

# Comparing Apples to Applies

Bill Chung, Justin Trobec, Nobu Yamaguchi

October 19, 2020

## **We would like you to think about such questions as:**

**At a high level, how are you planning to execute the experiment? How will you divide up the data collection task among yourselves?**

**How detailed is your experimental design and procedure so far?**

**What parts of the protocol have you not fleshed out yet?**

**What aspects are you undecided about? Would you like advice on these?**

**What software (if any) needs to be written to execute the experiment? How far along are you on this?**

**On what questions would you like advice from the instructor?**

**Are you hoping for a grant to help cover expenses of the experiment? If so, make sure to send the instructor a one-page email detailing your grant amount request (up to \$500 per group)**

## **Experiment question:**

**Would placing apples in certain positions make them last longer at a room temperature?**

## **Background:**

Banana hangers are used to hang bananas to make them last longer by preventing bananas from bruising and decreasing the chance of exposing the banana flesh to oxygen. Another potential reason that banana hangers can keep bananas fresh for a longer period of time could be contributed to how bananas are kept in the natural position (i.e., how they used to be growing from the tree).

Devices like banana hangers can help bananas to stay fresh for a longer period of time at a room temperature, but there are no commercially available such devices for apples or oranges. I propose to test if placing apples and oranges in a certain position can last them longer at a room temperature.

Importance of the experiment Findings from this experiment have important business implications to apple and orange sellers whose objective is to keep their fruits fresh for a longer period without using any artificial preservatives. As it can be seen in the figure above, companies are already spending resources to keep their product to last longer. If we prove that just by placing apples and oranges in certain positions can keep them fresh longer, it has potential to significantly decrease their loss due to spoiled fruits.

## Description of the experiments

Each group member will buy 12 apples. Then, randomly place  $\frac{1}{2}$  of apples in (i) upside-up position and the other half in (ii) upside-down position. The treatment will be placing apples and oranges in different positions. Fruits will be placed at a room temperature. Pictures of each apple and orange will be taken after the sun goes down and will report the temperature and other weather conditions.

```
ima1_path <-"ApplePicture/fig/slide2.PNG"
img1 <- readPNG(ima1_path, native = TRUE, info = TRUE)
attr(img1,"info")
```

```
## $dim
## [1] 1280 720
##
## $bit.depth
## [1] 8
##
## $color.type
## [1] "RGB"
##
## $gamma
## [1] 0.45455
##
## $dpi
## [1] 95.9866 95.9866
```

```
#not sure why this function is not working
#include_graphics(img1_path)
```

To make the condition of fruits to be independent of each other, they will be kept apart from each other as much as possible and where kids can touch.

I intend to employ blocking to compare apples to apples and oranges to oranges.

## Outcome

The number of days that apples and oranges stay fresh. We will be taking pictures of apples and oranges on a daily basis and use CNN to detect any changes in the appearance and also to quantify the changes. The pictures will be posted on a website each day.

Secondary outcome measures you plan to collect? Identify if the fruits were organic or not. Temperature of the room

## Greatest risks to the experiment

Family members accidentally touching them or kids eating them.

## Picture of Apples from COSTCO



Figure 1: Treatment and control

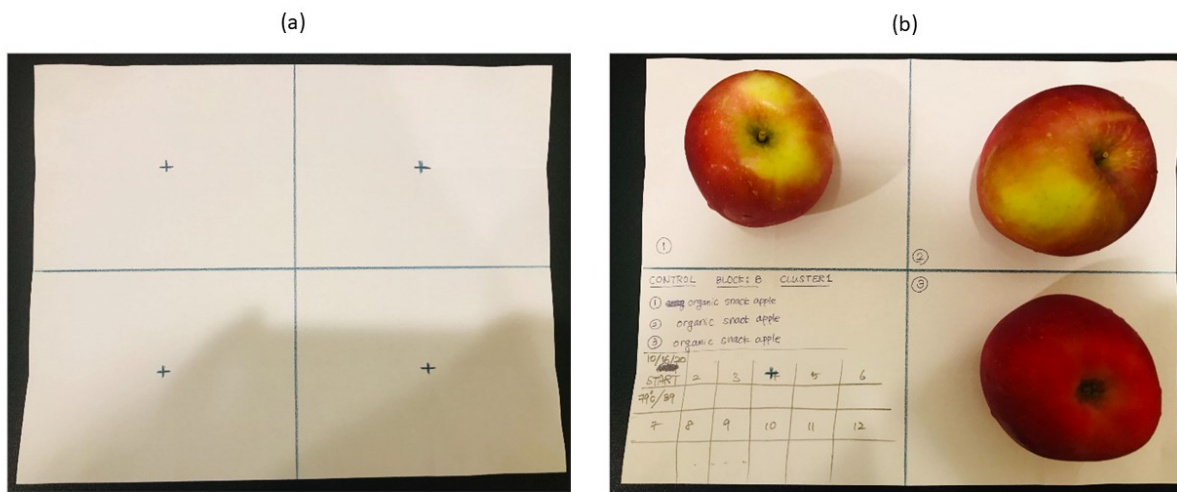


Figure 2: Treatment and control



Figure 3: Treatment and control

Lable	Type	Name	Price
a	Conventional	Honey Crisp	\$9.99
b	Organic	Envy Apples	\$9.99
c	Organic	Ambrosa	\$7.99
d	Organic	Fuju	\$9.99
e	Organic	Gala	\$8.99
f	Organic	Honey Crisp	\$12.99
g	Organic	Snack Fuji	\$4.99



Figure 4: Picture of Apples