$10: Lentil Stew

\$1.43 - Lentils

\$1.33 - Potatoes

\$1.51 - Carrots

\$2.16 - Onions

\$1.69 - Cabbage

\$1.19 - Black Beans

Total: \$9.31

Fruit Snack ideas under \$5:

\$1.21 Watermelon

\$1.54 Bananas

\$2.20 Pineapple

Total: \$4.95

This showed us we could purchase 9 different produce items times 5 cups each gives you 45 cups of produce all for less than \$15.00

We also wanted to see if it was possible for someone to buy 5 cups of produce on a \$3 budget, what combinations would work? So we created a scrolling table for fruit and one for vegetables that showed only the produce that was \$3.00 or less for 5 cups.

```
FruitDataUnder3 <- FruitData %>% mutate(Priceper5cups = 5 * CupEquivalentPrice) %>% filter(Priceper5cups <= 3)
VegetabledataUnder3 <- VegetableData %>% mutate(Priceper5cups = 5 * CupEquivalentPrice) %>% filter(Priceper5cups <= 3)
FruitDataUnder3 %>% select(Fruit, Form, Priceper5cups) %>% arrange(-Priceper5cups) %>% knitr::kable()
```

Fruit	Form	Priceper5cups
Grapefruit, ready-to-drink	Juice	2.9840
Cantaloupe	Fresh	2.7640
Oranges, ready-to-drink	Juice	2.6430
Grapes, ready-to-drink	Juice	2.6275
Apples	Fresh	2.4980
Pineapple	Fresh	2.2005
Apples, ready-to-drink	Juice	2.1745
Grapes, frozen concentrate	Juice	1.8810
Oranges, frozen concentrate	Juice	1.8345
Pineapple, frozen concentrate	Juice	1.8140
Bananas	Fresh	1.5425
Apples, frozen concentrate	Juice	1.5215
Watermelon	Fresh	1.2145

```
VegetabledataUnder3 %>% select(Vegetable, Form, Priceper5cups) %>% arrange(-Priceper5cups) %>% knitr::kable()
```

Vegetable	Form	Priceper5cups
Carrots	Canned	2.9460
Tomatoes	Canned	2.8935
Sweet potatoes	Fresh	2.8910
Carrots	Frozen	2.8180
Radish	Fresh	2.7750
Potatoes	Canned	2.6985
Cabbage, red	Fresh	2.6750
Green beans	Canned	2.5850
Lettuce, romaine, heads	Fresh	2.5705

Tomatoes, roma & plum	Fresh	2.5645
Green peppers	Fresh	2.3855
Cucumbers without peel	Fresh	2.2600
Onions	Fresh	2.1675
Celery, trimmed bunches	Fresh	2.1085
Carrots, cooked whole	Fresh	1.9125
Carrots, baby	Fresh	1.8610
Lima beans	Dried	1.8180
Cucumbers with peel	Fresh	1.7010
Cabbage, green	Fresh	1.6920
Lettuce, iceberg	Fresh	1.5970
Carrots, raw whole	Fresh	1.5110
Kidney beans	Dried	1.4980
Blackeye peas	Dried	1.4630
Lentils	Dried	1.4365
Great northern beans	Dried	1.3440
Potatoes	Fresh	1.3315
Navy beans	Dried	1.2555
Black beans	Dried	1.1915
Pinto beans	Dried	1.1075

Once we did this it allowed us to see there are only 13 fruit options and 29 vegetable options to fit this scenario. The most expensive vegetable was 5 cups of canned carrots at \$2.94 and the least expensive was 5 cups of dried pinto beans at \$1.10. The most expensive fruit was 5 cups of grapefruit juice at \$2.98 and the least expensive was 5 cups of fresh watermelon at \$1.21

One of the most interesting patterns from the 2022 data is how dried fruits had the highest average prices, despite being sold in smaller quantities.

This shows a key point: Price per unit does not always reflect volume, some of the most expensive items give you the least actual food.

This is an important reminder that when comparing prices, context matters, and “more expensive” does NOT always mean “better value.”