## MISSION LOG

**Explore**

Collect data (in cm) to evaluate the performance of your astronaut.

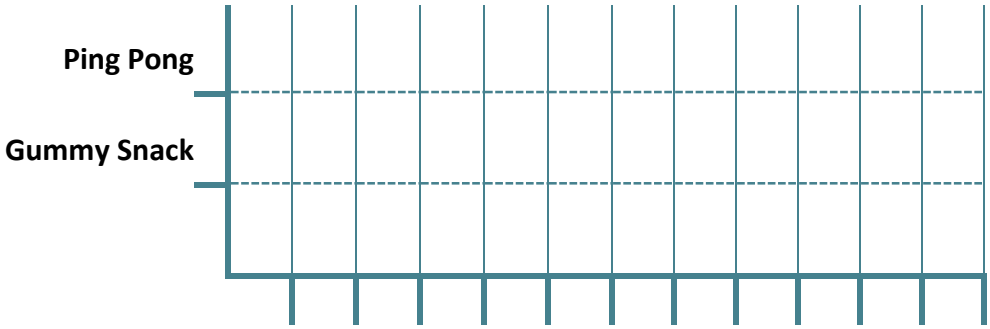
| | PING PONG | GUMMY SNACK |
|---|---|---|
| Launch Angle: 45°<br>Pull-back angle: 60° | **Landing distance (cm)** | **Landing distance (cm)** |
| **Trial 1** | | |
| **Trial 2** | | |
| **Trial 3** | | |
| **Trial 4** | | |
| **Trial 5** | | |
| **Trial 6** | | |
| **Trial 7** | | |
| **Trial 8** | | |
| **Trial 9** | | |
| **Trial 10** | | |

## Explain

Create a side-by-side comparative box plot for the landing distance of the ping pong ball and gummy snack.

**A.** Write the 5-number summary, IQR, the left and right fence, mean, and standard for the treatment.

| | Min | Q1 | Med | Q3 | Max | IQR | L-Fence | R-Fence |
|---|---|---|---|---|---|---|---|---|
| Ping Pong | | | | | | | | |
| Gummy Snack | | | | | | | | |




**B.** Write a few sentences comparing the shape, center, spread, and unusual features of the two plots. Be sure to use appropriate metrics for the center and spread.

**C.** Use an appropriate statistic(s) to describe which astronaut typically flies further.

**D.** Use an appropriate statistic(s) to describe which astronaut is the most consistent.

**E.** Which statistic would you consider the most important metric in evaluating the performance of our astronauts?

**F.** Which astronaut would you use?

**G.** What are the factors we can manipulate? At what levels?

**H.** What is our response variable?

## Extend

Collect bivariate data at different launch angles. You will need to hit a target ranging from 1 to 3.5 meters. Try 3 different launch angles to cover the range and create 3 models.

| | LAUNCH ANGLE | | LAUNCH ANGLE | | LAUNCH ANGLE | |
|---|---|---|---|---|---|---|
| | Pull-back Angle | Distance | Pull-back Angle | Distance | Pull-back Angle | Distance |
| Trial 1 | | | | | | |
| Trial 2 | | | | | | |
| Trial 3 | | | | | | |
| Trial 4 | | | | | | |
| Trial 5 | | | | | | |
| Trial 6 | | | | | | |
| Trial 7 | | | | | | |
| Trial 8 | | | | | | |
| Trial 9 | | | | | | |
| Trial 10 | | | | | | |
| Trial 11 | | | | | | |
| Trial 12 | | | | | | |
| Trial 13 | | | | | | |
| Trial 14 | | | | | | |
| Trial 15 | | | | | | |

## Evaluate

**A.** Aggregate your findings. What is your chosen regression model, what is the r-squared value of that model, and what are the launch settings that yield the most consistent results?

**B.** Record the number of attempts until your 1st success.

**C.** Record the Launch and Pull-back Angle that was successful.

**D.** Record the number of successes in 10 attempts by placing an X in 1 box for each success.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Successes** | | | | | | | | | | |